



Unipetrol výzkumně vzdělávací centrum, a.s.



CEN TC336/WG1: Paving Grade Bitumens

Datum: 3. 12. 2019

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- **36. zasedání CEN TC336/WG1**
 - **Atény**
 - **26. a 27. února 2019**
 - **osobní účast**

 - **37. zasedání CEN TC336/WG1**
 - **Dublin**
 - **17. a 18. září 2019**
 - **bez osobní účasti**
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Revize EN 12591, EN 13924-1 a EN 13924-2

- **prEN 12591 – rozhodnuto o**
 - revidovaná EN 12591 nebude publikovaná bez přílohy ZA
 - nový PWI – nová žádost o revizi

 - **EN 13924-1 a EN 13924-2**
 - Publikovány, ale necitovány v OJEU (Official Journal of the European Union)
 - CE značení pouze podle předchozích verzí
 - Část 2 je v současné době v systematické revizi
 - Část 1 bude v revizi v roce 2020
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TG5 - Revize EN 14023

- **Obecné připomínky**
 - Definice polymeru
 - Definice TBR, DV, RV – upravit tak, aby byly v souladu s ostatními normami
 - Vybrané vlastnosti a jejich další vývoj/parametry
 - BBR
 - Vialit
 - Tuhost (stiffness)
 - Specifikace jednotlivých druhů
 - Výběr zkoušky na kohezi
 - většinou se používá silová duktilita (EN 13589), Francie - stanovení tažných vlastností (EN 13587), někdy i kyvadlo Vialit (EN 13588).
 - rozdíl v požadavku na průtažnost vzorku – u 13589 se musí natáhnout na 400 mm a u 13587 na 200 mm. U 13589 se mohou diskriminovat tvrdší pojiva, Španělsko připraví rozbor.
 - RTFOT při 180°C
 - tvrdší PMB, problém s rovnoměrným filmem, vyšší teplota zkoušky může být v rozporu s bodem vzplanutí; vlastnosti pojiv po RTFOT@180°C budou jiné než při 163°C.
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TG5 - Revize EN 14023

- **Reologické zkoušky**

- DSR – stanovení teploty pro moduly tuhosti 5 MPa a 50 kPa
 - snaha popsat tepelnou citlivost a sklon k stárnutí
 - hodnoty tuhosti se stanovily z měření v rozmezí 1 kPa až 10 MPa – geometrie 25 mm pro 1-100 kPa, geometrie 8 mm pro 100 kPa - 10 MPa. Proměření různých druhů asfaltů.
 - jaká je správná metoda výpočtu teplot T1 až T4 z naměřených dat pro 50 kPa a 5 MPa – jak interpolovat výslednou hodnotu teploty – log-log, log-aritm.?
 - **Norsko**
 - zvážit možnost nahrazení bodu měknutí G^* @60°C, eventuálně se může použít T2 z teplotní citlivosti ($G^*=50$ kPa). S hodnotou G^* by se vždy měl uvádět fázový úhel
 - MSCRT Jnr@60°C by měl být doplněn další informací z měření
 - **Zkouška viskozity @135°C**
 - podle EN 13302 je max. napětí pro přístroj 100 s⁻¹ – pro některé přístroje to je příliš vysoká hodnota, protože mají nízký rozsah otáček pro dosažení této hodnoty
 - manipulace s PMB v praxi je okolo 160-190 °C, takže by se dala zvýšit teplota zkoušky
 - **Skladovací stabilita**
 - namísto bodu měknutí by se mohl používat G^* .
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Revize EN 14023

- **DSR Testing Stiffness**
 - Current elevated service temperature proposal
 - temperature at which the binder has a complex shear modulus (G^*) value of 50 kPa
 - Alternative elevated service temperature proposal
 - temperature at which the binder has a complex shear modulus (G^*) value of 15 kPa
 - 15 kPa currently used in German national specifications
 - CEN Enquiry
 - Draft to be submitted 30 September
 - CEN Enquiry expected Q1/2020
 - TG5 to meet again after Enquiry to discuss comments received
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Revize EN 14023

prEN 14023:2017 rev (E)

Table 2 — Specification framework for polymer modified bitumen - Characteristics

CHARACTERISTIC		TEST METHOD	UNIT	0	1	2	3	4	5
Addressing evolution of viscoelastic behaviour and temperature sensitivity: G^* and δ at 1.59 Hz (10 rad·s ⁻¹)	25mm plate Temperature T_0^d for $G^* = 15$ kPa Value of δ at T_0	EN 14770	°C	DV					
			degrees	DV					
	8 mm plate Temperature T_1^d for $G^* = 5$ MPa Value of δ at T_1	EN 12607-1 ^a EN 14770 ^c	°C	DV					
			degrees	DV					
	25 mm plate Temperature T_2^d for $G^* = 15$ kPa Value of δ at T_2		°C	DV					
			degrees	DV					
Addressing the development of viscoelastic properties: G^* and δ at 1.59 Hz (10 rad·s ⁻¹) after long term ageing	8 mm plate Temperature T_3^d for $G^* = 5$ MPa Value of δ at T_3	EN 12607-1 ^a + EN 14769 + EN 14770 ^c	°C	DV					
			degrees	DV					
	25 mm plate Temperature T_4^d for $G^* = 15$ kPa Value of δ at T_4		°C	DV					
			degrees	DV					
Dynamic viscosity at 100 s ⁻¹ ^b @ 135 °C		EN 13302	Pa·s	DV					
Storage stability ^c Difference in softening point		EN 13399 + EN 1427	°C	DV	≤ 5				
Storage stability ^c Difference in penetration		EN 13399 + EN 1426	0,1 mm	DV	≤ 10	≤ 15	≤ 20	≤ 25	
MSCRT after short term ageing: $J_{m,1}$ and % Recovery at 3.2 kPa and @ 60°C ^f		EN 12607-1 ^a + EN 16659	kPa ⁻¹	DV					
			%	DV					
Elastic recovery at 25 °C		EN 13398	%	DV	≥ 80	≥ 70	≥ 60	≥ 50	

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or Elastic recovery at 10 °C	EN 13398	%	DV	≥ 75	≥ 50			
Elastic recovery at 25 °C after short term ageing	EN 12607-1 ^a + EN 13398	%	DV	≥ 70	≥ 60	≥ 50		
or Elastic recovery at 10 °C after short term ageing	EN 12607-1 ^a + EN 13398	%	DV	≥ 50				

a. For some highly viscous polymer modified bitumens it is not possible to carry out the RTFOT at the reference temperature of 163 °C because no continuous binder film is formed. In this case the procedure shall be carried out at 180 °C. The selected conditioning temperature shall be declared.

b. For some viscometers (e.g. when testing highly viscous binders) at 135 °C, the required shear rate (100 s⁻¹) may not be achievable. If different testing parameters (i.e. shear rate or temperature) are used, those condition(s) shall be clearly stated. For Dynamic viscosity testing EN 13302 (rotating spindle) and EN 13702 (cone and plate) may be used. However, in case of dispute, EN 13302 shall be the reference method.

c. Storage conditions of the polymer modified binder shall be given by the supplier. Homogeneity is necessary for polymer modified bitumen. The tendency of polymer modified bitumens to separate during storage may be assessed by the storage stability test (see EN 13399). If the product does not fulfill the properties in Table 2 classes 2 to 5, information shall be given by the supplier regarding storage conditions (such as recommended maximal storage time, recommended stirring, recommended quality checks to ensure binder homogeneity) for the polymer modified bitumen to avoid separation of the components and to ensure the homogeneity of the product.

d. The temperatures T0, T1, T2, T3 and T4 are determined by logarithmic interpolation from two temperatures, one leading to a modulus below and one above the target modulus. The corresponding values of delta shall be determined by linear interpolation.

e. According to EN 14770, testing should be carried out within the linear viscoelastic range.

f. For some binders, it is not possible to carry out the MSCRT at 60°C. In this case the test may be carried out at a different temperature. The selected temperature shall be declared.

NOTE The following data may be given by the supplier of the polymer modified bitumens in the product data sheet:

- polymer dispersion (see EN 13632 [6]);
- solubility (see EN 12592 [7] using the appropriate solvent declared by the supplier);
- handling temperatures;
- minimum storage and pumping temperatures;
- storage conditions;
- maximum and minimum mixing temperatures; for comparison purposes, EN 13302 or EN 13702 should be used;
- density (see EN 15326).

Revize EN 14023

The question whether to include to $T(G^*=15 \text{ kPa})$ or to $T(G^*=50 \text{ kPa})$ in the document is discussed. As there is a local German specification that should be respected, Anja Sørensen asks WG 1 to accept changing the value to 15 kPa. Erik Nielsen and France prefer keeping the value of 50 kPa because it is being used at the moment. Torbjørn Jørgensen is in favour of a change to 15 kPa, as are other WG 1 members.

Decision 01/2019:

It is decided to change T0, T2 and T4 in EN 14023 to $T(G^*=15 \text{ kPa})$. Bernard Schaffner will circulate a notice of this change and the addition of the informative annex to CEN/TC 336.

Action 10/2019:

WG 1 members are to consult laboratories in their countries on experiences and preferences as well as correlations etc. for $T(G^*=15 \text{ kPa})$ as well as $T(G^*=50 \text{ kPa})$. Feedback to TG 5 shall be provided until the end of CEN-enquiry.

Action 11/2019: WG 1 members are to consult laboratories and the mirror committee in their countries on views on MSCRT test temperatures (eg. 60 °C or T2 or other) and to share with WG 1 before the next meeting. Anja Sørensen will contact TG 12 on the issue. Bernard Schaffner addresses the timing of the CEN-enquiry. CCMC has agreed to launch CEN-enquiry mid-January instead of mid-December in order to avoid end of year holidays.

Systematické revize

EN 12606-2:1999, *Bitumen and bituminous binders - Determination of the paraffin wax content - Part 2: Method by extraction*

Result: 13x confirmation, 1x withdrawal

Recommendation 03/2019: considering that the indicator used in EN 12606-2, even though in small quantities, is classified as carcinogenic, no recommendation about the future of **EN 12606-2:1999**, *Bitumen and bituminous binders - Determination of the paraffin wax content - Part 2: Method by extraction* can be made at the moment. Every national mirror committee is to check whether the standard is currently used and to give an opinion via a delegate at the CEN/TC 336 plenary meeting in November.

EN 13924-2:2014, *Bitumen and bituminous binders - Specification framework for special paving grade bitumen - Part 2: Multigrade paving grade bitumens*

Result: 13x confirmation, 4x revision, 9x abstention

The background for the confirmation votes is that experts would like to wait for the new Standardization Request and revise EN 13924-1 and EN 13924-2 together

Recommendation 04/2019: considering the result of the systematic review and comments as given in N 371, WG 1 recommends to CEN/TC 336 to **confirm EN 13924-2:2014**, *Bitumen and bituminous binders - Specification framework for special paving grade bitumen - Part 2: Multigrade paving grade bitumens* and prepare a draft decision accordingly.

EN 12594:2014, *Bitumen and bituminous binders - Preparation of test samples*

Result: 13x confirmation, 7x revision, 6x abstain

Systematické revize

Recommendation 05/2019: considering the result of the systematic review and comments as given in N 425, WG 1 recommends to CEN/TC 336 to **revise EN 12594:2014**, *Bitumen and bituminous binders - Preparation of test samples* and prepare a draft decision accordingly.

EN 12595:2014, *Bitumen and bituminous binders - Determination of kinematic viscosity*

Result: 16x confirmation, 2x revision (5 members prepared to participate in the revision)

Recommendation 06/2019: considering the result of the systematic review and comments as given in N 393, WG 1 recommends to CEN/TC 336 to **revise EN 12595:2014**, *Bitumen and bituminous binders - Determination of kinematic viscosity* and prepare a draft decision accordingly.

EN 12596:2014, *Bitumen and bituminous binders - Determination of dynamic viscosity by vacuum capillary*

Result: 12x confirmation, 3x revision (6 members prepared to participate in the revision)

Recommendation 07/2019: considering the result of the systematic review and comments as given in N 394, WG 1 recommends to CEN/TC 336 to **revise EN 12596:2014**, *Bitumen and bituminous binders - Determination of dynamic viscosity by vacuum capillary* and prepare a draft decision accordingly.

EN 12597:2014, *Bitumen and bituminous binders – Terminology*

Result: 16x confirmation, 4x revision

Recommendation 08/2019: considering the result of the systematic review and comments as given in N 425, WG 1 recommends to CEN/TC 336 to **revise EN 12597:2014**, *Bitumen and bituminous binders – Terminology* and prepare a draft decision accordingly.

Systematické revize

EN 13301:2010, *Bitumen and bituminous binders - Determination of staining tendency of bitumen*

Result: 10x confirm, 1x revise

Recommendation 09/2019: considering the result of the systematic review and comments as given in N 425, WG 1 recommends to CEN/TC 336 to **confirm EN 13301:2010**, *Bitumen and bituminous binders - Determination of staining tendency of bitumen* and prepare a draft decision accordingly.

EN 13304:2009, *Bitumen and bituminous binders - Framework for specification of oxidised bitumens*

Result: 14x confirmation, 1x revise

Recommendation 10/2019: considering the result of the systematic review and comments as given in N 425, WG 1 recommends to CEN/TC 336 to **confirm EN 13304:2009**, *Bitumen and bituminous binders - Framework for specification of oxidised bitumens* and prepare a draft decision accordingly.

EN 13305:2009, *Bitumen and bituminous binders - Framework for specification of hard industrial bitumens*

Result: 13x confirm

Recommendation 11/2019: considering the result of the systematic review and comments as given in N 425, WG 1 recommends to CEN/TC 336 to **confirm EN 13305:2009**, *Bitumen and bituminous binders - Framework for specification of hard industrial bitumens* and prepare a draft decision accordingly.

TG11 – Bod měknutí EN 1427

EN 1427 is due for Systematic Review in July 2020 and will be a key topic at the next WG 1 meeting in spring 2020.

The last meeting of TG 11 took place on the 3rd of September 2019

Action 12/2019: Input about which beakers/stirrers and other equipment is used as well as information on the influence of silicone oil on binder properties

TG12 – Ageing & Rheology and Low Service Temperatures

Review of EN 14769, EN 14770, EN 14771

A kick-off meeting took place on the 11 June 2019, another Audios. The following documents are up for revision and are planned to be worked on within the TG:

- **EN 14769:2012**, *Bitumen and bituminous binders - Accelerated long-term ageing conditioning by a Pressure Ageing Vessel (PAV)*
- **EN 14770:2012**, *Bitumen and bituminous binders - Determination of complex shear modulus and phase angle using a Dynamic Shear Rheometer (DSR)*
- **EN 14771:2012**, *Bitumen and bituminous binders - Determination of the flexural creep stiffness - Bending Beam Rheometer (BBR)*

Action 13/2019:

Anja Sörensen will contact TG 12 to discuss whether 4 mm test systems in DSR should be addressed in EN 14770 as well and provide feedback to WG 1 about this.



Revize 2020

- **EN 1426 (Needlepenetration), July 2020**
 - **EN 1427 (SP RaB), TG11, July 2020**
 - **EN 12593 (Fraass breaking Point), January 2020**
 - **EN 12606-2 (Paraffin wax content by distillation), July 2020**
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Ostatní

- **Mezilaboratorní zkoušky DSR a BBR**
 - Říjen 2018, asfalt 20/30, DSR – 37 laboratoří, BBR – 25 laboratoří
 - Zář 2019, PmB: 45/80-55, DSR, MSCRT, BBR

 - **Crumb Rubber Modified Bitumen**
 - Aktivita Maďarska, ve WG1 neschváleno

 - **Náhrada rtuťových teploměrů**
 - Širší problematika, řešení?
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