



Tti Testing Laboratories

OVER 30 YEARS OF EXCELLENCE IN QUALITY ASSURANCE



DIVISION 17 • METALS / MATERIALS

Metals & materials **testing**

Confidence, Verified.

Tti Labs tests metal accessories for nickel release and total lead. ICP-OES, ICP-MS and AAS measure 22 elements under ISO/IEC 17025 accreditation.



01 About Tti Labs

02 Elements in scope

03 Nickel release

04 Lead in children's products

05 Alloys & the CPSC

06 Metal in materials

07 Chromium (VI) & organotins

08 Which test, which part

11786 001

www.ttilabs.net



U.S. CPSC ACCEPTED

Pakistan's first U.S. CPSC Accepted Testing Laboratory.

CPSC Lab ID 1168. Lead 2009 · flammability 2010 · phthalates 2018.

DIVISION 17 · METALS / MATERIALS

Three categories, one metals division.

Tti Labs operates across 17 product divisions. Each division has its own team, instruments and specialised standards.

One of the most common questions Tti Labs receives is: do you test this? The answer, in almost every case, is yes.

- **Metal accessories:** nickel release and total lead in metal parts. See 03 · 04.
- **Alloys:** lead rulings on stainless steel and precious metals. See 05.
- **Materials:** metals measured in textiles, leather, plastics, toys, chemicals, food and water. See 02 · 06 · 07.

- ISO/IEC 17025 accredited testing laboratory, PNAC LAB 022
- ISO/IEC 17020 accredited inspection body, PNAC IB-006 (Tti Inspections Pvt Ltd)
- U.S. CPSC Accepted Conformity Assessment Body, Lab ID 1168
- PSQCA Approved · OGRA Approved · EPA Certified
- In service since 1995, from a 25,000 sq ft headquarters in Lahore
- Offices in Lahore, Karachi, Faisalabad and Sialkot



Nickel
release



Total lead



Multi-
element



Inspection

544

ACCREDITED
METHODS

378

ACCREDITED
PARAMETERS

600⁺

SAMPLES A DAY

1,500⁺

TESTS A DAY

3-day

TURNAROUND

1,500⁺

GLOBAL BRANDS

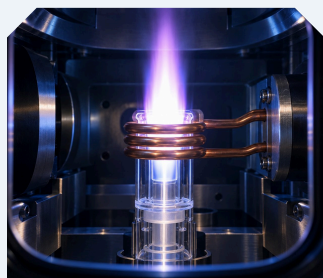
PNAC LAB 022 • ACCREDITED ELEMENTS

22 elements named in one accredited scope.

PNAC LAB 022 names, row by row, the elements Tti Labs is accredited to determine. The table lights each one. The rows and their methods follow overleaf.

[illegible]

FOUR INSTRUMENTS MEASURE THEM



ICP-OES

Installed 2018-19

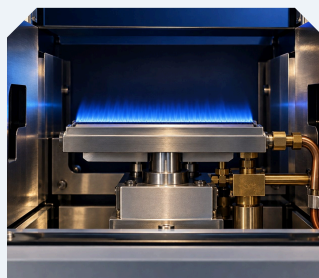
Multi-element, simultaneous detection. Heavy metals in textiles, leather, food, pharma, water and soil.



ICP-MS

New 2025

Ultra-trace heavy metal detection, with ppb and ppt sensitivity.



AAS

Atomic absorption

Cost-effective trace element measurement. Heavy metals in textiles, leather, water and food.



IC / CIC

Ion chromatography

Chromium (VI) to EN ISO 17075-2, free of interference. See 07.

Elements as named in PNAC LAB 022 Rev. 09 (3 Aug 2026), pp. 6, 10, 13-16, 19. Chromium in the product row is chromium (VI). Outline cells: not named in the scope. Instruments, years and uses: Tti Labs Magazine v2.



PNAC LAB 022 • ROWS AND METHODS

Each accredited row has its own method.

LAB 022 groups the elements by matrix: water, sludge, waste water, chemicals, food, feed and pharma. Read across a row to see which elements it names.

ROW • METHOD ON LAB 022	N	B	Na	Mg	P	K	Ca	Cr	Mn	Fe	Co	Ni	Cu	Zn	As	Se	Ag	Cd	Sn	Sb	Ba	Hg	Pb
Heavy metals • water APHA 3030, 3111, 3120 • EPA 6010C ICP, FAAS	16																						
Total heavy metals • sludge EPA 3050 B • USEPA 200.8 • EPA 6020 A Tti/WTL/SOP-039	14																						
Total heavy metals • waste water EPA 3050 B • USEPA 200.8 • EPA 6020 A Tti/WTL/SOP-039	16																						
Total heavy metals • chemicals (ZDHC) Tti/INORG/SOP-008a • acid digestion ICP / AAS	14																						
Elemental content • food, feed AOAC 999.10, 975.03, 985.01, 984.27 Tti/Inorg/SOP-013	10																						
Minerals • water, food Water: APHA 3030, 3111, 3120 • EPA 6010C Food: AOAC 975.03, 984.27 • Tti/INORG/SOP-20	4																						
Iron, sodium • pharma USP Monograph • AAS	2																						
Own product tests • see 03, 04, 06, 07 Ni release • total Pb • Cd extractability Cr (VI)	4																						

Navy cell: the row names the element. Lime cell: the element also has its own product test. N: elements in the row. Methods and techniques as printed in PNAC LAB 022 Rev. 09 (3 Aug 2026), pp. 6, 10, 13-16, 19.

EU REACH · ANNEX XVII, ENTRY 27

Nickel is limited by release, not content.

Entry 27 governs release rather than content, because the risk is skin sensitisation from a metal surface.

0.2 $\mu\text{g}/\text{cm}^2/\text{week}$

Pierced parts. Post assemblies inserted into pierced ears and other pierced parts of the body. Release must be less than 0.2.

0.5 $\mu\text{g}/\text{cm}^2/\text{week}$

Prolonged skin contact. The skin-contact parts of articles intended for direct and prolonged contact with the skin. Release must not be greater than 0.5.

2 years

coated articles

Coated articles. A non-nickel coating must keep release at or below 0.5 for at least two years of normal use.

EXAMPLES NAMED IN ENTRY 27, POINT 1(B)

- earrings
- necklaces, bracelets and chains, anklets, finger rings
- wrist-watch cases, watch straps and tighteners
- rivet buttons, tighteners, rivets, zippers and metal marks, when these are used in garments

On a pair of jeans, the exposure sits in the rivets, buttons and zip pulls.

BS EN 1811:2023

Nickel release · Tti Labs' accredited method, PNAC LAB 022, product row Textile Accessories. It replaces EN 1811:2011+A1:2015.

A common reason REACH files fail: **nickel reported as total content when entry 27 asks for release.**



ONE PART, TWO QUESTIONS

**A · CONTENT**

A, content: how much nickel the whole part contains, by weight.

**B · RELEASE**

B, release: how much nickel leaves the skin-contact surface, per cm^2 and per week. Entry 27 limits this.

Illustration, not to scale. Lime line: a non-nickel coating; pale band: skin contact.



U.S. CPSIA • CHILDREN'S PRODUCTS

100 ppm lead, in every part a child can reach.

The CPSIA defines a children's product as a consumer product designed or intended primarily for children 12 years of age or younger. The limit is total lead content by weight, for any part of the product.

THE LEAD LIMIT, STEPPED DOWN

BAR LENGTH TO SCALE



"Paint, coatings or electroplating may not be considered a barrier that would make the lead content of a product inaccessible to a child." 16 CFR 1500.91(a)

ACCREDITED LEAD METHODS • PNAC LAB 022, PRODUCT ROW TEXTILE ACCESSORIES

TEST

METHOD

Total lead, children's metal products (including jewelry)	CPSC-CH-E1001-08.3 • acid digestion • ICP-OES / AAS
Total lead, children's non-metal products	CPSC-CH-E1002-08.3 • acid digestion • ICP-OES / FAAS
Lead in paint & painted / surface coatings	CPSC-CH-E1003-09.1 • 16 CFR 1303 • ICP / FAAS



Can a child reach it? Parts a child cannot reach are exempt from the lead limits. The accessibility tests follow overleaf.

CPSC Lab ID 1168

Consumer Product Safety Improvement Act, Public Law 110-314, s. 101 and s. 235; eCFR 16 CFR 1303.1 and 1500.91, read 1 Oct 2026. Dates as printed in 16 CFR 1500.91(a). Exclusions apply. Summary, not legal advice.

U.S. CPSIA • 16 CFR 1500.87

Can a child reach it?

The lead limits apply to the parts a child can reach. CPSIA s. 101(b)(2) exempts parts that are not accessible to a child.

01

Probe the part.

Under 16 CFR 1500.87(d), the accessibility probes of the sharp point and sharp edge tests (16 CFR 1500.48 and 1500.49) decide whether a lead-containing part is accessible.

02

Then use and abuse it.

16 CFR 1500.87(e)–(h) also judge accessibility after foreseeable use. They apply the use-and-abuse tests of 16 CFR 1500.50 with 1500.51, 1500.52 or 1500.53, by age group.

PHYSICAL TESTS ON THE ACCREDITED SCOPE

TEST	METHOD
Sharp point	16 CFR 1500.48
Sharp edge	16 CFR 1500.49
Torque test	16 CFR 1500.50, 51, 53 ASTM F 963-2023
Tension test	16 CFR 1500.50, 51, 53 ASTM F 963-2023
Small parts cylinder	16 CFR 1501

LAB 022 row "Textile Accessories (Toys, etc.)" lists the five tests and their methods as one block. The pairs above follow the CFR section titles.

CPSC Lab ID 1168

ISO/IEC 17025 • PNAC LAB 022

CPSIA, Public Law 110-314, s. 101(b)(2); eCFR 16 CFR 1500.87, read 13 Oct 2026; PNAC LAB 022 Rev. 09 (3 Aug 2026), p. 7. Summary, not legal advice.





U.S. 16 CFR 1500.91(e)

A CPSC determination covers ten metals and alloys.

These do not exceed the CPSIA lead limits, provided that no lead or lead-containing metal is intentionally added.

Au

79

Gold, at least 10 karat

Ag

47

Sterling silver, at least 925/1000

Pt

78

Platinum

Pd

46

Palladium

Rh

45

Rhodium

Os

76

Osmium

Ir

77

Iridium

Ru

44

Ruthenium

Ti

22

Titanium

Stainless steel

UNS S13800–S66286 · surgical steel and other stainless steel · not including 303Pb (UNS S30360)

NOT COVERED BY THE DETERMINATION

The non-steel or non-precious metal components of a product, such as **solder or base metals in electroplate, clad or fill applications**. For these parts, Tti Labs' accredited method is CPSC-CH-E1001-08.3.

WHEN THE MATERIAL CHANGES

If a change or alteration takes a material or product over the lead limit, the determination no longer relieves it.

16 CFR 1500.91(c), paraphrased.

THE SAME RULE, 1500.91(d): MATERIALS NOT TREATED OR ADULTERATED WITH LEAD

- Precious gemstones: diamond, ruby, sapphire, emerald
- Semiprecious gemstones and other minerals*
- Natural or cultured pearls
- Wood
- Paper and similar cellulosic materials
- CMYK process printing inks*
- Textiles: natural and manufactured fibers*
- Other plant- and animal-derived materials

eCFR 16 CFR 1500.91, read 1 Oct 2026; wording quoted or closely paraphrased. * Exclusions and conditions in the rule apply. Summary, not legal advice.

Metals measured in seven materials.

Accredited methods also measure metals inside the materials a metal part meets: textiles, leather, plastics, toys, chemicals, food and water.

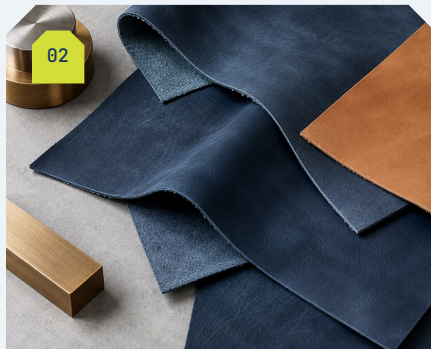


01

Textiles

Total metal content, acid digestion · DIN/BS/EN 16711-1:2016

Extractable metals, artificial perspiration · DIN/BS/EN 16711-2:2016



02

Leather

Extractable metals (ICP, FAAS) · ISO 17072-1:2019

Total metals, digestion (ICP, FAAS) · ISO 17072-2:2022

Chromium (VI), chromic oxide, organotins · see 07



03

Plastics & plastisol prints

Cadmium extractability, wet decomposition · BS EN 1122:2001

The same row covers plastic-coated textiles.



04

Toys

Migration of certain elements · EN 71-3:2019+A2:2024

The standard lists 19 elements.



05

Chemicals & water (ZDHC)

Total heavy metals in chemicals, 14 elements · Tti/INORG/SOP-008a (ICP/AAS)

Heavy metals in water, 16 elements · APHA 3030, 3111, 3120 · EPA 6010C

Sludge and waste water · see 02



06

Food & feed

Elemental content, 10 elements · AOAC 999.10, 975.03, 985.01, 984.27

Minerals Na, K, Ca, Mg · AOAC 975.03, 984.27

METAL PARTS IN OTHER TTI LABS DIVISIONS



Division 01 · Garment accessories

Trims · Labels · Zippers · Buttons. LAB 022 row Textile Accessories: nickel release and total lead (03, 04).



Division 15 · Surgical instruments

Curettes · Ear Cannula · Forceps · Needle Holder · Probes/Directors · Retractors · Scalpel · Scissors. Elemental impurities · mechanical strength · dimensional verification.



Tti Labs Inspections · Hardlines

Ceramics, furniture, tent, accessories. Booking within 24 hours; report within the next 24 hours after inspection.

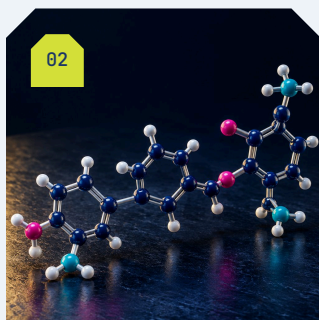
Chromium (VI) in four matrices, organotins in four.

LAB 022 names chromium (VI) apart from total chromium: in leather, chemicals, waste water and sludge. Organotins are organic tin compounds, not total tin.



Leather

Colorimetric · ISO 17075-1:2017
Chromatographic · ISO 17075-2
Also listed · ISO 10195:2018 ·
ISO 20344:2021/Amd 1:2024 ·
EN ISO 21420:2020+A1:2024



Chemicals (ZDHC)

Ion chromatography ·
Tti/INORG/SOP-23



Waste water

ISO 18724:2025



Sludge

EPA 3060a · EPA 7196A
Tti/CHEM/SOP-20a

3 mg/kg
CHROMIUM (VI) LIMIT

EU REACH · ANNEX XVII, ENTRY 47 · APPLIES SINCE 1 MAY 2015

Leather articles that touch the skin must contain **less than 3 mg/kg chromium (VI)**, on the total dry weight of the leather. The limit also applies to each leather part of an article.

Recital 6 of the Regulation points to EN ISO 17075, the method on Tti Labs' accredited scope.

CHROMIC OXIDE • LEATHER

The chromium tanning agent, measured.

Chromic oxide content, titrimetric and spectroscopic ·
ISO 5398-1 & 3:2018

Ion chromatography measures chromium (VI) to EN ISO 17075-2, free of interference (02).

ORGANOTIN COMPOUNDS

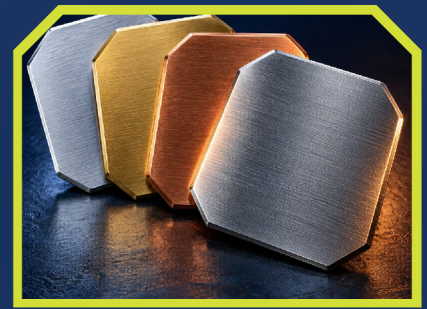
Organic tin compounds, not total tin.

Leather	ISO 16179:2025
Waste water, chemicals (ZDHC)	ISO 16179:2025
Water	ISO 17353:2004 Tti/Org/SOP-28

TEST FINDER

Start from the part, find the test.

Each row names the question, Tti Labs' accredited method and the page that sets out the rule.



PART OR MATERIAL	QUESTION	ACCREDITED METHOD	PAGE
EU REACH			
Pierced-ear posts, piercings	Nickel release, less than 0.2 µg/cm ² /week	BS EN 1811:2023	5
Rivets, buttons, zips, watch cases	Nickel release, 0.5 µg/cm ² /week at most	BS EN 1811:2023	5
Leather touching the skin	Chromium (VI), less than 3 mg/kg	ISO 17075-1:2017 · ISO 17075-2	10
U.S. CPSIA · CHILDREN'S PRODUCTS			
Metal parts, children's jewelry	Total lead, 100 ppm	CPSC-CH-E1001-08.3	6
Non-metal parts	Total lead, 100 ppm	CPSC-CH-E1002-08.3	6
Paint and surface coatings	Lead in paint, 90 ppm	CPSC-CH-E1003-09.1	6
Points, edges, small parts	Can a child reach it?	16 CFR 1500.48 · 1500.49 · 1501	7
MATERIALS AND MATRICES			
Textiles	Total and extractable metals	DIN/BS/EN 16711-1:2016 · 16711-2:2016	9
Leather	Extractable and total metals	ISO 17072-1:2019 · ISO 17072-2:2022	9
Plastics, plastisol prints	Cadmium	BS EN 1122:2001	9
Toys	Migration of certain elements	EN 71-3:2019+A2:2024	9
Chemicals (ZDHC)	Total heavy metals, 14 elements	Tti/INORG/SOP-008a	4
Water	Heavy metals, 16 elements	APHA 3030, 3111, 3120 · EPA 6010C	4
Waste water, sludge	Total heavy metals	EPA 3050 B · USEPA 200.8 · EPA 6020 A	4
Food, feed	Elemental content, 10 elements	AOAC 999.10, 975.03, 985.01, 984.27	4
CHROMIUM (VI) AND ORGANOTINS			
Chemicals, waste water, sludge	Chromium (VI)	Tti/INORG/SOP-23 · ISO 18724:2025 · EPA 3060a, 7196A	10
Leather, chemicals, water	Organotin compounds	ISO 16179:2025 · ISO 17353:2004	10

Limits, methods and sources as set out on the pages named. Summary, not legal advice.



Tti Testing Laboratories

Confidence, Verified.

Your trusted quality partner, with the region's largest accredited testing scope, providing end-to-end TIC solutions.

01

Customer portal.

Submit requisitions, track samples and retrieve reports online.

etrft.ttilabs.net

02

Accredited testing.

BS EN 1811, CPSC, EN and ISO methods in Tti Labs' laboratory.

PNAC LAB 022

03

CPSC accepted.

Pakistan's first U.S. CPSC accepted testing laboratory.

Lab ID 1168

04

Quotations.

Quotations by email; one number for all offices.

quotations@ttilabs.net

ISO/IEC 17025 · PNAC LAB 022

ISO/IEC 17020 · PNAC IB-006

U.S. CPSC Accepted · Lab ID 1168

PSQCA Approved

111 786 001



www.ttilabs.net
quotations@ttilabs.net
marketing@ttilabs.net

Lahore Office

Headquarters & Laboratories

347-S Quaid-e-Azam
Industrial Estate,
Kot Lakhpat, Lahore-54770

(92-42) 111 786 001

Karachi Office

3rd Floor, Plot No. 7c,
Sunset Commercial St.
No. 1, Phase 4, DHA,
Karachi-75500

(92-21) 111 786 001

Faisalabad Office

Office # 145, 1st Floor,
Centre Point Plaza,
Jaranwala Road,
Faisalabad-38000

(041) 8733001

Sialkot Office

Opposite Mag Town Masjid,
Kashmir Road, Sialkot-51310

(052) 3573367

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