



ITAK

**PROFICIENCY TESTING PLAN
FOR COPPER ORE AND
CONCENTRATES
2026**

Ensaios de Proficiência
ABNT NBR
ISO/IEC 17043



PEP 0021

ACCREDITATION

ITAK—Instituto de Tecnologia August Kekulé is an ISO / IEC 17043 Proficiency Testing provider accredited by “Coordenação Geral de Acreditação do Inmetro (Cgcre)” for the following PTs: Iron Ore, Gold Ore, Copper Ore and Concentrates, Nickel Ore, Silver and Ferroniobium Alloy, Phosphate Rock and Phosphate Concentrate, and Bauxite.

We aim to provide continuous improvement practices in performing chemical analyses worldwide to our customers.

The project will continue, and in 2026, ITAK will promote four rounds of the Proficiency Testing Program for Copper Ore and Concentrates and invite the laboratories of this market to join the group of participants.

BENEFITS

Besides being an impartial tool for assessing laboratory performance, participation in proficiency tests has several benefits, such as:

- ✓ Adherence to one of the requirements of **ISO / IEC 17025** for companies already Accredited or searching for accreditation on this ISO standard or other quality systems.
- ✓ Increased metrological reliability of the results obtained by the laboratory from their levels of precision and accuracy.
- ✓ Comparison with other industry laboratories and finding improvement opportunities to increase performance level (benchmarking).
- ✓ The opportunity for evaluation and comparison of methodologies, seeking one that best suits the level of accuracy required for specific parameters and levels.
- ✓ Awareness of the type of deviations that may be made by the laboratory (systematic or random), guiding actions to eliminate/minimise them.
- ✓ Identify staff training needs; and/or normalisation or improvement of analytical methods.

CONFIDENTIALITY

All information regarding Proficiency Test participants is treated as confidential and proprietary to the client. The only public information available in each round's report is the names of the participants. A confidentiality agreement with ITAK binds individuals who have access to this information.

When required by law or authorised by contractual commitments, ITAK will disclose confidential information, and the affected participant will be notified of such disclosures, except if prohibited by law.

If ITAK receives information about the participant from sources other than the participant, such as a complainant or regulatory authority, ITAK will ensure that this information remains confidential. The identity of these sources will also be kept confidential and not disclosed to the participant unless the source agrees to share that information.

According to ITAK's confidentiality protocol, laboratories are assigned distinct numerical codes. Each participant is granted access exclusively to their code, effectively preventing any possibility of collusion

among participants. In case of any suspected collusion, the Program's coordination team will conduct a thorough investigation and take appropriate action.

The report for each round includes a list of participants, excluding lab codes to maintain confidentiality. By confirming participation, the laboratory agrees to have your name included in the report. If you prefer not to have your name mentioned, please inform us via email at interlab@itak.com.br.

Participating laboratories understand and agree that their reported results may be utilised by ITAK for the characterisation of reference materials used as test items in the Proficiency Tests. Confidentiality will always be maintained.

STATISTICAL TREATMENT

If this Proficiency Test uses a Statistical model with designated values and Standard deviation from Certified Reference Materials, a minimum number of participants is not required.

If the Proficiency Test uses a Statistical model with Consensus values, a minimum of six participants is required.

If the Proficiency Test uses a Statistical model that involves Consensus values from expert participants after removing outliers, a minimum of three participants is required for evaluation.

According to the results of accurate assessments, the performance of the participants can be classified as satisfactory, unsatisfactory, or questionable for each evaluated parameter.

If the participant does not provide complete data for evaluation for some specific analyses, the report will be issued as “insufficient data”.

Each statistical technique has its use limited and conditioned to the number of participants who report numerically valid results and are approved in the Evaluation and Treatment Outliers.

SAMPLES AND ANALYSES

In 2026, **ITAK** will launch four rounds of a **Proficiency Testing Program for Analysis of Copper Ore and Concentrates**, each consisting of 10 samples referring to two reference materials of different concentrations. Each sample will be split into five (05) sachets containing **60 g** each.

The samples used in the Proficiency Test are Reference Materials (RM) with proven homogeneity and stability. RM's are produced by ITAK following the ISO 9001: 2015 Quality Management System and ISO quality protocols (ISO Series Guide 30 to 35) and ABNT NBR ISO 17034 - General requirements for the competence of reference materials producers.

The participating laboratory is required to undertake one (1) independent determination in each sample, preferably in five (05) different days, analysing a couple a day, employing one or more validated analytical methods. The methods used should be reported with the results. The samples must be analysed as ordinary routine samples of the laboratory, without any special treatment.

The parameters to be determined in each sample are listed below:

- ✓ **(Copper) Cu, (Iron) Fe, (Nickel) Ni, (Gold) Au, (Silver) Ag, (Sulfur) S, (Carbon) C, (Fluorine) F, (Chlorine) Cl, (Arsenic) As, and (Silicon) SiO₂.**

The samples will be sent by ITAK from João Monlevade / MG, under the guidance of the Participant Laboratory, using an appropriate way to transport them. In case of loss or damage to any test item, ITAK will evaluate the possibility of replacement, which will depend on how it can be transported and the delivery deadline, so as not to compromise the schedule.

It is the participant's responsibility to follow up and clarify the shipment through customs or the carrier when it is required. If samples come back to ITAK because of incorrect address information or because the laboratory has not clarified the shipment through customs, ITAK can charge reshipping expenses.

Test items can be shipped using customer accounts on FedEx, DHL, and UPS carriers.

Along with the samples, there will also be instructions directing the Participating Laboratory on how to treat the samples, carry out the analyses, and report the analytical results.

Any communication about this Proficiency Testing, such as questions, reporting of results, technical reports, and certificates of participation, is by software at www.itak.com.br/app for participating laboratories.

In addition to their test results and methodologies, ITAK PT participants should also report the measurement uncertainties of each analysed parameter (if available). It must be sent as the Standard Uncertainty Combined, without application of any coverage factor, which would make it Expanded Uncertainty. Such data should be reported in specific fields in the ITAK PT Management System.

Invalid analytical results, such as "less than" or "zero", are not amenable to statistical evaluation. Therefore, in these situations, ITAK will not do the participant performance evaluation.

ANALYTICAL METHODS

The participant laboratory should use its routine procedures to analyse the requested parameters. The suggested analytical methods for the **Proficiency Testing Program in Analysis of Copper Ore and Concentrates** are:

- ✓ **Copper Ore (Cu):** Acid digestion and determination by AAS or ICP.
- ✓ **Copper Concentrate (Cu):** Acid digestion and determination by Titration or Electrogravimetry.
- ✓ **Iron (Fe), Nickel (Ni), Gold (Au), Silver (Ag), Silicon (SiO₂), and Arsenic (As):** Acid digestion or Fusion and determination by AAS or ICP.
- ✓ **Sulfur (S):** Determination by infrared analyser – LECO or Gravimetry
- ✓ **Carbon (C):** Determination by infrared analyser – LECO
- ✓ **Fluorine (F):** Acid digestion and determination by Potentiometric Method; Ion Specific Electrode.
- ✓ **Chlorine (Cl):** Acid digestion and determination by Titration.

The methodologies used should be reported, whenever possible, mentioning the standard "Digestion Technique / Reading Instrument" using simplified codes according to the following examples:

- Alkaline Fusion and ICP-OES finish: **FUSALK-ICP**.
- Fusion and X-Ray Fluorescence finish: **FUS-XRF**.
- Four acid digestion (HF,HNO₃,HClO₄,HCl) and Atomic Absorption Spectrometry finish: **DIG4AC-AAS**.
- Four acid digestion (HF,HNO₃,HClO₄,HCl) and Titrimetric finish: **DIG4AC-TIT**.
- Four acid digestion (HF,HNO₃,HClO₄,HCl) and ICP-OES finish: **DIG4AC-ICP**.
- Acid digestion (HCl) and Atomic Absorption Spectrometry finish: **DIGAC-AAS**.
- Acid digestion (HCl) and Titrimetric finish: **DIGAC-TIT**.
- Acid digestion (HCl) and ICP-OES finish: **DIGAC-ICP**.
- Aqua Regia digestion (HCl and HNO₃) and Atomic Absorption Spectrometry finish: **DIGAR-AAS**.
- Aqua Regia digestion (HCl and HNO₃) and Titrimetric finish: **DIGAR-TIT**.
- Aqua Regia digestion (HCl and HNO₃) and ICP-OES finish: **DIGAR-ICP**.
- Fire Assay and Atomic Absorption Spectrometry finish: **FA-AS**.
- Fire Assay and ICP-OES finish: **FA-ICP**.
- Fire Assay and Gravimetric finish: **FA-GRA**.
- DIBK Extraction and Atomic Absorption Spectrometry finish: **DIBK-AAS**.
- MIBK Extraction and Atomic Absorption Spectrometry finish: **MIBK-AAS**.
- Combustion and Infrared Analyser (Leco): **COMB-IR**.
- Alkaline fusion and Ion Selective Electrode: **FUSALK-ISE**.
- Acid Leach and Potentiometric: **LIXAC-POT**.
- Gravimetric: **GRA**.
- Colorimetric: **COL**.
- Electrogravimetric: **ELETGRA**.

SCHEDULE

The proposed schedule is presented in the table below; however, it can be adjusted as required. The official schedule should be checked through the PTP Management System.

Steps of the Program	1 st Round (56 th round)	2 nd Round (57 th round)	3 rd Round (58 th round)	4 th Round (59 th round)
1- Sending invitations	05/Dec/2025	---	---	---
2-Confirmation of participants	09/Feb	---	---	---
3- Sending samples to the participants	30/Apr	10/Jul	10/Aug	01/Oct
4- Receiving samples by the participants	15/May	27/Jul	26/Aug	19/Oct

5- Completion of the analyses and report of the results by the participants	01/Jun	14/Aug	18/Sep	19/Nov
6- Preparation and delivery of the Performance Report to the participants.	17/Jun	28/Aug	28/Sep	07/Dec
7-Registration of appeals	Up to 10 days after the report is submitted			
8- Reply to appeals	Up to 15 days after the filing of the appeal			

Note: the dates in bold (item 5) must be met to avoid delays in issuing the results, which can compromise the subsequent rounds of the program. If delays occur, the Program Coordinator must be contacted to assess the possibility of extending the deadline without compromising the schedule or causing loss to the other participants. If there are unjustified delays, ITAK may close the rounds without the missing results.

For each round, the instructions will be sent along with the samples, containing guidelines on how the laboratory should proceed, and specific information about the samples, such as expected levels of the analyte (s).

REQUIREMENTS FOR PARTICIPATION

Laboratories that wish to participate in this Proficiency Test must be legally registered organizations equipped with the necessary technical capabilities and equipment to perform the required chemical analyses and confirm their participation by the deadline specified in the schedule.

PERFORMANCE REPORT

For each round, **ITAK** will issue a personalised digital Interlaboratory Performance Evaluation Report under confidentiality identification for the internal evaluation of the Participant Laboratory and identifying improvement opportunities.

If the participant wants to receive the report of another unit of the same business group, it must be requested directly to the person in charge or through a formal authorization from the person in charge. Preliminary reports will not be issued.

If required, ITAK may rectify or ratify reports provided that such corrections do not require further statistical processing of data. All rectification generates a new version and a new report number that will replace the previous version when published and communicated.

If required by law, the performance report can be delivered or presented to the Regulatory Entity or Public Prosecutor's Office without the participant's permission and will be formally and previously communicated.

If it is not possible to deliver the performance report on the date planned in the schedule, the participants will be promptly notified of the possible delay and the new delivery date.

ITAK Interlaboratory Performance Report is accepted as an ISO/IEC 17025 requirement.

APPEAL

The participant in ITAK's Proficiency Test has the right to appeal against its performance evaluation in the Technical Report.

The participants who have doubts or disagree with the performance evaluation must register their appeal in the "Appeals" field in the Proficiency Test Management System.

Meeting a requirement of ISO/IEC 17043 - Conformity assessment – General requirements for proficiency testing, ITAK has a procedure that manages this process.

INVESTMENT

Request a proposal or contact us by email.

ITAK has an attractive discount policy, such as participation of several units of companies belonging to the same economic group, discounts for laboratories participating in more than one PT, discounts for the purchase of ITAK's CRM, etc.

All customs duties are the participants' responsibility.

ITAK must receive the total amount without any deductions, such as bank fees or taxes applied. It is necessary to take them into account before sending us the payment.

SUBCONTRACTED ACTIVITIES

For this PT, homogeneity test analyses of Reference Materials used as samples (test items) can be subcontracted from competent laboratories.

All laboratories are evaluated and qualified in the ITAK's Quality Management System for these analyses, providing results with which, after appropriate statistical treatment, the designated values, standard deviations, and uncertainties are obtained for the Proficiency Test.

COORDINATION TEAM

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