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Requirement for Asphalt cement ASTM D946
Product Specifications **Bitumen 40-50**

Analysis	Unit	Limit	Test Method
Density @ 25°C	kg/m ³	1010-1060	ASTM D70 or D3289
Penetration @ 25°C	mm/10	40-50	ASTM D5
Softening point	°C	49 min	ASTM D36
Ductility @ 25°C	cm	100 min	ASTM D113
Loss on heating	wt%	0.2 max	ASTM D6
Drop in penetration after heating	%	20 max	ASTM D5
Flash point	°C	230 min	ASTM D92
Solubility in Trichloroethylene	wt%	99.0 min	ASTM D2042
Spot test	- - -	Negative	AASHTO T102
Dynamic Viscosity @ 60°C	Pa.S	400±80	ASTM D2171
Kinematic Viscosity @ 135°C	cSt	400 min	ASTM D2170
Wax Content	%	2 max	DIN EN 12606-1

Tests on residue from thin film oven Test (ASTM D1754)

Retained Penetration after (T.F.O.T), %	%	55 min	ASTM D5
Viscosity @ 60°C	Pa.S	2000 max	ASTM D2171



Requirement for Asphalt cement ASTM D946
Product Specifications **Bitumen 60-70**

Analysis	Unit	Limit	Test Method
Density @ 25°C	kg/m ³	1010-1060	ASTM D70 or D3289
Penetration @ 25°C	mm/10	60-70	ASTM D5
Softening point	°C	46 min	ASTM D36
Ductility @ 25°C	cm	100 min	ASTM D113
Loss on heating	wt%	0.2 max	ASTM D6
Drop in penetration after heating	%	20 max	ASTM D5
Flash point	°C	230 min	ASTM D92
Solubility in Trichloroethylene	wt%	99.0 min	ASTM D2042
Spot test	----	Negative	AASHTO T102
Dynamic Viscosity @ 60°C	Pa.S	200±40	ASTM D2171
Kinematic Viscosity @ 135°C	cSt	300 min	ASTM D2170
Wax Content	%	2 max	DIN EN 12606-1

Tests on residue from thin film oven Test (ASTM D1754)

Retained Penetration after (T.F.O.T), %	%	52 min	ASTM D5
Ductility, (25°C), 5cm/min, cm after TFOT	cm	50 min	ASTM D113
Viscosity @ 60°C	Pa.S	1000 max	ASTM D2171





Requirement for Asphalt cement ASTM D946
Product Specifications **Bitumen 85-100**

Analysis	Unit	Limit	Test Method
Density @ 25°C	kg/m ³	1010-1050	ASTM D70 or D3289
Penetration @ 25°C	mm/10	85-100	ASTM D5
Softening point	°C	42 min	ASTM D36
Ductility @ 25°C	cm	100 min	ASTM D113
Loss on heating	wt%	0.5 max	ASTM D6
Drop in penetration after heating	%	20 max	ASTM D5
Flash point	°C	230 min	ASTM D92
Solubility in Trichloroethylene	wt%	99.0 min	ASTM D2042
Spot test	- - -	Negative	AASHTO T102
Dynamic Viscosity @ 60°C	Pa.S	100±20	ASTM D2171
Kinematic Viscosity @ 135°C	cSt	250 min	ASTM D2170
Wax Content	%	2 max	DIN EN 12606-1
Tests on residue from thin film oven Test (ASTM D1754)			
Retained Penetration after (T.F.O.T), %	%	47 min	ASTM D5
Ductility, (25°C), 5cm/min, cm after TFOT	cm	75 min	ASTM D113
Viscosity @ 60°C	Pa.S	500max	ASTM D2171



Requirement for Asphalt cement ASTM D946
Product Specifications **Bitumen 120-150**

Analysis	Unit	Limit	Test Method
Density @ 25°C	kg/m ³	1000-1050	ASTM D70 or D3289
Penetration @ 25°C	mm/10	120-150	ASTM D5
Softening point	°C	37 min	ASTM D36
Ductility @ 25°C	cm	100 min	ASTM D113
Loss on heating	wt%	0.5 max	ASTM D6
Drop in penetration after heating	%	20 max	ASTM D5
Flash point	°C	220 min	ASTM D92
Solubility in Trichloroethylene	wt%	99.0 min	ASTM D2042
Spot test	---	Negative	AASHTO T102
Dynamic Viscosity @ 60°C	Pa.S	45±9	ASTM D2171
Kinematic Viscosity @ 135°C	cSt	170 min	ASTM D2170
Wax Content	%	2 max	DIN EN 12606-1

Tests on residue from thin film oven Test (ASTM D1754)

Retained Penetration after (T.F.O.T), %	%	42 min	ASTM D5
Ductility, (25°C), 5cm/min, cm after TFOT	cm	100 min	ASTM D113
Viscosity @ 60°C	Pa.S	225 max	ASTM D2171



Requirement for Paving Grade Bitumen EN 12591
Products Specifications

Characteristic	Unit	35-50	50-70	70-100	100-150	160-220	Test Method
Penetration @ 25°C	dmm	35-50	50-70	70-100	100-150	160-220	EN 1426
Softening Point	°C	50-58	46-54	43-51	39-47	35-43	EN 1427
Resistance to Hardening @163°C:							
Retained Penetration	%	53 min	50 min	46 min	43 min	37 min	EN 12607-1
Change of Mass	%	0.5 max	0.5 max	0.8 max	0.8 max	1.0 max	
Flash Point	°C	240 min	230 min	230 min	230 min	220min	EN ISO 2592
Solubility	%	99.0 min	99.0 min	99.0 min	99.0 min	99.0min	EN 12592
Penetration Index	-	-1.5 to +0.7	-1.5 to +0.7	-1.5 to +0.7	-1.5 to +0.7	-1.5 to +0.7	EN 12591-Annex A
Dynamic Viscosity @60°C	Pa.S	225 min	145 min	90 min	55 min	30 min	EN 12596
Fraass Breaking Point	°C	-5 max	-8 max	-10 max	-12 max	-15 max	EN 12593
Kinematic Viscosity @ 135°C	cSt	370 min	295 min	230 min	175 min	135 min	EN 12595



Requirement for Asphalt cement SM GOST 22245-90
Product Specifications Bitumen 60-90

Specifications	60-90	Test Method
Specific Gravity	1.00-1.25	ASTM D3289
Penetration (25°C, 100g, 5s), 0.1mm	60-90	ASTM D5
Softening point,°C	40-60	ASTM D36
Flash point,°C	min 230	ASTM D92
Ductility (25°C, 5cm/min),cm	min 100	ASTM D113
Solubility in TCE, wt%	min 99.5	ASTM D4
Spot Test	negative	AASHTO T102
Loss on heating, wt%	max 0.03	ASTM D6



قیرهای طبقه بندی عملکردی (PG)

هدف از تولید قیرهای طبقه بندی عملکردی (PG) با در نظر گرفتن کاربرد آن بر اساس شرایط محیطی، اثرات آب و هوایی، ساخت و ساز، اعمال بار در دوران اجرا و بهره برداری و میزان ترافیک می باشد

Performance Grade (PG)

PG 52 - 28	PG 64 - 22
PG 52 - 22	PG 64 - 16
PG 52 - 16	PG 64 - 10
PG 52 - 10	PG 70 - 22
PG 58 - 22	PG 70 - 16
PG 58 - 16	PG 70 - 10
PG 58 - 10	PG 76 - 10

مزایای استفاده از قیرهای طبقه بندی عملکردی:

- کاهش حساسیت حرارتی
 - افزایش خاصیت الاستیسیته
 - افزایش دامنه سرویس دهی از نظر دما
 - افزایش مقاومت تنشی
 - افزایش عمر کاربری
 - کاهش میزان خرابی جاده ای
- تولید سایر قیرهای (PG) اصلاح شده بنا به درخواست مشتری

Performance Grade	PG52		PG58		PG64		PG70		PG76		Test Method	
	10	16	22	10	16	22	10	16	22	10		
Average 7-day maximum Pavement Design Temperature, °C	≤52		≤58		≤64		≤70		≤76			
minimum Pavement Design Temperature, °C	≥-10	≥-16	≥-22	≥-10	≥-16	≥-22	≥-10	≥-16	≥-22	≥-10		
Original Binder												
Flash Point Temperature, Minimum +2	230										AASHTO T48	
Viscosity maximum 3 Pas, Test Temperature, °C	135										AASHTO T316	
Dynamic Shear G* sin δ minimum 1 kPa Test Temperature, °C	52		58		64		70		76		AASHTO T315	
Rolling Thin Film Oven Test												
Mass change maximum percent	1.00										AASHTO T240	
Dynamic Shear G* sin δ minimum 2.2 kPa Test Temperature @ 10 days, °C	52		58		64		70		76		AASHTO T315	
Pressure Aging Vessel												
PAV aging Temperature, °C	90		100		100		100(110)		100(110)			
Dynamic Shear G* sin δ maximum 5000 kPa Test Temperature @ 10 days, °C	25	22	19	28	25	22	31	28	25	34	31	AASHTO T315
Creep Stiffness S maximum 300 Mpa @ min. maximum 0.300 Test Temperature @ 60s, °C	0	-6	-12	0	-6	-12	0	-6	-12	0	-6	AASHTO T313
Direct Tension Failure strain, minimum 1 % Test Temperature @ 5 min. °C	0	-6	-12	0	-6	-12	0	-6	-12	0	-6	AASHTO T214
Critical low cracking Temperature Critical cracking determined by PFAZ Test Temperature	0	-6	-12	0	-6	-12	0	-6	-12	0	-6	AASHTO PP42



Requirement for Cationic Emulsified Asphalt ASTM D2397
Product Specifications **Bitumen Emulsions**

Specification of Cationic Bitumen Emulsions	Quick - Setting		Rapid - Setting				Medium - Setting				Slow - Setting			
	CQS 1h		CRS 1		CRS 2		CMS 2		CMS 2h		CSS 1		CSS 1h	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Test on emulsions :														
Viscosity, Saybolt Furol at 25°C SFs	20	100	—	—	—	—	—	—	—	—	20	100	20	100
Viscosity, Saybolt Furol at 50°C SFs	—	—	20	100	100	400	50	450	50	450	—	—	—	—
Storage stability test, 24 - h, %A	—	1	—	1	—	1	—	1	—	1	—	1	—	1
Demulsibility, 35 mL, 0.8% dioctyl sodium	—	—	40	—	40	—	—	—	—	—	—	—	—	—
Particle charge test	positive		positive		positive		positive		positive		positive		positive	
Sieve test, %A	—	0.1	—	0.1	—	0.1	—	0.1	—	0.1	—	0.1	—	0.1
Cement mixing test, %	—	N/A	—	—	—	—	—	—	—	—	—	2	—	2
Coating ability and water resistance :														
Coating, dry aggregate	—	—	—	—	—	—	good	—	good	—	—	—	—	—
Coating, after spraying	—	—	—	—	—	—	fair	—	fair	—	—	—	—	—
Coating, wet aggregate	—	—	—	—	—	—	fair	—	fair	—	—	—	—	—
Coating, after spraying	—	—	—	—	—	—	fair	—	fair	—	—	—	—	—
Distillation:														
Oil distillate, by volume of emulsion, %	—	—	3	—	3	—	12	—	12	—	—	—	—	—
Residue, %	57	—	60	—	65	—	65	—	65	—	57	—	57	—
Tests on residue from distillation test:														
Penetration, 25°C, 100 g, 5 s	40	90	100	250	100	250	100	250	40	90	100	250	40	90
Ductility, 25°C, 5 cm/min, cm	40	—	40	—	40	—	40	—	40	—	40	—	40	—
Solubility in trichloroethylene, %	97.5	—	97.5	—	97.5	—	97.5	—	97.5	—	97.5	—	97.5	—



Requirement for Cutback Asphalt (Medium-Curing Type) ASTM D2027
Product Specifications Cutback Bitumen MC

Designation	MC-30		MC-70		MC-250		MC-800		MC-3000	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Kinematic viscosity at 60°C [140°F], mm ² /s	30	60	70	140	250	500	800	1600	3000	6000
Flash point (Tag open-cup), °C [°F]	38 [100]	.....	38 [100]	.....	66[150]	.....	66[150]	.....	66[150]	.....
Distillate test:										
Distillate, volume percent of total distillate to 360°C [680°F]:										
	.....	35	.....	25	.....	20	.....	.....	.....	.....
to 225°C [437°F]	.....	35	.....	25	.....	20	.....	.....	.....	.....
to 260°C [500°F]	30	75	10	70	5	55	.....	40	.....	15
to 316°C [600°F]	75	95	65	93	60	90	45	85	15	75
Residue from distillation to 360°C [680°F], percent volume by difference	50	.....	55	.....	67	.....	75	.....	80	.....
Tests on residue from distillation:										
Viscosity at 60°C [140°F], Pa · s ^A	30	120	30	120	30	120	30	120	30	120
Ductility at 25°C [77°F], cm	100	.....	100	.....	100	.....	100	.....	100	.....
Solubility in trichloroethylene,	99.0%	.....	99.0%	.....	99.0%	.....	99.0%	.....	99.0%	.....
Water, %	.....	0.2	.....	0.2	.....	0.2	.....	0.2	.....	0.2

^A Instead of viscosity of the residue, the specifying agency, at its option, can specify penetration 100 g: 5 s at 25°C [77°F] of 120 to 300 for Grades MC-30, MC-70, and MC-250, and 120 to 250 for MC-800 and MC-3000. However, in no case will both be required.

NOTE 1- If the ductility at 25°C [77°F] is less than 100, the material will be acceptable if its ductility at 15°C [59°F] is more than 100.



Requirement for Cutback Asphalt (Medium-Curing Type) ASTM D2027
Product Specifications Cutback Bitumen MC

Designation	MC-30		MC-70		MC-250		MC-800		MC-3000	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Kinematic viscosity at 60°C [140°F], mm ² /s	30	60	70	140	250	500	800	1600	3000	6000
Flash point (Tag open-cup), °C [°F]	38 [100]	.....	38 [100]	.....	66[150]	.....	66[150]	.....	66[150]	.....
Distillate test:										
Distillate, volume percent of total distillate to 360°C [680°F]:										
	.....	35	.....	25	.....	20	.....	.....	.....	.....
to 225°C [437°F]	30	75	10	70	5	55	.....	40	.....	15
to 260°C [500°F]	75	95	65	93	60	90	45	85	15	75
to 316°C [600°F]	50	.....	55	.....	67	.....	75	.....	80	.....
Residue from distillation to 360°C [680°F], percent volume by difference	50	.....	55	.....	67	.....	75	.....	80	.....
Tests on residue from distillation:										
Viscosity at 60°C [140°F], Pa · s ^A	30	120	30	120	30	120	30	120	30	120
Ductility at 25°C [77°F], cm	100	.....	100	.....	100	.....	100	.....	100	.....
Solubility in trichloroethylene,	99.0%	.....	99.0%	.....	99.0%	.....	99.0%	.....	99.0%	.....
Water, %	.....	0.2	.....	0.2	.....	0.2	.....	0.2	.....	0.2

^A Instead of viscosity of the residue, the specifying agency, at its option, can specify penetration 100 g: 5 s at 25°C [77°F] of 120 to 300 for Grades MC-30, MC-70, and MC-250, and 120 to 250 for MC-800 and MC-3000. However, in no case will both be required.

NOTE 1- If the ductility at 25°C [77°F] is less than 100, the material will be acceptable if its ductility at 15°C [59°F] is more than 100.



Product Specifications Viscosity Grade Bitumen

Conforms to BIS (IS 73:2006) Specifications

	Specification				Test Method
	VG 40	VG 30	VG 20	VG 10	
Absolute Viscosity at 60°C, Poises	Min. 3200	Min. 2400	Min. 1600	Min. 800	IS 1206 (Part 2)
Kinematic Viscosity at 135°C, cSt	Min. 400	Min. 350	Min. 300	Min. 250	IS 1206 (Part 3)
Flash Point (Cleveland Open Cup), °C	Min. 220	Min. 220	Min. 220	Min. 220	IS 1209
Solubility in trichloroethylene, %	Min. 99	Min. 99	Min. 99	Min. 99	IS 1206
Softening Point (R&B), °C	Min. 50	Min. 47	Min. 45	Min. 40	IS 1205
Penetration @ 25°C (100 g, 5 sec.), 0.1 mm	40 - 60	50 - 70	60 - 80	80 - 100	IS 1203

Testson residue from thin film oven Tests/RTFOT

i) Viscosity ratio at 60°C	Max. 4.0	Max. 4.0	Max. 4.0	Max. 4.0	IS 1206 (Part 2)
ii) Ductility at 25°C, cm, after thin film oven test	Min. 25	Min. 40	Min. 50	Min. 75	IS 1208
Specific Gravity @ 27/27 °C	Min. 0.99	Min. 0.99	Min. 0.99	Min. 0.99	IS 1202

