



Tti Testing Laboratories

OVER 30 YEARS OF EXCELLENCE IN QUALITY ASSURANCE



PPE TESTING • CE CERTIFICATION

PPE testing & CE certification

Gloves, garments and footwear, tested to EN standards for the CE mark.

Accredited testing of gloves, garments and footwear against 15 EN and EN ISO standards. Tti Labs tests, compiles the technical file and coordinates your Notified Body.



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www.ttilabs.net



FIRST IN PAKISTAN

Pakistan's first accredited chromium VI and TOF tests.

EN ISO 17075-2 by ion chromatography, in Tti Labs' CIC laboratory since 2025.

SINCE 1995

One laboratory, from first stitch to CE mark.

Tti Labs is Pakistan's one-stop solution for CE certification of personal protective equipment. We test gloves, garments and footwear against European standards.

For PPE exporters, certification is market access. Without the CE mark, PPE cannot be sold in Europe.

Standard turnaround is 3 days. Our Sialkot liaison office serves the city's leather, PPE and sports goods hub.

- ✓ ISO/IEC 17025 accredited testing laboratory, PNAC Lab 022
- ✓ ISO/IEC 17020 accredited inspection body, PNAC IB-006 (Tti Inspections Pvt Ltd)
- ✓ 544 accredited methods and 378 accredited parameters
- ✓ 600+ samples and 1,500+ tests a day
- ✓ 25,000 sq ft headquarters in Lahore; offices in Karachi, Faisalabad and Sialkot



Testing



Inspection



CE & UKCA



Chemical safety

PAKISTAN'S LARGEST LEATHER & PPE TESTING SCOPE

15 EN standards, one scope.

Tti Labs tests protective gloves, garments, impact protectors and footwear against 15 EN and EN ISO standards. Testing runs under ISO/IEC 17025.



Protective gloves

EN 388, EN 407, EN 12477, EN 13594, EN 511, EN 659



Protective garments

EN 17092, EN ISO 11611, EN ISO 11612, EN 469, EN ISO 20471, EN 17353



Impact protectors

EN 1621-1, -2 and -3: limb, back and chest



Footwear

EN 13634 motorcycle, EN ISO 20345 safety



Chemical safety

Chromium VI, pH, fat content, TOF and FTIR leather ID



Inspection & CE

PPI, DUPRO, FRI, loading and Notified Body coordination



Also tested: EN 455 surgical gloves, EN 13795 surgical gowns, EN 14683 and ASTM F2100 masks, and ANSI/ISEA 105 working gloves. Division 15, Surgical & Medical Devices, handles surgical PPE.



PROTECTIVE GLOVES • ISO/IEC 17025

Gloves: every digit of the performance code, tested.

Tti Labs tests gloves for mechanical, thermal and cold risks. Each accredited result maps to one digit of the glove's performance code.



EN 388:2016+A1:2018

Mechanical risks:
abrasion, cut, tear,
puncture



EN 407:2020

Thermal risks: flame, heat,
molten metal



EN 12477:2001+A1:2005

Welders' gloves, Type A
and Type B



EN 13594:2015

Motorcycle riders: Level 1,
Level 2, knuckle protection
KP



EN 511:2006

Cold: convective cold,
contact cold, water
penetration



EN 659:2003+A1:2008

Firefighters: heat, flame,
cut, whole-glove integrity

EN 388 · EN 407 · EN 12477

Gloves for cut, heat and molten metal.

EN 388 rates abrasion, cut, tear and puncture. EN 407 rates flame, heat and molten metal. EN 12477 draws on both for welders' gloves.

TEST	CLAUSE
EN 388:2016+A1:2018 · Mechanical risks	
Abrasion resistance	6.1
Blade cut resistance	6.2
Cut resistance, EN ISO 13997	6.3
Tear resistance	6.4
Puncture resistance	6.5
EN 407:2020 · Thermal risks	
Limited flame spread	6.2
Contact heat	6.3
Convective heat	6.4
Radiant heat	6.5
Small splashes of molten metal	6.6
Large quantities of molten metal	6.7
Tear resistance	6.8

TEST	CLAUSE
EN 12477:2001+A1:2005 · Welders' gloves	
TYPE A FOR HEAVY WELDING, TYPE B WHERE DEXTERITY MATTERS	
Abrasion	EN 388 6.1
Blade cut	EN 388 6.2
Tear	EN 388 6.4
Puncture	EN 388 6.5
Flame spread	EN 407 6.2
Contact heat	EN 407 6.3
Convective heat	EN 407 6.4
Molten metal splashes	EN 407 6.6
Dexterity	EN 420 / EN ISO 21420

**Abrasion**

EN 388 · 6.1

**Blade cut**

EN 388 · 6.2

**Contact heat**

EN 407 · 6.3

**Molten metal splashes**

EN 407 · 6.6

Tti Labs tests against the applicable standards and validated test methods.



EN 13594 • EN 511 • EN 659

Rider, cold and firefighter gloves.

EN 13594 covers motorcycle gloves, from impact abrasion to knuckle protection.

EN 511 covers convective cold, contact cold and water penetration. EN 659 covers firefighters' gloves, from heat to whole-glove integrity.

TEST	CLAUSE
EN 13594:2015 • Motorcycle riders	
LEVEL 1 AND LEVEL 2, KNUCKLE PROTECTION KP	
Innocuousness	4.2
Hard inclusions	4.3
Ergonomic requirements	4.4
Sizing and cuff length	4.5
Restraint	4.6
Tear strength	4.7
Seam strength	4.8
Cut resistance	4.9
Impact abrasion resistance	4.10
Impact protection of knuckles	4.11
EN 511:2006 • Protection against cold	
Mechanical requirements	4.1
Flexibility behaviour	4.2
Water penetration	4.3
Extreme cold flexibility	4.4
Convective cold	4.5
Contact cold	4.6

TEST	CLAUSE
EN 659:2003+A1:2008 • Firefighters' gloves	
Sizes	3.2
Abrasion	3.3
Cut	3.4
Tear	3.5
Puncture	3.6
Burning behaviour	3.7
Convective heat	3.8
Radiant heat	3.9
Contact heat	3.10
Heat resistance of lining	3.11
Heat shrinkage	3.12
Dexterity	3.13
Seam breaking strength	3.14
Time for removal	3.15
Water penetration	3.16
Whole glove integrity	3.17
Liquid chemical penetration	3.18

PROTECTIVE GARMENTS • ISO/IEC 17025

Garments: high visibility, flame and impact protection.

Tti Labs tests clothing that must stay visible, resist flame and hold together in a fall.

✓ EN 17092:2020

Motorcycle garments, Classes AAA, AA, A, B and C

✓ EN 1621-1, -2, -3

Impact protectors for limbs, back and chest, Level 1 and Level 2

✓ EN ISO 11611:2024

Welding clothing, Class 1 and Class 2

✓ EN ISO 11612:2015

Heat and flame clothing, codes A to F

✓ EN 469:2020

Firefighters' clothing, levels Xf, Xr, Y and Z

✓ EN ISO 20471:2013

High-visibility clothing, Classes 1, 2 and 3

✓ EN 17353:2020

Enhanced visibility clothing, Types A, B and AB

Accredited in 2025: motorcycle PPE, workwear, footwear and gloves





EN 17092 · EN 1621 · EN ISO 11611

Motorcycle and welding garments.

Tti Labs tests every garment as fabric, as seams and as the finished article, the way the standard requires.

TEST

CLAUSE

EN 17092:2020 · Motorcycle garments

CLASSES AAA, AA, A, B AND C

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

EN 1621 · Impact protectors

PART 1 LIMB (2012), PART 2 BACK (2014), PART 3 CHEST (2018); LEVEL 1 AND LEVEL 2

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

TEST

CLAUSE

EN ISO 11611:2024 · Welding and allied processes

CLASS 1 AND CLASS 2

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



Impact abrasion

EN 17092 · 4.3



Impact attenuation

EN 1621 · 5.4



Molten metal spatter

EN ISO 11611 · 6.8



Seam strength

EN ISO 11611 · 6.5

EN ISO 11612 • EN 469

Heat, flame and firefighter clothing.

EN ISO 11612 rates heat and flame protection with codes A to F.
EN 469 sets levels Xf, Xr, Y and Z for firefighters' clothing.



TEST	CLAUSE
EN ISO 11612:2015 • Heat and flame	
PERFORMANCE CODES A TO F	
Size and fit	4.2
Heat resistance	6.2
Limited flame spread	6.3
Dimensional change	6.4
Tensile strength	6.5.1
Tear strength	6.5.2
Burst strength	6.5.3
Seam strength	6.5.4
Convective heat (B)	7.2
Radiant heat (C)	7.3
Molten aluminium splash (D)	7.4
Molten iron splash (E)	7.5
Contact heat (F)	7.6

TEST	CLAUSE
EN 469:2020 • Firefighters' clothing	
LEVELS XF, XR, Y AND Z	
Design requirements	4.3
Flame spread	6.2.1.1
Contact heat	6.2.1.2
Heat transfer, flame	6.2.1.3
Heat transfer, radiation	6.2.1.4
Heat resistance	6.2.1.6
Heat resistance, materials	6.2.1.7
Liquid chemical penetration	6.2.2
Tensile strength	6.2.3.1
Tear strength	6.2.3.2
Water penetration (Y1/Y2)	6.2.4
Dimensional change	6.2.5
Water vapour resistance (Z1/Z2)	6.3.1



Water penetration

EN 469 • 6.2.4



Liquid chemical penetration

EN 469 • 6.2.2



Heat resistance

EN ISO 11612 • 6.2



Water vapour resistance

EN 469 • 6.3.1

EN ISO 11612 • PERFORMANCE CODES

What the six heat codes, A to F, mean.

EN ISO 11612 gives each heat and flame hazard its own letter. For codes B to F, the number after the letter is the performance level. A1 and A2 name the two flame-spread procedures, surface and edge ignition. Tti Labs' Workwear & Protective Clothing Lab has tested welding apparel since 2022.



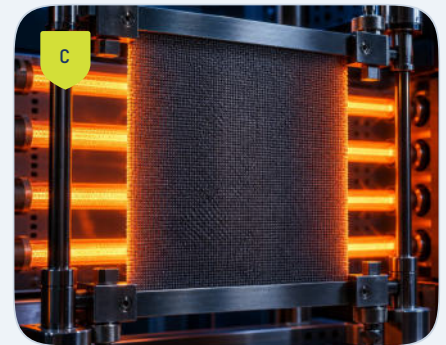
Limited flame spread

Code A1 / A2



Convective heat

Code B1 to B3



Radiant heat

Code C1 to C4



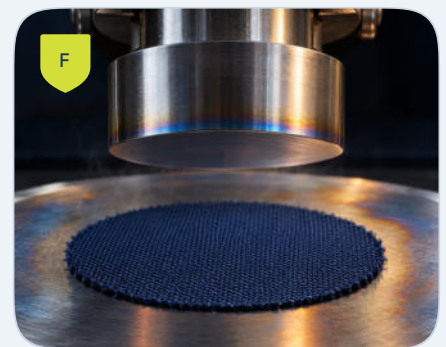
Molten aluminium splash

Code D1 to D3



Molten iron splash

Code E1 to E3



Contact heat

Code F1 to F3



Welding clothing: EN ISO 11611 Class 1 or Class 2.

Firefighters' clothing: EN 469 Xf, Xr, Y and Z, Level 1 or 2.

Gloves: EN 407 contact heat Level 1 to 4 (100 to 500 °C), and small splashes and large quantities of molten metal.



EN ISO 20471 • EN 17353 • ANSI/ISEA 107

High-visibility clothing, tested new and after washing.

EN ISO 20471 covers high-risk work, in Classes 1, 2 and 3. EN 17353 covers medium-risk situations. Tti Labs measures retroreflective performance new and after the washes the label promises.

TEST	CLAUSE
EN ISO 20471:2013 • High-visibility clothing	
Design	4.2
Sizing	4.3
Colour, new material	5.1
Colour after xenon test	5.2
Colour fastness	5.3
Dimensional change	5.4
Tensile strength	5.5.1
Bursting strength	5.5.2
Coated materials	5.5.3
Water vapour and thermal resistance	5.6
Retroreflective performance, new	6.1
Retroreflective performance, after testing	6.2

EN 17353:2020 • Enhanced visibility, medium risk

TYPE	AT RISK OF NOT BEING SEEN	VISIBILITY MATERIAL
A	In daylight only	Fluorescent
B	In the dark only (B1 free-hanging, B2 limbs, B3 torso)	Retroreflective
AB	In daylight, twilight and darkness	Fluorescent and retroreflective

 US market: ANSI/ISEA 107 high-visibility apparel.

FOOTWEAR • ISO/IEC 17025

Footwear, tested from the upper to the outsole.

Tti Labs tests motorcycle boots to EN 13634:2017 and safety footwear to EN ISO 20345 (ISO 20345:2021/Amd 1:2024). Its Footwear & Protective Equipment Testing Lab opened in 2016.



Innocuousness

pH value, azo colourants, chromium VI



Protective performance

Toecap impact and compression, corrosion resistance, thermal and chemical resistance, protective dimensions and design



Design & ergonomics

Upper height, dimensions and design, construction assessment, material integrity, specific ergonomics



Whole footwear performance

Slip resistance, leak proofness, electrical resistance, thermal properties, energy absorption, whole shoe flexing



Mechanical properties

Seam, tear, puncture, bond and tensile strength



Material durability

Hydrolysis, flexing and abrasion resistance





EN 13634:2017 • MOTORCYCLE FOOTWEAR

Motorcycle boots: every EN 13634 clause.

EN 13634:2017 takes a motorcycle boot apart layer by layer. Tti Labs tests every listed clause, from the upper to the insole.

TEST	CLAUSE
Upper	
Height of upper	4.2.1
pH value	4.4.1
Chromium VI	4.4.2
Colour fastness	4.4.3
Impact abrasion	4.4.4
Impact cut	4.4.5
Lining	
Tear strength	4.5.2
Abrasion	4.5.3
Water vapour	4.5.4
pH value	4.5.5
Chromium VI	4.5.6

TEST	CLAUSE
Outsole	
Thickness	4.6.1
Tear strength	4.6.2
Abrasion	4.6.3
Flex resistance	4.6.4
Insole & construction	
Bond strength	4.3.1
Innocuousness	4.3.2
Ergonomics	4.7
Transverse rigidity	4.8
Insole construction	4.9
Insole and insock	4.10

**Impact cut**

EN 13634 • 4.4.5

**Transverse rigidity**

EN 13634 • 4.8

**Outsole flex resistance**

EN 13634 • 4.6.4

**Bond strength**

EN 13634 • 4.3.1

EN ISO 20345 • SAFETY FOOTWEAR

26 tests for a safety boot.

Tti Labs tests safety footwear materials, components and construction to EN ISO 20345 (ISO 20345:2021/Amd 1:2024). Methods follow ISO 20344:2021/Amd 1:2024 and the standards it cites.



TEST	METHOD
pH value	ISO 20344 / ISO 4045
Chromium VI content	ISO 17075-1 / 17075-2
Azo colourants	ISO 14362-1 / ISO 17234-1
Height of upper	ISO 20344
Toecap impact resistance	ISO 20344
Tear strength: upper, lining, outsole	ISO 3377-2 / ISO 4674-1 B / ISO 34-1
Tensile strength, upper	ISO 3376
Thickness, upper	ISO 20344
Flexing resistance, outsole	ISO 17707
Bond strength, upper/outsole	ISO 20344
Bond strength, sole interlayer	ISO 20344
Abrasion, insocks and lining	ISO 20344
Outsole dimensions: cleated area, cleat height, thickness	ISO 20344

TEST	METHOD
Abrasion, outsole	ISO 4649
Antistatic footwear	ISO 20344
Heel area	ISO 20344
Internal toecap length and dimensions	ISO 20344
Corrosion resistance	ISO 22775
Specific ergonomics	ISO 20344
Footwear/insole construction	ISO 20344
Slip resistance	ISO 13287
Water absorption and desorption, insole/insock	ISO 20344
Resistance to fuel oil, outsole	ISO 20344
Hydrolysis, PU-based material	ISO 5423, Annex C
Dynamic water penetration	ISO 20344
Insole abrasion	ISO 20344



Toecap impact
ISO 20344



Slip resistance
ISO 13287



Outsole abrasion
ISO 4649



Dynamic water penetration
ISO 20344

ISO 20344 means ISO 20344:2021/Amd 1:2024. EN ISO 20345 safety footwear has a 200 J toecap. EN ISO 20346 protective footwear has a 100 J toecap.

LEATHER SAFETY • FIRST IN PAKISTAN

First in Pakistan for chromium VI and TOF.

Since 2025, Tti Labs' CIC laboratory has run Pakistan's first accredited tests for chromium VI (Cr VI) and total organic fluorine (TOF).

EN ISO 17075-2 measures Cr VI in leather by ion chromatography. Cr VI can form when chrome-tanned leather ages under heat and light.

INNOCUOUSNESS TESTING MATTERS FOR

- ✓ Motorcycle gloves, EN 13594
- ✓ Motorcycle garments, EN 17092
- ✓ Impact protectors, EN 1621
- ✓ Motorcycle footwear, EN 13634 (4.4.2, 4.5.6)
- ✓ Welding leathers, EN ISO 11611

WHY SCREEN

- ✓ Cr VI is a skin sensitiser, restricted in leather under EU REACH
- ✓ TOF flags fluorinated finishes before targeted PFAS tests
- ✓ Screening reduces the risk of rejection, recall and penalties

Also

pH value of leather

Fat content of welding leathers

Genuine leather by FTIR

Heavy metals





REGULATION (EU) 2016/425

Seven steps from sample to CE mark.

Under Regulation (EU) 2016/425, PPE reaches the EU market only with the CE mark. Tti Labs guides you through every step and coordinates the Notified Body.

01

Standards identification

Product, market and risk mapped to EN standards.

02

Accredited testing

Tested under ISO/IEC 17025, PNAC Lab 022.

03

Technical file

Reports, risk assessment and user information.

04

Notified Body coordination

Intertek, CIMAC or SATRA.

05

EU type-examination

Module B certificate, issued by the Notified Body.

06

CE marking

Declaration of conformity, CE or UKCA.

07

Annual renewal

Surveillance and retesting as standards change.

CATEGORY	RISK	CONFORMITY ROUTE	EXAMPLE
I • Simple	Minimal risks	Module A self-declaration	–
II • Intermediate	Risks not in Category I or III	Module B + C	EN 388 gloves, high-visibility clothing, motorcycle wear
III • Complex	Mortal or irreversible risk	Module B + C2 or D	Firefighter PPE



Tti Labs tests, compiles the technical file and coordinates your Notified Body. The Notified Body issues the EU type-examination certificate.

Markets: CE for the EU, UKCA for Great Britain.



ISO/IEC 17020 • PNAC IB-006

Every shipment, checked against the certified type.

Tti Labs inspects gloves, garments and footwear against EN standards and buyer specifications. Reports flag risks and compliance gaps before shipment.



Pre-production (PPI)

Leather, fabric and the approved sample



During production (DUPRO)

In-line quality control during manufacturing



Final random (FRI)

Pre-shipment inspection to AQL standards



Loading supervision (LS)

Count, condition and container sealing

ANSI/ASQ Z1.4-2008 • GENERAL LEVEL II

AQL sampling and every CE marking, checked.

From incoming leather to the sealed container, Tti Labs' reports show buyers that production matches the certified type.

AQL SAMPLING	VALUE
Sampling plan	ANSI/ASQ Z1.4-2008
Inspection level	General Level II
Critical defects	AQL 0
Major defects	AQL 2.5
Minor defects	AQL 4.0

CE label & documentation checks

Markings and documents the regulation and standards require, checked.

- ✓ CE mark, with the Notified Body number for Category III
- ✓ Manufacturer name and address
- ✓ EN standard, pictogram and performance code
- ✓ Size and model identification
- ✓ User information leaflet
- ✓ EU declaration of conformity



CE label check

Markings verified on the product



Loading supervision

Count, condition and container sealing



Tti Labs offers PPE inspection checklists, guidance on CE marking and structured support from the first production run.

SIALKOT · SINCE 2012

Laboratories built for PPE since 2012.

2012 CPC Laboratories Sialkot, with PGMEA

2014 MTS partnership and UL technical cooperation

2016 Footwear & Protective Equipment Testing Lab

2020 Medical & Biocompatibility Lab

2022 Workwear and protective clothing facilities: welding apparel, motorcycle protective equipment

2025 CIC laboratory: Pakistan's first accredited chromium VI and TOF tests

2025 Accredited scope for motorcycle PPE, workwear, footwear and gloves



Sialkot liaison office: Opposite Mag Town Masjid, Kashmir Road, Sialkot-51310 · (052) 3573367. It is the only private TIC liaison office in Sialkot.

WORK WITH US

01

Customer portal

Submit requisitions, track samples and retrieve reports online.

etrnf.tttilabs.net

02

Turnaround

Standard turnaround of 3 days, with 600+ samples tested a day.

ppe@tttilabs.net

03

Accredited testing

EN and EN ISO methods under ISO/IEC 17025.

PNAC Lab 022

04

CE support

Technical file and Notified Body coordination: Intertek, CIMAC or SATRA.

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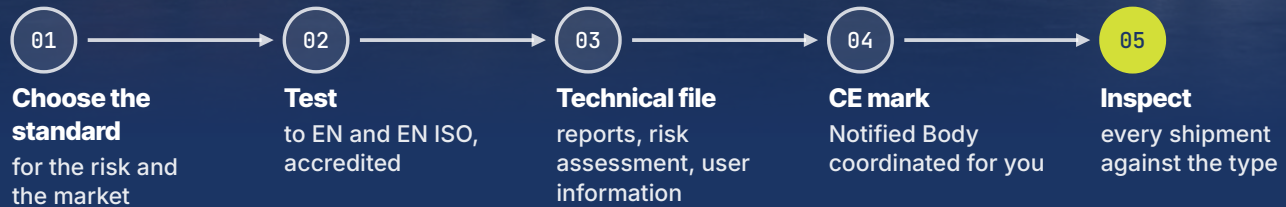
Markets: CE (EU) · UKCA (Great Britain) · ANSI/ISEA 105 and 107 (US)



Tti Testing Laboratories



From first stitch to **CE mark**.



ISO/IEC 17025 Accredited

ISO/IEC 17020 Inspection

CE & UKCA support

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