



PROFICIENCY TESTING PLAN

in accordance with **ISO/IEC 17043:2023**

This proficiency testing scheme is within the scope of accreditation of the PT Provider PTS Bulgaria



No. PTS 26/06-T-1

TESTING OF AGGREGATES



www.ptsbg.eu



office@ptsbg.eu



+359 897 503 980

1. Type of the proficiency testing scheme

- Simultaneous PT scheme** - a proficiency testing scheme in which sub-samples from the same source of material are distributed simultaneously to the participants for concurrent testing. (Clause A.2.2 of Annex A to ISO/IEC 17043:2023)
- Sequential PT scheme** - a proficiency testing scheme in which the proficiency test item is distributed sequentially from one participant to the next or is returned to the PT provider for rechecking. (Clause A.2.3 of Annex A to ISO/IEC 17043:2023)

2. Personnel involved in the proficiency testing scheme

PT Scheme Manager



eng. Valentin Belovski

Materials Engineer



eng. Ivanka Dobрева, PhD

Statistical Processing Expert



eng. Atanas Atanasov

Data Collection and Coding



Tatyana Kasabova

The allocation of responsibilities and functions of the personnel involved in the present proficiency testing scheme is carried out in accordance with the internal procedures of the PT provider and the requirements of ISO/IEC 17043:2023.

3. Information about services provided by external providers



**LABORATORY COMPLEX
AT "NJN" LTD**

Bulgaria, 6300 Haskovo,
3 Planinski Izgled Str.

The external provider performs the following activities within the present proficiency testing scheme:

- taking/provision of the source material;
- preparation of the material in accordance with written instructions from the PT provider;
- sieving, distribution and formation of sub-samples for the individual characteristics under test;
- packaging and labelling of the sub-samples;
- selection of sub-samples for homogeneity and stability assessment;
- performance of tests required for the assessment of homogeneity of the proficiency test items;
- performance of tests required for the assessment of stability of the proficiency test items.

The external provider is used under predefined conditions and under the control of the PT provider.

The activities related to preparation, distribution, packaging and selection of sub-samples are performed in accordance with written instructions from the PT provider, while observing technically justified principles for representativeness, homogeneity, stability, identification and traceability of the proficiency test items.

The PT provider retains full responsibility for the planning, validity and management of the scheme, for the assessment of homogeneity and stability of the proficiency test items, for statistical processing, for the evaluation of participant performance and for the final decisions related to the present proficiency testing scheme, in accordance with ISO/IEC 17043:2023.

If the external provider or a laboratory related to it participates in the present proficiency testing scheme, the participation is carried out under the same conditions, timeframes and reporting rules applicable to the other participants. The laboratory receives a separate proficiency test item and reports its results in accordance with the scheme schedule. The sub-samples used for homogeneity and stability assessment are different from the sub-samples provided to the participants and are tested separately. The results from the homogeneity and stability tests are not used for the evaluation of the performance of the external provider as a participant and are not used in the determination of the assigned value and the standard deviation for proficiency assessment.

4. Criteria for participation in the present proficiency testing scheme

Laboratories performing testing of aggregates, or laboratories wishing to evaluate their performance with respect to one or more of the characteristics included in the scheme, may participate in the present proficiency testing scheme.

Participation is open to all laboratories that apply for participation and accept the conditions of the present scheme. Each laboratory independently assesses its capability to perform the relevant tests using the applicable methods specified in Clause 6 of the present plan.

Participation does not depend on the accreditation status or stage of accreditation of the laboratory.

By submitting an application for participation, the laboratory confirms that it accepts the conditions of the scheme, including the requirements for receipt, storage, handling and preparation of the samples, the timeframes for testing and reporting, the format for reporting results and the rules on confidentiality.

5. Number and type of expected participants in the proficiency testing scheme

The expected number of participants in the present proficiency testing scheme is at least 5 laboratories, mainly performing testing of aggregates.

The scheme shall be conducted when at least 5 participations have been registered for at least one characteristic.

A characteristic for which fewer than 5 participations have been registered shall not be included in the scheme. The affected participants shall be notified by e-mail.

6. Selection of test methods, characteristics and range of expected values

Test method	Characteristic	Range of Expected Values
*EN 933-1, including Clause 7.1 "Washing"	Particle size distribution /cumulative percentages passing through sieves: 4 mm, 2 mm, 1 mm, 0.500 mm, 0.250 mm, 0.125 mm/ <i>(mean value of three determinations for each sieve)</i>	Not determined in advance
*EN 933-1, including Clause 7.1 "Washing"	Fines content /percentage of fines passing the 0.063 mm sieve/ <i>(mean value of three determinations)</i>	Not determined in advance
*EN 933-8+A1	Sand equivalent, SE(10) <i>(mean value of two or three individual determinations)</i>	(30 – 90) %
*EN 1097-3	Loose bulk density, ρ_b <i>(mean value of three individual determinations)</i>	(1.40 – 1.80) Mg/m ³
*EN 1097-5	Water content, W <i>(mean value of three individual determinations)</i>	(2 – 10) %
*EN 1097-6, Clause 9 "Pyknometer method"	Apparent particle density, ρ_a <i>(mean value of three individual determinations)</i>	(2.50 – 2.99) Mg/m ³
*EN 1097-6, Clause 9 "Pyknometer method"	Oven-dried particle density, ρ_{rd} <i>(mean value of three individual determinations)</i>	(2.50 – 2.99) Mg/m ³
*EN 1097-6, Clause 9 "Pyknometer method"	Saturated and surface-dried particle density, ρ_{ssd} <i>(mean value of three individual determinations)</i>	(2.52 – 2.99) Mg/m ³
*EN 1097-6, Clause 9 "Pyknometer method"	Water absorption, WA₂₄ <i>(mean value of three individual determinations)</i>	(0.2 – 1.9) %
*EN 1097-6, Annex A, Clause A.4 "Pyknometer method for pre-dried particles"	Pre-dried particle density, ρ_p <i>(mean value of three individual determinations)</i>	(2.50 – 2.99) Mg/m ³

* The tests shall be performed in accordance with the latest valid version of the specified standardized test method.

7. Potential major sources of errors

The potential major sources of error during the performance of the tests included in the present proficiency testing scheme may include:

- incorrect application or interpretation of the requirements of the applicable standardized test methods;
- use of unsuitable, uncalibrated or technically defective testing and measuring equipment;
- improper storage, mixing, handling or preparation of the sample before testing;
- loss, retention, contamination or unintentional inclusion of material during washing, sieving, transfer, drying or other preparation and testing operations;
- failure to comply with the requirements for preparation of test portions, preparation and use of reagents/solutions, times, temperatures and other test conditions;
- incorrect use of sieves, pyknometers, measuring vessels, drying ovens, balances or other means that may influence the results;
- change in the condition of the sample due to unsuitable storage conditions, delayed testing or packaging that is not tightly closed;
- errors in reading, recording, transferring, calculating, rounding and reporting the results.

8. Requirements regarding the production, quality control, storage and distribution of PT items

- The proficiency test items are sub-samples of crushed fine aggregate 0/4 mm from natural aggregates, prepared for the purposes of the present scheme.
- The selection, preparation, sieving, distribution, packaging and labelling of the sub-samples are carried out in a manner ensuring their fitness for the purposes of the scheme.
- Until their distribution to the participants, the proficiency test items are stored under conditions preventing contamination, loss of material, segregation, change in water content or any other influence on their condition.
- Before distribution, quality control is carried out, including verification of readiness for dispatch and assessment of homogeneity and stability, where applicable.
- The proficiency test items are distributed to the participants in suitable packaging and with labelling ensuring their identification and preservation of their characteristics during transportation.
- Detailed requirements regarding receipt, storage, handling, preparation, testing and reporting of results are provided in the **“Instruction for Participants” /F 7.3.5-1/**.

9. Confidentiality

Participants shall not exchange information related to the proficiency test items, the testing conditions, the obtained results or their processing until the final report is issued by the PT provider.

The Head of Laboratory completes the “Confidentiality Declaration” /F 4.2-2/.

Where collusion between participants is established, including exchange of results, manipulation or falsification of data, the results of the respective participants shall not be included in the evaluation, and the grounds for this decision shall be documented.

The PT provider ensures the confidentiality of information obtained or created during the implementation of the present proficiency testing scheme. The identity of participants shall be kept confidential, except where the participant has given consent for disclosure or where disclosure is required by an accreditation body, a contractual obligation or an applicable regulatory requirement.

10. Time schedule of the PT scheme and information for participants



⚠ In case of any changes related to the time schedule for the conduct of the present proficiency testing scheme or other significant changes, all participants shall be notified by email.

Detailed information will be provided in the **“Instruction for Participants” /F 7.3.5-1/**, which will be sent to participants by email.

11. Methods or procedures to be used for the storage, handling, preparation, dispatch and disposal of proficiency testing items

- The proficiency test items are provided to the participants in suitable closed packaging, labelled in a manner ensuring identification and traceability.
- After receipt, the participant checks the integrity of the packaging and the condition of the delivered sample. In case of damaged packaging, loss of material, contamination, visible change in the condition of the sample or suspicion of unsuitability, the participant shall notify the PT provider before starting the tests.
- Until testing starts, the samples shall be stored in their original closed packaging or under equivalent conditions, so as to prevent loss of material, contamination, segregation, change in water content or any other influence on their condition.
- Handling, mixing and separation of test portions shall be carried out carefully, so as to prevent spillage, contamination, segregation, loss of fine particles or change in water content.
- Preparation and testing of the samples shall be carried out in accordance with the applicable standardized test methods specified in Clause 6 of the present plan and with the instructions given in the **Instruction for Participants /F 7.3.5-1/**.

- Dispatch of the proficiency test items to the participants shall be carried out in suitable packaging, so as to prevent spillage, contamination, wetting, drying, segregation or mechanical damage during transportation.
- After completion of testing, the remaining quantities of material shall be handled and disposed of in accordance with the internal procedures of the participating laboratory and the applicable waste management requirements.
- Detailed instructions for receipt, storage, handling, preparation, testing and reporting of results are specified in the **Instruction for Participants /F 7.3.5-1/**.

12. Methods to be used for the assessment of homogeneity and stability of proficiency test items

- The homogeneity and stability assessment of the proficiency test items shall be carried out in accordance with **ISO/IEC 17043:2023**, **ISO 15528:2022**, where applicable, and procedure **P 7.3.2 “Assessment of homogeneity and stability of proficiency testing items”**.
- The acceptance criteria shall be predefined so that any possible inhomogeneity or instability of the proficiency test items does not have a significant influence on the evaluation of participants.
- The homogeneity assessment shall be carried out on finally prepared, packaged and labelled sub-samples selected at random. The tests shall be performed using the applicable methods for the characteristics included in the scheme.
- The stability assessment shall be carried out for the period relevant to the present scheme, including storage, transportation and testing by the participants, by testing sub-samples at predefined points in time or by another technically justified approach.
- The homogeneity and stability tests shall be performed by an external provider of laboratory services, where applicable. Processing of the results, assessment of acceptability and final decisions shall remain the responsibility of the PT provider.
- The approaches used, criteria, results and conclusions from the homogeneity and stability assessment shall be documented and included in the final report of the proficiency testing scheme.

13. Reporting of results

The results shall be reported using the **“Results Sheet” (F 7.2.1-7)**, which shall be sent by email within the deadline specified in Clause 10.

14. Detailed description of the statistical analysis used and the criteria for evaluation of participant performance

- The statistical analysis shall be carried out in accordance with **ISO/IEC 17043:2023**, **ISO 15528:2022** and **Procedure P 7.2.3 “Determination of assigned values”**.
- Statistical processing shall be carried out separately for each characteristic included in the scheme. For the purposes of evaluation, one result shall be used for each participant for the respective characteristic, representing the mean value of the valid individual results reported in accordance with the requirements of the scheme.
- For each characteristic, the following shall be determined:
 - assigned value;
 - standard uncertainty of the assigned value;
 - standard deviation for proficiency assessment.
- The assigned value and the standard deviation for proficiency assessment shall be determined using a robust statistical approach based on the participants’ results, in accordance with **ISO 15528:2022**.
- The standard uncertainty of the assigned value shall be determined according to the selected approach and **Procedure P 7.2.3**.
- Before statistical processing, the submitted results shall be checked for:
 - technical validity of the submitted results;
 - conformity with the required format, units, rounding and manner of presentation of the results;
 - errors in recording, transfer, recalculation or other obvious inconsistencies.
- Blunders shall be considered in accordance with **ISO 15528:2022**, Clause 6.3 and Procedure P 7.2.3. Where an obvious technical reason has been established, the result may be excluded from the group statistical processing, and the decision shall be documented. Outlying results shall not be automatically excluded from the individual evaluation of the participant.
- For the identification of outlying results, appropriate statistical and graphical methods may be used, taking into account the specific data set and the statistical design of the scheme, including the interquartile range method (IQR), Grubbs’ test, the “three sigma” criterion or other appropriate methods, where applicable. To limit the influence of outlying results on the summary statistics, an appropriate robust statistical approach shall be applied in accordance with **ISO/IEC 17043:2023** and

ISO 13528:2022. The methods used, the grounds for their application and the decisions for inclusion, marking or exclusion of results shall be documented in the final report.

- The evaluation of participant performance shall be carried out using the z-score. Where the standard uncertainty of the assigned value is not negligible in relation to the standard deviation for proficiency assessment, a z'-score shall also be calculated.
- If the z'-score does not lead to a different interpretation of performance compared with the z-score, the z-score shall be used as the main and only reported score in the final report. Where the z'-score leads to a different interpretation of performance, the evaluation shall be based on the z'-score, and the decision and the grounds for it shall be documented in the final report.
- Where the participant has reported the uncertainty of the result in the required format, a ζ-score (zeta-score) may also be calculated.
- The evaluation results shall be interpreted as follows:
 - $|z| \leq 2,0$ – satisfactory performance;
 - $2,0 < |z| < 3,0$ – questionable performance (warning signal);
 - $|z| \geq 3,0$ – unsatisfactory performance (action signal).
- Where **z'-score** or **ζ-score** is used, the results shall be interpreted in an analogous manner, unless another justified evaluation criterion is defined in the final report.
- The results of an external provider or a laboratory related to it, where such a laboratory participates in the scheme, shall be processed in accordance with the rules specified in Clause 3 of the present plan.
- Detailed information regarding the statistical methods used, the assumptions, the evaluation criteria, the handling of invalid, blunder and outlying results and the sources used shall be presented in the final report of the proficiency testing scheme.

15. Origin, metrological traceability and standard uncertainty of the assigned value

The assigned value for each characteristic shall be determined as a consensus value from the valid results reported by the participants for the respective characteristic, in accordance with ISO 13528:2022 and **Procedure P 7.2.3 “Determination of Assigned Values”**.

A robust statistical approach shall be used for the determination of the assigned value, applied to the results reported by the participants in accordance with the requirements of the present proficiency testing scheme.

The standard uncertainty of the assigned value shall be estimated in accordance with the selected statistical approach and **Procedure P 7.2.3**.

The standard deviation for proficiency assessment shall be determined separately from the standard uncertainty of the assigned value and shall be used for the evaluation of participant performance.

The assigned value, determined as a consensus value from participant results, does not constitute a certified or independent reference value. It is used solely for the purposes of evaluating performance within the present proficiency testing scheme.

The metrological traceability of the results reported by the participants shall be ensured by the participants themselves through the use of suitable equipment, calibrated or verified measuring instruments, and application of the relevant standardized test methods.

The methods, assumptions, criteria, results and conclusions used with regard to the determination of the assigned value, the standard uncertainty of the assigned value and the standard deviation for proficiency assessment shall be documented and included in the final report of the proficiency testing scheme.

16. Treatment of results for the same characteristic obtained by different test methods, where permitted by the proficiency testing scheme

Not applicable to the present proficiency testing scheme. For each characteristic, one specified method as indicated in Clause 6 shall be applied.

17. Extent to which participant results, conclusions and the final report will be made public or shared

The information received from participants in connection with the present proficiency testing scheme shall be used solely for the purposes of conducting the scheme, statistical processing, evaluation of performance and preparation of the final report.

Each participant shall be provided only with information regarding its own results and evaluation, while maintaining confidentiality with respect to the other participants. No information allowing the identification of other participants or their results shall be provided, except in an aggregated and anonymized form included in the final report.

The **final report /F 7.4.3-1/** shall be provided to all participants in the proficiency testing scheme and, upon request, to the accreditation body of the PT provider or to another competent authority, where this is required by regulatory provisions.

The final report, results, performance evaluations, assigned values and related information shall not be publicly disclosed or provided to other interested parties, except where this is required by applicable regulatory acts or upon an official request from a competent authority.

Verification of the authenticity of an issued certificate through the **“Register”** section of the official website of **PTS Bulgaria Ltd** shall not be considered public disclosure of results or performance evaluations. During such verification, only information necessary for identification and confirmation of the certificate shall be displayed, without results, performance evaluations, assigned values or standard deviations for proficiency assessment.

18. Actions to be taken in the case of lost, delayed or damaged PT items.

- The proficiency test items shall be dispatched to the participants by courier service. Participants shall be notified by e-mail when the shipment is dispatched and, where possible, tracking information shall also be provided.
- In case of delayed delivery, the PT provider shall assess whether the delay may affect the validity of the scheme. Where appropriate, the deadline for performing the tests and submitting the results may be extended.
- Where, due to loss, significant delay or damage to the item before its receipt by the participant, valid participation cannot be ensured, the PT provider shall assess the specific case and make a documented decision regarding dispatch of a replacement sample, reimbursement of the paid participation fee or impossibility of evaluating the participant for the respective characteristic.
- Upon receipt of the item, the participant shall check the integrity of the packaging and the condition of the delivered sample and shall complete the **“Protocol for PT Item Receipt” /F 7.3.4-1/**, which shall be sent to the PT provider by e-mail.
- In case of open or visibly damaged packaging, contamination, spillage, loss of material, discrepancy between the received sample and the information sent by the PT provider by e-mail, or suspicion of unsuitability of the sample, the participant shall notify the PT provider before starting the tests and shall provide objective evidence, including photographic evidence, where applicable.
- In case of confirmed loss, damage or unsuitability of the item, the PT provider shall assess the influence on the validity of the participation and, where possible, shall arrange dispatch of a replacement sample from the same prepared batch.

19. Feedback and communication with the participants

Throughout the entire period of the proficiency testing scheme, the PT Scheme Manager shall maintain communication with participants’ representatives by telephone, written correspondence and e-mail.

Before dispatch of the proficiency testing items, or no later than on the day of their dispatch, each participant shall receive the following documents by e-mail:

- > **Instruction for Participants /F 7.3.5-1/;**
- > **Protocol for PT Item Receipt /F 7.3.4-1/;**
- > **Results Sheet /F 7.2.1-7/;**
- > **Confidentiality Declaration /F 4.2-2/.**

Where necessary, the PT provider may organize technical meetings with participants in relation to the present scheme. The meetings may be held remotely or in another agreed format and may address organizational and technical matters related to the conduct of the scheme, including scope, schedule, storage and handling of proficiency testing items, reporting requirements and significant changes.

During these meetings, individual participants’ results shall not be discussed or disclosed prior to the issuance of the final report.

Feedback from participants after completion of the scheme shall be collected through the **“Feedback Form” /F 8.6-2/**, which shall be sent by e-mail. The deadline for submission shall be specified in the **Instruction for Participants /F 7.3.5-1/**.

20. Registration for participation in the proficiency testing scheme

- Application for participation shall be made using the **Application for Participation /F 7.2.1-3/**. The application may also be submitted electronically via the official website of PTS Bulgaria Ltd.
- By submitting the application, the participant confirms that it is familiar with and accepts the conditions of the proficiency testing scheme, including the conditions for receipt, storage and preparation of the proficiency testing items, the deadlines for testing and reporting, the confidentiality rules, the statistical processing and the criteria for evaluation of performance.

- Each laboratory may apply for participation in one or more characteristics included in the current proficiency testing scheme.
- Each laboratory may apply for more than one participation in the scheme where this is related to the objectives of participation. In such cases, separate codes shall be assigned to the laboratory, and the respective proficiency testing items shall be provided.
- In the case of more than one participation by the same laboratory, the results shall be evaluated and reported under the separately assigned codes. The use of these results for the determination of the assigned value and the standard deviation for proficiency assessment shall be carried out in such a way as to prevent disproportionate influence of a single laboratory on the group statistical processing. The applied approach shall be documented in the final report.
- The PT Provider may require the submission of more than one result where this is specified in the conditions of the scheme or is necessary for the purposes of evaluation.
- The PT Provider shall not be responsible for the internal allocation of assigned codes and provided items among the staff of the participating laboratory.
- **The final report /F 7.4.3-1/ shall be provided to participants by e-mail.**
- The certificate of participation shall be generated by the PT Provider's software and sent to the e-mail address specified in the **Application for Participation /F 7.2.1-3/**.
- The authenticity of an issued certificate may be verified in the "Registry" section of the official website of PTS Bulgaria Ltd by entering the certificate number or by using the QR code indicated on the certificate. During verification, only the information necessary for identification and confirmation of the certificate shall be displayed, including the certificate number, the number and name of the proficiency testing scheme, the participant's name and code, the proficiency testing item, the characteristics determined, the methods used and the date of issue. Results, performance evaluations, assigned values, standard deviations for proficiency assessment or any other information revealing the participant's specific performance shall not be displayed.

21. Financial conditions

- The financial conditions are specified in the **"Invitation for Proficiency Testing" (F 7.2.1-2)**.
- To receive the **"Invitation for Proficiency Testing" (F 7.2.1-2)** with the applicable prices, please contact us.

22. Contacts

eng. Valentin Belovski
PT Scheme Manager



+359 89 7503980



office@ptsbg.eu

Tatyana Kasabova
Data Collection and Coding Expert



+359 89 9301570

2026-06-01

Date

PT Scheme Manager