



# 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 Ltd.



## Nº PTS 26/05-T-1

### TESTING OF BITUMEN



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## 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 participants for concurrent testing. (item A.2.2, Annex A of ISO/IEC 17043:2023)
- Sequential PT scheme - a proficiency testing scheme in which the PT item is circulated successively from one participant to the next or returned to the PT Provider for rechecking. (item A.2.3, Annex A of ISO/IEC 17043:2023)

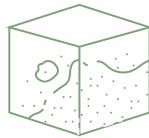
## 2. Personnel involved in the design and operation of the PT scheme

PT Scheme Manager



eng. Valentin Belovski

Materials Engineer



eng. Ivanka Dobreva, PhD

Statistical Processing Expert



eng. Atanas Atanasov

Data Collection and Coding Expert



Tatyana Kasabova

The allocation of responsibilities and functions among the personnel involved is carried out in accordance with the PT Provider's internal procedures and the requirements of ISO/IEC 17043:2023.

## 3. Information on Activities Undertaken by External Providers



**ROAD CONSTRUCTION LABORATORY at  
ROAD COMPANY EAD**

2140 Botevgrad, 44 Tsar Ivan Shishman St., Bulgaria

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

- Sampling;
- Packaging of the samples;
- Performing tests required for the evaluation of the homogeneity of the proficiency test items;
- Performing tests required for the evaluation of the stability of the proficiency test items.

The external provider is used under pre-defined conditions and under the control of the PT Provider. The PT Provider retains full responsibility for the planning, validity and management of the scheme, for the evaluation of the homogeneity and stability of the proficiency test items, for the statistical processing, for the evaluation of the participants' 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 shall be under the same conditions, deadlines 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 samples used for the evaluation of homogeneity and stability are different from the samples provided to the participants and are tested separately. The results from the homogeneity and stability tests are not used for evaluating the performance of the external provider as a participant and are not used for determining the assigned value and the standard deviation for proficiency assessment.

## 4. Criteria to be met for participation in the PT scheme

Laboratories that perform testing of bitumen or wish 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 according to the applicable methods specified in Clause 6 of the present plan.

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

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 deadlines for testing and reporting, the reporting format for results and the confidentiality rules.

## 5. Number and type of expected participants in the PT scheme

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

The scheme shall be conducted with a minimum of 5 registered participations for at least one characteristic.

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

## 6. Selection of Methods, Characteristics to be Determined and Range of Expected Values.

Test method	Characteristic	Expected range of values
*EN 1426	Penetration (three determinations)	45 to 65 [0.1 mm]
*EN 1427	Softening point (two determinations)	44 °C to 58 °C
*EN 15326+A1	Density (three determinations)	940 kg/m <sup>3</sup> to 1120 kg/m <sup>3</sup>
*EN 12592	Solubility (three determinations)	> 95 %
*EN 12593	Fraass breaking point (two or four determinations)	< -5 °C
*EN ISO 2592	Flash point (three determinations)	> 200 °C

\* The tests are performed according to the latest valid version of the specified standard test method.

## 7. Potential major sources of errors

- Incorrect preparation of test samples according to EN 12594, including overheating, insufficient homogenization, air entrainment, contamination or presence of moisture.
- Deviations from the requirements of the applicable test methods, including conditioning conditions, time, temperature, heating or cooling rate, number of determinations and manner of reading the results.
- Incorrect handling, storage or transport of the samples, including damaged packaging, contamination, moisture, surface skin formation or another change in the sample.
- Use of unsuitable, technically defective, unverified or uncalibrated equipment and measuring instruments.
- Errors in recording, transferring, calculating, rounding, use of units or reporting of results, including reporting of measurement uncertainty.

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

- The proficiency test items are samples of bitumen grade 50/70, prepared for the purposes of the present scheme under controlled conditions.
- The preparation of the samples is performed in accordance with EN 12594 and the applicable requirements of the test methods specified in Clause 6.
- The homogenization, distribution and packaging of the samples are performed in a documented manner to ensure representativeness, traceability and appropriate homogeneity of the items.
- Before distribution, quality control is performed, including verification of the identification, integrity of the packaging and suitability of the samples for testing.
- The items are stored and transported under conditions that prevent contamination, moisture, overheating, mechanical damage or any other change that may affect the test results.
- A label with the number and name of the PT scheme is placed on the packaging of each item. Traceability to the respective participant is ensured through the records of the PT Provider and the **Results Sheet /F 7.2.1-7/**.
- The detailed requirements for receipt, storage, handling, preparation, testing and reporting of results are specified in the **Instruction for Participants /F 7.3.5-1/**.

## 9. Confidentiality

Participants shall not exchange information related to the proficiency test items, the test conditions, the results or their processing until the final report has been issued by the PT Provider.

The Head of the laboratory shall complete a **Confidentiality Declaration /F 4.2-2/** prior to participation in the scheme.

Where exchange of information, coordinated actions or data manipulation are identified, the results of the participants concerned may be excluded from the evaluation.

The members of the PT Provider's team and persons acting on its behalf, including external providers where they have access to information related to the scheme, shall comply with the confidentiality requirements and shall not disclose information, except where this has been agreed, is required by a competent authority, or is provided for by law.

## 10. Schedule of the Proficiency Testing Scheme and Information for Participants



**⚠ In the event of any changes related to the time schedule for conducting the present proficiency testing scheme, or any other important changes, all participants will be notified by e-mail.**

Detailed information shall be provided through the **Instruction for Participants /F 7.3.5-1/**, which shall be sent to the participants by e-mail.

## 11. Methods or Procedures to be Used for Storage, Handling, Preparation, Dispatch and Disposal of the proficiency testing item

- The proficiency testing item is a bitumen sample placed in a metal can with a lid, with a capacity of 1.2 L, and additionally packed in a cardboard box for transport.
- A label indicating the number and name of the PT scheme shall be affixed to the package. The participant code and the sample code shall be indicated in the **Results Sheet /F 7.2.1-7/**, which is sent to the participant by e-mail.
- Upon receipt, the participant shall check the condition of the cardboard box, the metal can and the lid. In the event of an open or visibly damaged can, contamination, discrepancy between the received sample and the information sent by the PT Provider by e-mail, or any doubt regarding the suitability of the sample, the participant shall notify the PT Provider before starting the tests.
- Until the start of testing, the sample shall be stored in the original closed can, in a dry indoor area, protected from contamination, direct solar heating, local heating and mechanical damage.
- Before testing, the sample shall be prepared in accordance with EN 12594 and the applicable test methods specified in Clause 6 of the present plan.
- The PT items shall be dispatched to the participants in closed metal cans placed in suitable cardboard boxes, in such a way as to prevent mechanical damage, opening or contamination during transport.
- After completion of the tests, the remaining bitumen, used solvents and auxiliary materials shall be treated in accordance with the laboratory's internal procedures and the applicable requirements for safety and waste management.
- Detailed instructions for receipt, storage, handling, preparation, testing and reporting of results are provided in the **Instruction for Participants /F 7.3.5-1/**.

## 12. Methods and procedures for homogeneity and stability testing of PT items

- The assessment of the homogeneity and stability of the proficiency testing items shall be performed after the final preparation, distribution, packaging and labelling of the samples and prior to their dispatch to the participants.
- The assessment shall be carried out in accordance with ISO/IEC 17043:2023, ISO 13528:2022, where applicable, and **Procedure P 7.3.2 "Assessment of Homogeneity and Stability of Proficiency Testing Items"**.

- Homogeneity shall be assessed on randomly selected samples from the prepared batch by testing one or more technically justified characteristics included in the scheme. The selected characteristics, the number of samples and the number of determinations shall be defined in advance and documented in the scheme records.
- Stability shall be assessed over a period covering the conditions of storage, transport and use of the samples by the participants. The assessment shall be performed by comparison of results obtained at predefined points in time.
- The testing for the assessment of homogeneity and stability shall be performed by a designated external laboratory service provider. The external provider shall provide the test results, while the statistical processing, evaluation of acceptability and formulation of conclusions shall be carried out by the PT Provider.
- The PT Provider shall retain full responsibility for the final assessment of homogeneity and stability, for the documentation of the results and for the decisions taken regarding the suitability of the PT items for use in the current scheme.
- The approaches, criteria, results and conclusions from the assessment of homogeneity and stability shall be documented and included in the final proficiency testing report.

### 13. Reporting of results

The results shall be reported using the **Results Sheet /F 7.2.1-7/**, which shall be sent to the participants by e-mail in accordance with the deadline specified in Clause 10.

### 14. Detailed description of the statistical analysis to be used and criteria for evaluation of the participants' performance

- The statistical analysis shall be performed in accordance with ISO/IEC 17043:2023, ISO 13528:2022 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 per participant shall be used for each 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:
  - the assigned value;
  - the standard uncertainty of the assigned value;
  - the 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 participants' results, in accordance with ISO 13528:2022.
- The standard uncertainty of the assigned value shall be determined in accordance with the selected approach for the determination of the assigned value and **Procedure P 7.2.3**.
- The results from the assessment of homogeneity and stability shall be used to confirm the suitability of the proficiency testing items for use in the current scheme.
- Prior to statistical processing, a check shall be performed for:
  - technical validity of the submitted results;
  - compliance with the required format, units, rounding and presentation of the results;
  - presence of errors in recording, data transfer, recalculation or other obvious inconsistencies.
- Blunders shall be treated in accordance with ISO 13528:2022, Clause 6.3 and **Procedure P 7.2.3**. Where an obvious technical reason is identified, 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 and limitation of the influence of outlying results on the summary statistics, statistical approaches such as the interquartile range (IQR) method, Grubbs' test and the three-sigma criterion may be applied, where appropriate to the specific data set. The methods used, the justification for their application and the decisions regarding inclusion, flagging or exclusion of results shall be documented in the final report.
- The evaluation of participants' performance shall be performed using a z-score. Where the standard uncertainty of the assigned value is not negligible relative 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 to the z-score, the z-score shall be used as the primary performance score, and the z'-score may be presented for information in the final report. Where the z'-score leads to a different interpretation of performance, the final evaluation shall be based on the z'-score, and the decision shall be documented in the final report.
- Where the participant has reported the uncertainty of the result in the required format, a  $\zeta$ -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 a z'-score or  $\zeta$ -score is used, the results shall be interpreted in an analogous manner, unless another justified evaluation criterion is specified in the final report.
- Results from an external provider or from a laboratory related to it, where such a laboratory participates in the scheme, shall be processed in accordance with the rules defined in Section 3 of the present plan.
- Detailed information regarding the statistical methods used, assumptions made, evaluation criteria, treatment of invalid results, blunders and outlying results, and the sources used shall be provided in the final proficiency testing report.

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

The assigned value for each characteristic shall be determined as a consensus value based on 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”**.

For the determination of the assigned value, a robust statistical approach shall be applied to the results reported by the participants in accordance with the requirements of the scheme.

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

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

The assigned value, determined as a consensus value from participants' results, shall not constitute a certified reference value or an independently established reference value. It shall be used solely for the purpose of performance evaluation within the current proficiency testing scheme.

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

The methods used, assumptions made, criteria applied, results obtained and conclusions drawn regarding 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 proficiency testing report.

## 16. Treatment of results from different test methods, where permitted by the PT scheme

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

## 17. Public Availability of Information Received from Participants and of the Final Report

The information received from the participants in relation to the current 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 concerning its own results and evaluation, while maintaining confidentiality with respect to other participants. Information enabling the identification of other participants or their results shall not be provided, except in 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 required by applicable regulatory provisions.

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

Verification of the authenticity of an issued certificate through the “Registry” section on the official website of PTS Bulgaria Ltd shall not be considered as public disclosure of results or performance evaluations. During such verification, only the information necessary for identification and confirmation of the certificate shall be displayed, without disclosure of 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.

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- Proficiency testing items shall be dispatched to participants by courier service. Participants shall be notified by e-mail upon dispatch of the shipment and, where available, tracking information shall be provided.
- In the event of a delivery delay, 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 valid participation cannot be ensured due to loss, significant delay or damage to the item prior to its receipt by the participant, the PT provider shall decide whether to dispatch a reserve sample, refund the participation fee or exclude the participant from the scheme.
- Upon receipt of the item, the participant shall check the condition of the cardboard box, the metal can and the lid, and shall complete the **Protocol for PT Item Receipt /F 7.3.4-1/**, which shall be submitted to the PT provider by e-mail.
- In the event of an open or visibly damaged can, contamination, discrepancy between the received sample and the information provided by the PT provider by e-mail, or any doubt regarding the suitability of the sample, the participant shall notify the PT provider prior to performing the tests and shall provide objective evidence, including photographic evidence where applicable.
- In the event of confirmed loss, damage or unsuitability of the item, the PT Provider shall assess the impact on the validity of participation and, where possible, shall arrange dispatch of a reserve sample from the same prepared batch.

## 19. Feedback and communication with the participants

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- 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 current 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. Application for Participation in the proficiency testing scheme

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- 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.**

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- 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.

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## 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.

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## 22. Contacts

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**Date**

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**PT Scheme Manager**