

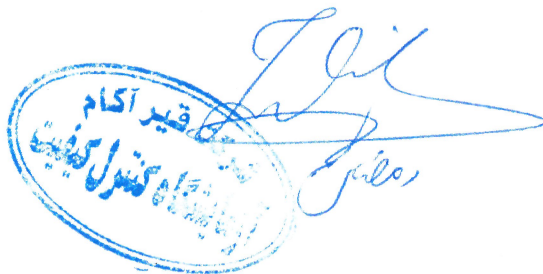
به نام خدا

شرایط آزمون:

آزمون DSR در یک پله بالاتر از دامنه استاندارد زده شد (۱۰۰ درجه سانتی گراد) و آن هم پاس شد.
در آزمون BBR تا دمای ۳۴- آزمون انجام شد که پائین تر از آن برای دستگاه مقدور نمی باشد، و با توجه به نتایج بدست آمده می شود احتمال داد که یک پله پائین تر از آن هم پاس شود.

مشاهدات:

نمونه در دمای پائین تر از ۱۵۰ درجه سانتی گراد نمی توان میکس کرد. و همچنین نمونه بعد از سرد شدن می توان از سطح جدا کرد که برای مثال می توان این را بیان کرد در آزمون نقطه نرمی ، نمونه بعد از پایان تست توانستیم نمونه را از رینگ جدا نمائیم.
برای امتحان چسبندگی نمونه ، نمونه را داخل یک قالب ریخته و پس از سرد شدن ، نمونه را بر روی یک کاغذ قرار داده و بعد از نیم ساعت نمونه بدون اینکه کاغذ را پاره کند از کاغذ جدا شد.



قیر اکام
کنترل کیفیت



AKAM BIL MEN CO

فرم گواهی آزمون آزمایشگاه شرکت قیر آکام

تاریخ:

شماره سریال:

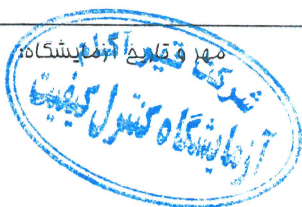
50%V.B 50%Poli	شرح و کد نمونه:	تاریخ تمویل به آزمایشگاه:
	کد نمونه در آزمایشگاه:	تاریخ انجام آزمون ها:
رطوبت: %	دما:	شرایط محیطی در آزمایشگاه:
		1396/07/10
		تاریخ اعلام نتایج:

مشخصه کنترلی	روش آزمون	محدوده پذیرش	نتیجه آزمون	ملاحظات
Penetration	ASTM - D5		90	25C در mm/10
Softening Point	ASTM - D36		+80	C
Ductility	ASTM - D113		72	cm/25c
Solubility	ASTM - D2042		--	در تری کلرو اتیلن
Specific Gravity	ASTM - D 70		--	15.6 °C
Test Spot	T102		--	حلال نفتای سیاه
Drop in Penetration	ASTM - D5&D6		--	%
Mass Loss	ASTM- D6		--	Wt%
Flash Point	ASTM - D92		--	C
Rotational Viscometer	ASTM D4402		3284	est in 163° C

توضیحات و نظرات آزمایشگاه:

آزمایش کننده:

مسئول آزمایشگاه:



این گواهی بدون مهر و امضاء آزمایشگاه بدون اعتبار می باشد.

آدرس: کیلومتر ۲۰ اتوبان قم - تهران، شهرک صنعتی محمود، خیابان دماوند، شرکت قیر آکام

تلفن: 025-33353351-5 فاکس: 025-33353356



AKAMBITUMEN CO.

Performance Grade (PG) form ASTM D6373

1396/07/10

تاریخ:

50%V.B+50%Pol

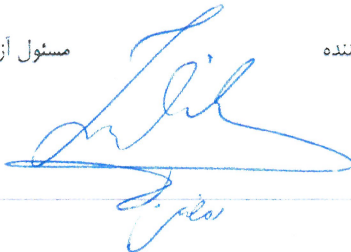
نوع نمونه:

شماره:

مشخصه:

original					
Acceptable Range	Result		unit	Specifications	Test Method
	Fail	Pass			
≥ 1.00		100	°c	Temperature	Dynamic Shear Rheometer (DSR) ASTM D7175
		33.1	°	phase angle (δ)	
		2.04	kPa	G*	
		3.75	kPa	G* /sinδ	
	3284		cst	163°c	Rotational Viscometer (RV) ASTM D4402
	90		0.1mm	in 25°c	Penetration ASTM D5
Rolling Thin Film Oven (RTFO) ASTM D2872					
≥ 2.2		100	°c	Temperature	Dynamic Shear Rheometer (DSR) ASTM D7175
		41.2	°	phase angle (δ)	
		1.64	kPa	G*	
		2.48	kPa	G* /sinδ	
Pressure Aging Vessel (PAV) ASTM D6521					
≤ 5000		...	°c	Temperature	Dynamic Shear Rheometer (DSR) ASTM D7175
			°	phase angle (δ)	
			kPa	G*	
			kPa	G* × sinδ	
	-34		°c	(Temperature)	Bending Beam Rheometer (BBR) ASTM D6648
≥ 0.3	0.312			m-Value	
≤ 300	97.73		Mpa	Stiffness	

توضیحات: به پیوست توضیحاتی در مورد تست های انجام شده موجود است.

	مسئول آزمایشگاه 	آزمایش کننده
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نشانی: کیلومتر ۲۰ اتوبان قهرمان - شهرک صنعتی محمود آباد - کوچه دماوند - شهرک فیر اکام

تلفن: 025-33353351-5

فکس: 025-33353356

===== TEST PARAMETERS:

```

file name          : E:\Hamid\Falah & Memariyan(Polimer50%)\RTFO\Mr MemariyanPolime
ta series         : Grading: RTFO RESIDUE Polimer 50%&V.B 1
ed measuring points : I 2, P 11 ... I 2, P 20
ce of test        : 9/29/17
ne of test        : 1:34:05
erator           :
mple             : PGXX-XX 100 °C
ark              :
asuring device    : SmartPave102 SN81640782; FW3.86; Slot(3,-1); Adj(201,0)d
perature control unit : TU1=P-PTD200+H-PTD120-SN81639380-81639229
asuring system   : PP25/PE-SN37001
    Diameter      : 25.00 mm
    Gap           : 1.000 mm
  
```

ASURING DATA:

Time [s]	Temp. [°C]	Freq. [rad/s]	Deform. [%]	G* [kPa]	delta [°]
190.2	100.0	10.0	10.00	1.64	41.2
196.2	100.0	10.0	10.00	1.64	41.2
202.2	100.0	10.0	10.00	1.64	41.2
208.2	100.0	10.0	10.00	1.64	41.2
214.2	100.0	10.0	10.00	1.64	41.3
220.3	100.0	10.0	10.00	1.64	41.3
226.3	100.0	10.0	10.00	1.64	41.3
232.3	100.0	10.0	10.00	1.64	41.3
238.3	100.0	10.0	10.00	1.64	41.3
244.3	100.0	10.0	10.00	1.64	41.3

TEST RESULTS:

```

an frequency      : 10.0 rad/s = 1.59 Hz
an strain amplitude : 10.00 %
an stress amplitude : 0.164 kPa
an phase angle     : 41.3 °
an complex modulus |G*| : 1.64 kPa
an temperature lower plate : 100.0 °C
an temperature sample : 100.0 °C
  
```

EVALUATION RESULTS:

```

mber of data points : 10
*/sin(delta)        : 2.49 kPa
Standard deviation   : 0.00571 kPa
Median               : 2.49 kPa
Confidence Interval (95%) : 2.48 ... 2.49 kPa
SHTO T315 RTFO PERFORMANCE CRIT. : |G*|/sin(delta) >= 2.20 kPa
  
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=====

This sample is found to P A S S at 100.0 °C

=====

The test temperature is not according to AASHTO T315!

=====

RTFO

~~DSR~~ DSR 100°C

TEST PARAMETERS:

File name : E:\Hamid\Falah & Memariyan(Polimer50%)\Original\Memar50%Poli.c
 Test series : Grading: ORIGINAL Mr Memarzade 50%Poli 4
 Load measuring points : I 2, P 11 ... I 2, P 20
 Date of test : 9/28/17
 Time of test : 21:34:09
 Operator :
 Sample : PGXX-XX 100 °C
 Mark :
 Measuring device : SmartPave102 SN81640782; FW3.86; Slot(3,-1); Adj(201,0)d
 Temperature control unit : TU1=P-PTD200+H-PTD120-SN81639380-81639229
 Measuring system : PP25/PE-SN37001
 Diameter : 25.00 mm
 Gap : 1.000 mm

MEASURING DATA:

Time [s]	Temp. [°C]	Freq. [rad/s]	Deform. [%]	G* [kPa]	delta [°]
146.3	100.0	10.0	12.00	2.05	33.1
148.3	100.0	10.0	12.00	2.05	33.1
150.3	100.0	10.0	12.00	2.05	33.1
152.3	100.0	10.0	12.00	2.05	33.1
154.3	100.0	10.0	12.00	2.04	33.1
156.3	100.0	10.0	12.00	2.04	33.1
158.3	100.0	10.0	12.00	2.04	33.1
160.3	100.0	10.0	12.00	2.04	33.1
162.3	100.0	10.0	12.00	2.04	33.1
164.3	100.0	10.0	12.00	2.04	33.1

TEST RESULTS:

Test frequency : 10.0 rad/s = 1.59 Hz
 Test strain amplitude : 12.00 %
 Test stress amplitude : 0.245 kPa
 Test phase angle : 33.1 °
 Test complex modulus |G*| : 2.04 kPa
 Test temperature lower plate : 100.0 °C
 Test temperature sample : 100.0 °C

EVALUATION RESULTS:

Number of data points : 10
 |G*|/sin(delta) : 3.75 kPa
 Standard deviation : 0.00408 kPa
 Median : 3.75 kPa
 Confidence Interval (95%) : 3.74 ... 3.75 kPa
 AASHTO T315 ORIG. BINDER PERF. CRIT.: |G*|/sin(delta) >= 1.00 kPa

This sample is found to PASS at 100.0 °C

The test temperature is not according to AASHTO T315!

original
 DSR 100°C

Time	Temp.	Freq.	Deform.	G'1	delta
[s]	[°C]	[rad/s]	[%]	[kPa]	[°]
147.6	94.0	10.0	12.00	2.49	28.9
149.6	94.0	10.0	12.00	2.49	28.9
151.7	94.0	10.0	12.00	2.49	28.9
153.7	94.0	10.0	12.00	2.49	29.0
155.7	94.0	10.0	12.00	2.49	29.0
157.7	94.0	10.0	12.00	2.49	29.0
159.7	94.0	10.0	12.00	2.48	29.0
161.7	94.0	10.0	12.00	2.48	29.0
163.7	94.0	10.0	12.00	2.48	29.0
165.7	94.0	10.0	12.00	2.48	29.0

```

an frequency           : 10.0 rad/s = 1.59 Hz
an strain amplitude    : 12.00 %
an stress amplitude    : 0.296 kPa
an phase angle        : 29.0 °
an complex modulus |G*| : 2.49 kPa
an temperature lower plate : 94.0 °C
an temperature sample   : 94.0 °C

```

```

Number of data points      :      10
*1/sin(delta)             :      5.13 kPa
Standard deviation        :  0.00505 kPa
Median                   :      5.13 kPa
Confidence Interval (95%) :      5.13 ... 5.14 kPa
3HTO T315 ORIG. BINDER PERF. CRIT.: |G*|/sin(delta) >= 1.00 kPa

```

The test temperature is not according to AASHTO T315!

original
DSR 94°C

===== TEST PARAMETERS:

File name : E:\Hamid\Falah & Memariyan(Polimer50%)\Original\Memar50%Poli.c
 Test series : Grading: ORIGINAL Mr Memarzade 50%Poli 2
 Test measuring points : 1 2, P 11 ... 1 2, P 20
 Date of test : 9/28/17
 Time of test : 20:26:48
 Operator :
 Sample : PGXX-XX 88 °C
 Mark :
 Measuring device : SmartPave102 SN81640782; FW3.86; Slot(3,-1); Adj(201,0)d
 Temperature control unit : TU1=P-PTD200+H-PTD120-SN81639380-81639229
 Measuring system : PP25/PE-SN37001
 Diameter : 25.00 mm
 Gap : 1.000 mm

ASURING DATA:

Time [s]	Temp. [°C]	Freq. [rad/s]	Deform. [%]	[G*] [kPa]	delta [°]
147.6	88.0	10.0	12.00	2.88	27.3
149.6	88.0	10.0	12.00	2.88	27.3
151.7	88.0	10.0	12.00	2.88	27.3
153.7	88.0	10.0	12.00	2.88	27.3
155.7	88.0	10.0	12.00	2.88	27.3
157.7	88.0	10.0	12.00	2.88	27.3
159.7	88.0	10.0	12.00	2.88	27.3
161.7	88.0	10.0	12.00	2.88	27.3
163.7	88.0	10.0	12.00	2.88	27.3
165.7	88.0	10.0	12.00	2.88	27.3

TEST RESULTS:

Test frequency : 10.0 rad/s = 1.59 Hz
 Test strain amplitude : 12.00 %
 Test stress amplitude : 0.345 kPa
 Test phase angle : 27.3 °
 Test complex modulus [G*] : 2.88 kPa
 Test temperature lower plate : 88.0 °C
 Test temperature sample : 88.0 °C

EVALUATION RESULTS:

Number of data points : 10
 $G^*/\sin(\delta)$: 6.27 kPa
 Standard deviation : 0.00526 kPa
 Median : 6.27 kPa
 Confidence Interval (95%) : 6.27 ... 6.28 kPa
 SHTO T315 ORIG. BINDER PERF. CRIT.: $G^*/\sin(\delta) \geq 1.00$ kPa

=====
 This sample is found to PASS at 88.0 °C
 =====
 This is the highest tested Original Binder temperature which passes, the starting performance grade for RTFO test is 88.
 Start temperature of subsequent RTFO test to 88 °C.
 =====

original
 DSR 88°C

===== ST PARAMETERS:

le name : E:\Hamid\Falah & Memariyan(Polimer50%)\Original\Memar50%Poli.c
 ta series : Grading: ORIGINAL Mr Memarzade 50%Poli 1
 ed measuring points : I 2, P 11 ... I 2, P 20
 te of test : 9/28/17
 ne of test : 19:41:53
 erator :
 mple : PGXX-XX 82 °C
 ark :
 asuring device : SmartPavel02 SN81640782; FW3.86; Slot(3,-1); Adj(201,0)d
 mperature control unit : TU1=P-PTD200+H-PTD120-SN81639380-81639229
 asuring system : PP25/PE-SN37001
 Diameter : 25.00 mm
 Cap : 1.000 mm

ASURING DATA:

Time	Temp.	Freq.	Deform.	G*	delta
[s]	[°C]	[rad/s]	[%]	[kPa]	[°]
147.4	82.0	10.0	12.00	3.25	28.0
149.4	82.0	10.0	12.00	3.25	28.0
151.4	82.0	10.0	12.00	3.25	28.0
153.4	82.0	10.0	12.00	3.25	28.0
155.4	82.0	10.0	12.00	3.25	28.0
157.4	82.0	10.0	12.00	3.25	28.0
159.4	82.0	10.0	12.00	3.25	28.1
161.4	82.0	10.0	12.00	3.25	28.1
163.5	82.0	10.0	12.00	3.25	28.1
165.5	82.0	10.0	12.00	3.25	28.1

ST RESULTS:

an frequency : 10.0 rad/s = 1.59 Hz
 an strain amplitude : 12.00 %
 an stress amplitude : 0.390 kPa
 an phase angle : 28.0 °
 an complex modulus |G*| : 3.25 kPa
 an temperature lower plate : 82.0 °C
 an temperature sample : 82.0 °C

ALUCATION RESULTS:

number of data points : 10
 |G*|/sin(delta) : 6.91 kPa
 Standard deviation : 0.00340 kPa
 Median : 6.91 kPa
 Confidence Interval (95%) : 6.91 ... 6.91 kPa
 SHTO T315 ORIG. BINDER PERF. CRIT.: |G*|/sin(delta) >= 1.00 kPa

=====

This sample is found to P A S S at 82.0 °C

=====

this is the highest tested Original Binder temperature which
 passes, the starting performance grade for RTFO test is 82.
 start temperature of subsequent RTFO test to 82 °C.

=====

original

DSR 82°C

50%Polim.R

Test Identification

Operator:
Start Time: 29-Sep-2017 at 01:39:50
Test Type: BBR Specimen Test
Project ID: 50%Polim
Specimen Number:
Specimen Dimensions: 120.00 mm x 12.20 mm x 6.30 mm
File Name: 50%Polim.S

Test Results

t Time (sec)	P Load (mN)	d Defl (mm)	Measured Stiffness (MPa)	Estimated Stiffness (MPa)	Difference (%)	m-value
0.0	17.2	0.0199	--	--	--	--
0.5	1014.2	0.4612	--	--	--	--
8.0	1028.5	1.0529	138.3261	138.2007	-0.090666	0.270594
15.0	1027.5	1.2565	115.8055	115.9530	0.127400	0.287851
30.0	1026.5	1.5416	94.2991	94.3553	0.059554	0.306880
60.0	1026.4	1.9167	75.8297	75.7743	-0.073036	0.325908 *
120.0	1025.8	2.4164	60.1132	60.0551	-0.096622	0.344937
240.0	1025.8	3.0948	46.9386	46.9731	0.073611	0.363966
250.0	14.7	2.0689	--	--	--	--

Correlation Coefficient $R^2 = 0.9999971$

Regression Coefficients: A = 5.359104, B = -0.213508, C = -0.031606

Minimum and Maximum Load from 0.5 to 240 s was 1014.2 and 1030.8 mN.

Average Load from 0.5 to 240 s was 1025.8 mN.

Maximum Load Deviation from 0.5 to 5 s was 11.6 mN.

Maximum Load Deviation from 5.0 to 240 s was 4.2 mN.

Minimum and Maximum Temperature from 0.5 to 240 s was -19.9 and -19.9 c.

Test Conditions

This test was performed using an Applied Test Systems Bending Beam Rheometer, serial number 14-12353, device ID ATS BBR 01, using software version 5.01.

Elapsed Time In Bath: 0 minutes

The most recent machine calibrations were:

Type	Date	Result
Deflection (LVDT)	28-Sep-2017	1.851E+00 um/(ADC Count)
Load (Load Cell)	28-Sep-2017	1.738E+01 mN/(ADC Count)
Compliance	28-Sep-2017	6.133E+00 um/N
Confidence Check	24-Sep-2015	2.248E+02 GPa
Temperature (RTD)	24-Jun-2015	

NOTES:

BBR at -28°C

50%Polim.R01

Test Identification

Operator:
Start Time: 29-Sep-2017 at 03:19:17
Test Type: BBR Specimen Test
Project ID: 50%Polim
Specimen Number: 01
Specimen Dimensions: 120.00 mm x 12.20 mm x 6.30 mm
File Name: 50%Polim.S01

Test Results

t Time (sec)	P Load (mN)	d Defl (mm)	Measured Stiffness (MPa)	Estimated Stiffness (MPa)	Difference (%)	m-value
0.0	23.0	0.0169	--	--	--	--
0.5	993.2	0.3878	--	--	--	--
8.0	996.3	0.8187	172.3354	172.2319	-0.060027	0.250289
15.0	996.1	0.9652	146.1489	146.2618	0.077256	0.269729
30.0	995.6	1.1715	120.3567	120.4226	0.054791	0.291165
60.0	995.5	1.4425	97.7370	97.6860	-0.052124	0.312601 *
120.0	995.1	1.8036	78.1316	78.0735	-0.074299	0.334037
240.0	995.4	2.2940	61.4449	61.4784	0.054521	0.355473
250.0	22.5	1.4942	--	--	--	--

Correlation Coefficient $R^2 = 0.9999984$

Regression Coefficients: A = 5.433109, B = -0.185981, C = -0.035604

Minimum and Maximum Load from 0.5 to 240 s was 993.2 and 997.5 mN.
Average Load from 0.5 to 240 s was 995.5 mN.
Maximum Load Deviation from 0.5 to 5 s was 2.3 mN.
Maximum Load Deviation from 5.0 to 240 s was 1.6 mN.
Minimum and Maximum Temperature from 0.5 to 240 s was -21.9 and -21.9 C.

Test Conditions

This test was performed using an Applied Test Systems Bending Beam Rheometer, serial number 14-12353, device ID ATS BBR 01, using software version 5.01.

Elapsed Time In Bath: 0 minutes

The most recent machine calibrations were:

Type	Date	Result
Deflection (LVDT)	28-Sep-2017	1.851E+00 um/(ADC Count)
Load (Load Cell)	28-Sep-2017	1.738E+01 mN/(ADC Count)
Compliance	28-Sep-2017	6.133E+00 um/N
Confidence Check	24-Sep-2015	2.248E+02 GPa
Temperature (RTD)	24-Jun-2015	

NOTES:

BBR at -34°C