



## PROFICIENCY TESTING PLAN

### **ZAP 2025/1 – Testing of Asphalt Products**

**(ZAP 1426, 1427, 13398, 12593, 1429, 12697-1, 12697-2+A1, 12697-5, 12697-6, 12697-8, 12697-12, 12697-18, 12697-22, 12697-23, 12697-34, 73 6161)**

**Proficiency Testing Provider at the SZK FAST**

**Veveří 95, 602 00 Brno**

**Czech Republic**

**szk.fce.vutbr.cz  
ptprovider.cz**

Coordinator  
Supervisor  
Approved for PT Provider

Assoc. Prof. Ing. Tomáš Vymazal, Ph.D.  
Ing. Petr Misák, Ph.D.  
Assoc. Prof. Ing. Tomáš Vymazal, Ph.D.

Approved: March 10, 2025  
Approved: March 10, 2025  
Approved: March 10, 2025

## Contents

<b>1 Basic Information about the Proficiency Testing Program</b>	<b>2</b>
<b>2 Implementation of the Proficiency Testing Program</b>	<b>2</b>
2.1 Specifications and Characteristics . . . . .	2
2.2 Environmental Requirements for Individual Procedures . . . . .	6
2.3 Ensuring Homogeneity and Stability . . . . .	6
2.4 Instructions for Eliminating Major Sources of Errors and Risks . . . . .	6
2.5 PTP Procedure . . . . .	7
<b>3 Procedures used in the Statistical Analysis of Laboratory Results</b>	<b>7</b>
<b>4 Certificate of Participation and the Final Report on the Results of Interlaboratory Comparison</b>	<b>7</b>
<b>5 Safeguards for Confidentiality</b>	<b>7</b>
<b>6 Related Documents</b>	<b>7</b>

## 1 Basic Information about the Proficiency Testing Program

The purpose of the proficiency testing program (PTP) is to compare and evaluate the test results of asphalt products according to selected parts of EN 1426 [1], EN 1427 [2], EN 13398 [3], EN 12593 [4], EN 1429 [5], EN 12697-1 [6], EN 12697-2+A1 [7], EN 12697-5 [8], EN 12697-6 [9], EN 12697-8 [10], EN 12697-12 [11], EN 12697-18 [12], EN 12697-22 [13], EN 12697-23 [14], EN 12697-34 [15], and ČSN 73 6161 [16]. This program is intended primarily for participants from European Union countries, with the restriction in place to ensure sample stability during transport.

The goal of the PT program is to provide objective information about the measurement capabilities of PTP participants. The primary criterion for participation is timely registration in the program. The basic requirement for receiving a Certificate of Participation and a Final Report on the results of the precision experiment is the timely payment of the participation fee.

### Important dates:

<b>Application Deadline:</b>	<b>April 30, 2025</b>
<b>Sample Distribution:</b>	<b>May 19–23, 2025</b>
<b>Testing Implementation/Start:</b>	<b>May 26, 2025</b>
<b>Submission of Results to Organizer:</b>	<b>June 6, 2025</b>
<b>Evaluation by:</b>	<b>June 30, 2025</b>

**Submission of test results** – exclusively via <http://ptprovider.cz/OutcomesCode>. To log in, it is necessary to enter the participant's code, which is automatically sent when registering in PTP.

## 2 Implementation of the Proficiency Testing Program

### 2.1 Specifications and Characteristics

Applications for this PTP are accepted from testing laboratories or other interested entities. The minimum number of participants for each part of the program is 6. If the number of participants approaches the minimum, the coordinator may consider evaluating PTP results using Horn's procedure to determine the reference value and its uncertainty. The maximum number of participants is not limited. If the minimum number of participants is not met, the PTP reserves the right to cancel the PTP. In such cases, the procedure follows Chapter 3 of the directive "Management of Appeals and Complaints" [17].

The program is conducted for the following characteristics:

#### 1. EN 1426 [1]

- Characteristic: Determination of Needle Penetration
- Units: 0.1 mm
- Specification according to EN 12591 [18]: Table 1A – for road bitumen 50/70
- Number of determinations: 2 x 3 determinations of penetration on one test sample
- Test specimens: 2 x container with test sample in accordance with EN 1426 [1], section 5.3
- Instructions: Preparation of test containers is specified in EN 1426 [1] - the container is filled in accordance with Chapter 6, and then proceed according to section 6.5 for penetration values up to 330 x 0.1 mm.  
The test is performed according to EN 1426 [1] in accordance with Chapter 8 for binders with a softening point between 28 °C and 80 °C.

#### 2. EN 1427 [2]

- Characteristic: Determination of Softening Point – Ring and Ball Method
- Units: °C
- Specification according to EN 12591 [18]: Table 1A – for road bitumen 50/70

- Number of determinations: 2
- Test specimens: 2 x ring
- Instructions: Preparation of test rings specified in EN 1427 [2] - rings are filled in accordance with Chapter 7.  
The test is conducted according to EN 1427 [2] in accordance with Chapter 8.

3. EN 13398 [3]

- Characteristic: Determination of Elastic Recovery of Modified Bitumens (RE)
- Units: %
- Specification according to EN 14023 [19]: Table 2
- Number of determinations: 2
- Test specimens: 2 x mold
- Instructions: Preparation of test specimens is specified in EN 13398 [3] - molds are filled according to Chapter 6, preheated to 70 °C. The test is performed according to EN 13398 [3] in accordance with Chapter 7.

4. EN 12593 [4]

- Characteristic: Determination of Fraass Breaking Point (T)
- Units: °C
- Specification according to:
  - EN 12591 [18] – Table 1B – for road bitumens
  - EN 14023 [19] – Table 2 – for polymer-modified bitumens
- Number of determinations: 2
- Test specimens: 3 x test plates
- Instructions: Preparation of test plates is specified in EN 12593 [4] – plates are prepared in accordance with Chapter 6, applied manually, for binders with a softening point equal to or lower than 100 °C.  
The test is performed according to EN 12593 [4] in accordance with Chapter 7.

5. EN 1429 [5]

- Characteristic: Determination of Residue on Sieve of Asphalt Emulsions and Determination of Storage Stability
- Units: % (separate as residue on 0.500 mm + 0.500 – 0.160 mm sieve)
- Specification according to EN 13808-1 [20]: Table 2
- Number of determinations: 2 (follow procedure for arbitration test)
- Test sample: 2 x test sample
- Instructions: Preparation of test samples is specified in EN 1429 [5], Chapter 7. The test is conducted according to EN 1429 [5] in accordance with Chapter 8.

6. EN 12697-1 [6]

- Characteristic: Determination of Soluble Binder Content
- Units: %
- Specification according to EN 13108-1 [21]: section 5.2.3
- Number of determinations: 1
- Test sample: 1 x

- Instructions: Preparation of the test sample is specified in EN 12697-1 [6], Chapter 4. Test sample size is specified in EN 12697-28 [22], Table 2. The test is conducted according to EN 12697-1 [6], separation of mineral material in accordance with B.2.1, calculation by difference in section 5.5.2. The calculation of bound binder content according to EN 73 6160 [23] is not applied, per formula A.1 of EN 12697-1 [6].

#### 7. EN 12697-2+A1 [7]

- Characteristic: Determination of Particle Size Distribution
- Units: %
- Specification according to EN 13108-1 [21]: section 5.2.2
- Number of determinations: 1
- Test sample: 1
- Instructions: Preparation of the test sample is specified in EN 12697-2+A1 [7], Chapter 7. Sample size is specified in EN 12697-28 [22], Table 2. The test is conducted according to EN 12697-2+A1 [7], in accordance with Chapter 8.

#### 8. EN 12697-5 [8]

- Characteristic: Determination of Maximum Density
- Units:  $\text{Mg/m}^3$
- Specification according to EN 13108-1 [21]
- Number of determinations: 2
- Test sample: recommended sample mass  $2 \times 600 \text{ g}$
- Instructions: Preparation of the test sample is specified in EN 12697-5 [8], Chapter 7, 1 sample mass  $600 \text{ g} + 10 \text{ g}$ . The test is performed according to EN 12697-5 [8] in accordance with Chapter 9, section 9.2 – volumetric procedure at a water bath test temperature of  $25^\circ\text{C}$ . The test result is the average value of two determinations with an accuracy of  $0.001 \text{ Mg/m}^3$ .

#### 9. EN 12697-6 [9]

- Characteristic: Determination of Bulk Density of Asphalt Specimens
- Units:  $\text{Mg/m}^3$
- Specification according to EN 13108-1 [21]
- Number of determinations: 1 - average of 4 individual determinations
- Test specimens: 4
- Instructions: Preparation of test specimens is specified in EN 12697-6 [9], Chapter 8, and EN 12697-30 [24]. Specimen compaction temperature  $150^\circ\text{C}$ , compacted with a Marshall hammer  $2 \times 50$  blows. The test is conducted according to EN 12697-6 [9] in accordance with Chapter 9, section 9.3. Procedure B: Bulk density – saturated surface dry (SSD).

#### 10. EN 12697-8 [10]

- Characteristic: Determination of Void Content in Asphalt Mixtures
- Units: %
- Specification according to EN 13108-1 [21]: section 5.3.2.1
- Number of determinations: 1
- Test specimens: 0
- Instructions: Determination follows the completion of Test Method No. 9 – Determination of Maximum Density according to EN 12697-5 [8] and Test Method No. 10 – Determination of Bulk Density of Asphalt Specimens according to EN 12697-6 [9]. The test is conducted according to EN 12697-8 [10] in accordance with Chapter 4.

## 11. EN 12697-12 [11]; EN 12697-23 [14]

- Characteristic: ITSR – Water Sensitivity as Indirect Tensile Strength Ratio – Method A
- Units: %, kPa
- Specification according to EN 13108-1 [21]: section 5.3.3
- Number of determinations:
  - 1 x average dry indirect tensile strength (ITS<sub>d</sub>)
  - 1 x average wet indirect tensile strength (ITS<sub>w</sub>)
  - 1 x ITSR
- Test specimens: 6
- Instructions: Preparation of test specimens is specified in EN 12697-12 [11], Chapter 5, section 5.2.3, compacted with an impact compactor according to EN 12697-30 [24] 2 x 25 blows. The test is conducted according to EN 12697-12 [11] in accordance with Chapter 5. Indirect tensile strength determination according to section 5.4(h) of EN 12697-23 [14]. The ITSR value in % is the indirect tensile strength ratio according to EN 12697-12 [11] Chapter 8, section 8.2.m.

## 12. EN 12697-18 [12]

- Characteristic: Determination of Binder Drainage – Chapter 5 – Beaker Method
- Units: %
- Specification according to EN 13108-5 [25]: section 5.3.3
- Number of determinations: 2
- Test batches: 3 sub-batches
- Instructions: Preparation of sub-batches of asphalt mixture is specified in EN 12697-18 [12], Chapter 5, sections 5.4.2–5.4.6. The mixture temperature will be specified in relation to the asphalt binder used. The test is conducted according to EN 12697-18 [12] in accordance with Chapter 5, sections 5.4.7–5.4.10.

## 13. EN 12697-20 [26]

- Characteristic: Determination of Hardness Number on Cube or Marshall Specimens – Penetration depth of the loading pin after 60 minutes
- Units: mm
- Specification according to EN 12970 [27]: Annex A, Table A.1
- Number of determinations: 2
- Test specimens: 2 – cubes (C)
- Instructions: Preparation of test specimens is specified in EN 12697-20 [26] Chapter 5, section 5.1, with reference to section 6.3.2. Test conditions and execution according to EN 12697-20 [26] Chapter 6, section 6.2, Table 1 – test conditions for use of asphalt mixture in pavement construction, test is conducted in accordance with Chapter 6, sections 6.5–6.6.2.

## 14. EN 12697-22+A1 [13]

- Characteristic: Wheel Tracking Test – Small Device, Procedure B in Air
- Units: mm/10<sup>3</sup> cycles; %
- Specification according to EN 13108-1 [21]: section 5.3.5
- Number of determinations: 2
- Test specimens: 2 x test slab of 40 mm thickness
- Instructions: Preparation of test specimens is specified in EN 12697-22+A1 [13] Chapter 7, section 7.2.1.1. The test is conducted according to EN 12697-22+A1 [13] Chapter 8, section 8.3 – Procedure B. The specified test temperature (will be clarified according to the type of mixture being tested):

<b>Mixture:</b>	<b>Binder:</b>	<b>°C</b>
ACO	unmodified	50
ACO	modified	60
ACL	all types	50
SMA	unmodified	50
SMA	modified	60
VMT	all types	50
SMA L	all types	50
BBTM O NH	all types	50
SAL	all types	40

#### 15. ČSN 73 6161 [16]

- Characteristic: Determination of Adhesion of Asphalt Binders to Aggregate – Test with Dry Aggregate
- Units: %
- Specification according to EN 73 6121 [28]: Table E.2, note a
- Number of determinations: 2
- Test sample: 2
- Instructions: Preparation of test samples is specified in EN 73 6161 [16], Chapter 6, section 6.1. The test is performed according to EN 73 6161 [16], Chapter 6, section 6.2, with the working temperature set in Table 1 for binder with penetration 51 to 70.

## 2.2 Environmental Requirements for Individual Procedures

The environmental requirements for each testing procedure are specified by the testing standard according to which the test is performed.

## 2.3 Ensuring Homogeneity and Stability

PTP staff and their potential suppliers are aware of the importance of homogeneity and stability of test specimens for the results of the proficiency testing program. Proficiency testing items are provided in cooperation with SQZ, s.r.o., U místní dráhy 939/5, 77900 Olomouc. Homogeneity and stability of the test specimens are ensured by:

1. producing specimens from a single production batch, and/or
2. dividing specimens made from multiple production batches to ensure homogeneity in the testing of physical-mechanical and durability characteristics,
3. the preparation procedure for test specimens (samples), their size, and shape are always specified by the given testing standard.

## 2.4 Instructions for Eliminating Major Sources of Errors and Risks

PTP participants are required to:

- handle proficiency testing items in the same manner as most routinely tested samples,

- follow the instructions of the PTP staff member responsible for conducting the PTP, particularly regarding the type of test performed, the number of determinations of results, and its timing,
- report measurement uncertainty in accordance with their documented procedures, including the appropriate coverage factor. Unless otherwise specified, participants should use a coverage factor of 2, which corresponds to a confidence level of approximately 95%,
- adhere to the principles and standards of ethical conduct, refraining from dishonest practices that could negatively impact the evaluation of the PT program,
- comply with occupational health and safety (OHS) and fire protection (FP) principles, using only electrical devices and instruments with valid inspections,
- submit the testing results of proficiency testing items to the PTP, including measurement uncertainties, within the deadline specified in Section 1.

## 2.5 PTP Procedure

All additional information, forms, and records not included in this document are currently published at [www.ptprovider.cz](http://ptprovider.cz).

## 3 Procedures used in the Statistical Analysis of Laboratory Results

Procedures used in the statistical analysis of proficiency testing programs can be found here: <http://ptprovider.cz/?lang=en>.

## 4 Certificate of Participation and the Final Report on the Results of Interlaboratory Comparison

The PT Provider gives expert commentary on participant efficiency evaluation in the Final Report as part of training courses the PT Provider organises. The Final Report preserves the anonymity of the PTP participants. Each participant, or the participant's test results, is represented by an ID number. The Certificate of Participation in the PT programme is part of the Final Report. The Certificate is unique to each participant and includes the participant's ID number.

## 5 Safeguards for Confidentiality

The identity of PTP participants is confidential and only known to persons/subjects involved with the PTP. All participant information is considered confidential by the PT Provider. The participant may renounce this confidentiality for the purposes of discussion and mutual assistance until the PTP results are obtained. The PT Provider reveals the proficiency testing results to no third party with the sole exception of a written request by a regulatory authority submitted prior to the commencement of the PTP and which has been granted a written consent by the PTP participants.

## 6 Related Documents

- Quality Handbook of the PT Provider at the SZK FAST
- Cancellation and Complaint Proceedings available at <http://ptprovider.cz/?lang=en> [17]
- MPA 20 – 01 - . . . for application of EN ISO/IEC 17043 Concordance Assessment – General Requirements for Proficiency Testing in the Accreditation System of the Czech Republic.



## References

- [1] EN 1426. *Bitumen and Bituminous Binders - Determination of Needle Penetration*. 2024.
- [2] EN 1427. *Bitumen and Bituminous Binders - Determination of the Softening Point - Ring and Ball Method*. 2015.
- [3] EN 13398. *Bitumen and Bituminous Binders - Determination of the Elastic Recovery of Modified Bitumen*. 2018.
- [4] EN 12593. *Bitumen and Bituminous Binders - Determination of the Fraass Breaking Point*. 2015.
- [5] EN 1429. *Bitumen and bituminous binders - Determination of residue on sieving of bituminous emulsions, and determination of storage stability by sieving*. 2013.
- [6] EN 12697-1. *Bituminous mixtures - Test methods - Part 1: Soluble binder content*. 2020.
- [7] EN 12697-2+A1. *Bituminous mixtures - Test methods - Part 2: Determination of particle size distribution*. 2020.
- [8] EN 12697-5. *Bituminous mixtures - Test methods - Part 5: Determination of the maximum density*. 2020.
- [9] EN 12697-6. *Bituminous mixtures - Test methods - Part 6: Determination of bulk density of bituminous specimens*. 2021.
- [10] EN 12697-8. *Bituminous mixtures - Test methods - Part 8: Determination of void characteristics of bituminous specimens*. 2020.
- [11] EN 12697-12. *Bituminous mixtures - Test methods - Part 12: Determination of the water sensitivity of bituminous specimens*. 2020.
- [12] EN 12697-18. *Bituminous mixtures - Test methods - Part 18: Binder drainage*. 2018.
- [13] EN 12697-22+A1. *Bituminous mixtures - Test methods - Part 22: Wheel tracking*. 2024.
- [14] EN 12697-23. *Bituminous mixtures - Test methods - Part 23: Determination of the indirect tensile strength of bituminous specimens*. 2018.
- [15] EN 12697-34. *Bituminous mixtures - Test methods - Part 34: Marshall test*. 2021.
- [16] ČSN 73 6161. *Determination for adhesion of asphaltic binders to aggregate*. 2000.
- [17] *Cancellation and Complaint Proceedings* – available at [www.ptprovider.cz](http://www.ptprovider.cz).
- [18] EN 12591. *Bitumen and Bituminous Binders - Specifications for Paving Grade Bitumens*. 2009.
- [19] EN 14023. *Bitumen and Bituminous Binders - Specification Framework for Polymer Modified Bitumens*. 2010.
- [20] EN 13808-1. *Bitumen and Bituminous Binders - Framework for Specifying Cationic Bitumen Emulsions*. 2005.
- [21] EN 13108-1. *Bituminous Mixtures - Material Specifications - Part 1: Asphalt Concrete*. 2016.
- [22] EN 12697-28. *Bituminous Mixtures - Test Methods for Hot Mix Asphalt - Part 28: Preparation of Samples for Determining Binder Content, Water Content, and Grading*. 2008.
- [23] ČSN 73 6160. *Methods of Testing Asphalt and Asphalt Mixtures - Determination of Soluble Binder Content by Extraction*. 2006.
- [24] EN 12697-30. *Bituminous Mixtures - Test Methods for Hot Mix Asphalt - Part 30: Specimen Preparation by Impact Compactor*. 2012.
- [25] EN 13108-5. *Bituminous Mixtures - Material Specifications - Part 5: Stone Mastic Asphalt*. 2016.
- [26] EN 12697-20. *Bituminous Mixtures - Test Methods for Hot Mix Asphalt - Part 20: Indentation Using Cube or Cylindrical Specimens*. 2012.
- [27] EN 12970. *Bituminous Mixtures - Test Methods - Determination of the Hardness Number for the Use of Asphalt in Pavement Construction*. 2009.
- [28] ČSN 73 6121. *Roads - Testing Methods - Test for Adhesion of Bitumen to Aggregate*. 1997.