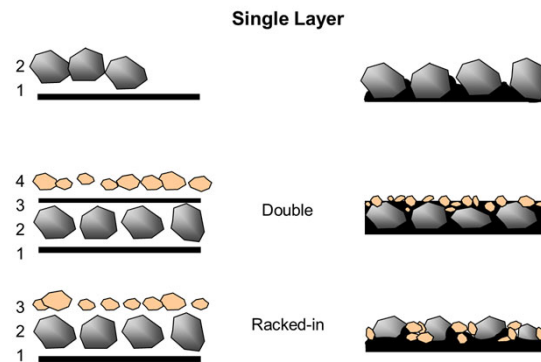




EN12846-1 Efflux time by weighing balance

Mark Smith

Surface Dressing / Chip seal / Ytbehandling



Viscosity of emulsion



SS-EN 13808:2013 (E)

			Performance Classes for the technical requirements of cationic bituminous emulsions										
Technical requirements	Document	Unit	Class 0	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10
Binder content	EN 1428 ^a or EN 1431 ^b EN 1431	% (m/m)			< 38	38 to 42	48 to 52	53 to 57	58 to 62	63 to 67	65 to 69	67 to 71	≥ 69
or Residual binder after distillation ^c		% (m/m)			< 38	≥ 38	≥ 48	≥ 53	≥ 58	≥ 63	≥ 65	≥ 67	≥ 69
					(C35)	(C40)	(C50)	(C55)	(C60)	(C65)	(C67)	(C69)	(C70)
Viscosity													
Efflux time 2 mm at 40 °C	EN 12846-1	s	NR		≤ 20	15 to 70	40 to 130	-	-	-	-	-	-
or Efflux time 4 mm at 40 °C	EN 12846-1	s	NR		-	-	-	5 to 70	40 to 100	-	-	-	-
or Efflux time 4 mm at 50 °C	EN 12846-1	s	NR		-	-	-	-	-	5 to 30	≥ 25	-	-

Efflux viscometer - EN 12846

Viscosity is defined as a fluid's resistance to flow and the emulsion viscosity increases exponentially with bitumen content.



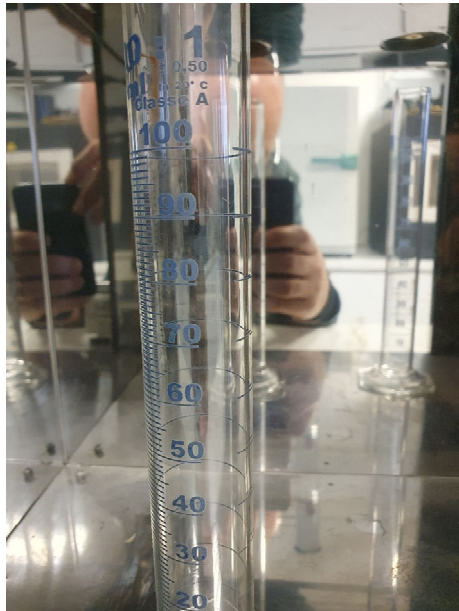
When the binder content exceeds 65%, a slight increase in binder concentration significantly increases the viscosity, which makes manufacture and use of highly concentrated emulsions difficult.



The viscosity is measured with a 2, 4 or 10mm standard viscosity cylinder at a temperature of 25, 40, or 50°C depending on specification.

The results are reported in Standard Tar Viscosity (STV) seconds.

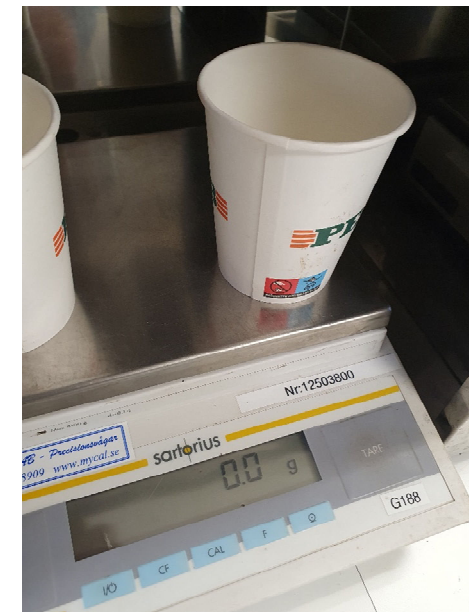
Volume vs. Mass



Time in Seconds
for 50 ml to flow
through 4mm
opening



Time in Seconds
for 50 grams to
flow through
4mm opening



PEAB
Peab Asfalt

Density of Bitumen emulsion ?

- 69% Bitumen (ASTM D 70 / ASTM D 4311) kg/L =

1,015 @ 15°C

1,00 @ 50°C

0,996 @ 150°C

Emulsion density = approx. 1,0 kg/L

- 31% Water

0,999 @ 15°C

0,978 @ 50°C

0,958 @ 100°C

Utrinngstid (internal ringanalys) - Emulsion

Emulsion	Temp	50 ml volume as EN12846-1			Min	Max	50 grams weight			Min	Max
		test a	test b	result			test a	test b	result		
		Repeatability		Repeatability							
26/09/2020											
Nouryon - Sarah Lundgren											
E123 C69R	50.0°C	52.8	54.2	53.5	50.8	56.2	52.3	53.4	52.9	50.2	55.5
23/09/2020											
Peab Asfalt – Mark Smith											
E122 C69R	48.3°C	73.2	74.5	73.9	70.2	77.5	74	74.7	74.4	70.6	78.1
E122 C69R	50.0°C	64.2	64.9	64.6	61.3	67.8	63.3	64.4	63.9	60.7	67.0
28/09/2020											
Peab Asfalt - Garine Garabed		More testing is planned next season									
Västerås											
C67R	41.3°C	11 sec					10 sec				



Utrinngstid (ringanalys) - Glycerol

$$\rho = \frac{m}{V}$$

50°C Gariné		
	cylinder	cup
	11	8,3
g/cm3	1,26	1,26
ml	50	39,7
g	63	50
correction		10,5
ml/sec	4,5	4,8
g/sec	5,7	6,0

50°C Mark		
	cylinder	cup
	10	8,3
g/cm3	1,26	1,26
ml	50	39,7
g	63	50
correction		10,5
ml/sec	5	4,8
g/sec	6,3	6,0

40°C Mark		
	cylinder	cup
	18	14
g/cm3	1,26	1,26
ml	50	39,7
g	63	50
correction		17,6
ml/sec	2,8	2,8
g/sec	3,5	3,6

30°C Mark		
	cylinder	cup
	32	24
g/cm3	1,26	1,26
ml	50	39,7
g	63	50
correction		30,2
ml/sec	1,6	1,7
g/sec	2,0	2,1

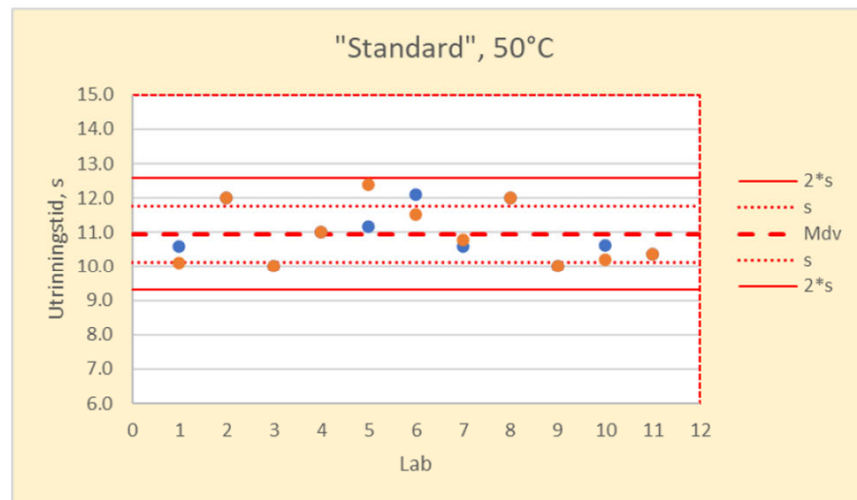


Ringanalys, Bestämning av uttrinningstid för uttrinningsviskosimeter-Del1 Bitumenemulsion

SS-EN 12846-1:2011

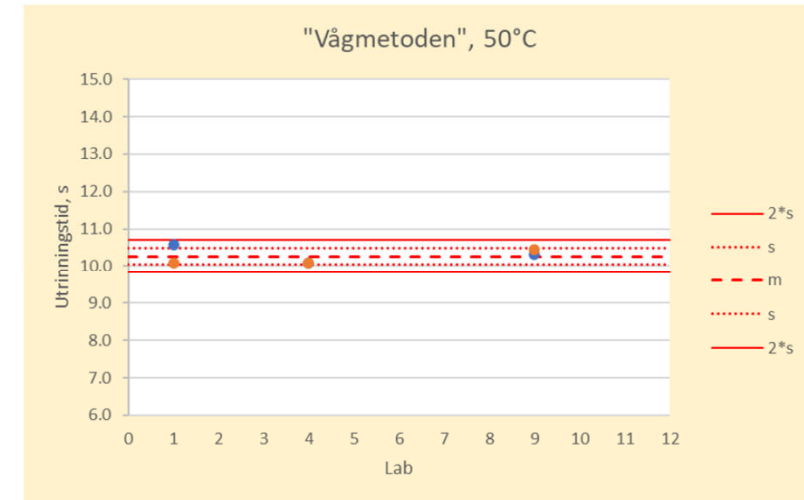
Andreas Waldemarson, VTI

2.1. Resultat "Standard" med koppöppning 4mm och 50°C



Figur 1 Resultat standard 4 mm kopp och 50°C, framräknat medel: 10,9 s.

2.3. Resultat "Vågmetoden" med koppöppning 4mm och 50°C



Figur 3 Resultat "vågmetod" 4 mm kopp och 40°C, framräknat medelvärde: 10,3 s.

De enskilda resultaten är omräknade baserat på 50 g och en densitet på glycerolet på 1,26 g/cm³.

FprEN 12846-1

August 2022

Will supersede EN 12846-1:2011



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

8.3.9 Carry out the test with either the receiver method (reference method) described in 8.3.9.1 or the balance method (alternative method) described in 8.3.9.2. In case of dispute the reference method shall be used. The method used shall be stated in the test report.

8.3.9.1 Pour the light mineral or vegetal oil (5) into the receiver (6.5) up to the 20 ml graduation mark and place the receiver directly under the orifice of the viscometer cup. Lift the valve rod and suspend it on the valve rod support so as to hold the valve at least 16 mm vertically above the orifice. Start the timing device (6.6) when the liquid in the receiver reaches the 25 ml graduation mark and stop it when the liquid reaches the 75 ml graduation mark.

Record the efflux time to the nearest 0,2 s.

8.3.9.2 Place the balance (6.7) tared with a cup on it (i.e. plastic, paper or glass) underneath the orifice of the viscometer cup. Lift the valve rod and suspend it on the valve rod support so as to hold the valve at least 16 mm vertically above the orifice. Start the timing device (6.6) when the liquid in the cup reaches 5,0 g and stop it when the liquid reaches 55,0 g.

NOTE If it is technically possible to connect the balance with a recorder, it can be of interest to plot the relationship between the mass and the time during the measurement.

Record the efflux time to the nearest 0,2 s.

Summary

EN12846-1 Efflux time by weighing balance as an alternative measurement method

- Modern balances can be set up in their menu to show instant readout without having to wait for a stability time.
- Also, the settling time (reaction time) of less than 1,5 seconds is recommended.
- Many balances today can be connected to computers and weight over time can be recorded, which makes the results even more accurate.
- Easier to read results
- Data can be logged and analyzed.
- Less mineral or vegetable oil waste
- Easier cleaning with no need for solvents