

## Australia Grade

Property	C170		C240		C320		C450		C600	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Viscosity at 60°C, Pa·s	140	200	190	280	260	380	Report		500	700
Viscosity at 135°C, Pa·s	0.25	0.45	0.32	0.55	0.40	0.65	—	0.70	0.60	0.85
Penetration at 25°C (100 g, 5 s), [0.1 mm]	62	—	53	—	40	—	Report		20	—
Flashpoint, °C	250	—	250	—	250	—	250	—	250	—
Matter insoluble in toluene, percent: mass	—	1.0	—	1.0	—	1.0	—	1.0	—	1.0
Viscosity at 60°C, percentage of original after RTFO treatment (Note 2)	—	300	—	300	—	300	—	—	—	300
	—	340	—	340	—	340	—	—	—	340
Viscosity at 60°C after RTFO treatment, Pa·s (Note 2)	—	—	—	—	—	—	750	1150	—	—
	—	—	—	—	—	—	850	1300	—	—
Penetration at 25°C after RTFO treatment (100 g, 5 s), [0.1 mm]	—	—	—	—	—	—	26	—	—	—
Long-term effect of heat and air, days	Report on request						—	—	—	—
Density at 15°C, kg/m <sup>3</sup>	Report on request									
Mass change, percent mass	—	—	—	—	—	—	-0.6	+0.6	—	—



Cutback Bitumen  
MC250

<b>Property</b>	<b>Min</b>	<b>Max</b>	<b>Test Method</b>
<b>Kinematic Viscosity at 60°C(140°F), mm<sup>2</sup>/s</b>	<b>250</b>	<b>500</b>	<b>ASTM D2170</b>
<b>Flash Point (Tag Open –cup), °C(°F)</b>	<b>66(150)</b>	<b>...</b>	<b>ASTM D3143</b>
<b>Distillate test : Distillate, volume percent of total distillate to 360 °C (680 °F)</b>			<b>ASTM D402</b>
<b>To 225 °C (437 °F)</b>	<b>...</b>	<b>10</b>	
<b>To 260 °C (500 °F)</b>	<b>15</b>	<b>55</b>	
<b>To 316 °C (600 °F)</b>	<b>60</b>	<b>87</b>	
<b>Residue from distillation to 360°C(680°F), percent volume by difference</b>	<b>67</b>	<b>...</b>	
<b>Tests on residue from distillation :</b>			
<b>Penetration at 25 °C (77 °F) , 100 gr , 5 s</b>	<b>120</b>	<b>250</b>	<b>ASTM D5</b>
<b>Ductility at 25°C (77 °F) , cm</b>	<b>100</b>	<b>...</b>	<b>ASTM D113</b>
<b>Solubility in trichloroethylene , (% by mass)</b>	<b>99.0</b>	<b>...</b>	<b>ASTM D2042</b>
<b>Water , (% by volume)</b>	<b>...</b>	<b>0.2</b>	<b>ASTM D95</b>

Penetration Grade- ASTM / AASH TO								
Analysis	Unit	40-50	60-70	85-100	120-150	150-200	200-300	Test Method
		Limit						
Density 25°C	kg/m <sup>3</sup>	1010-1060	1010-1060	1000-1050	1000-1050	1000-1050	990-1040	AST M D70 or D3289
Penetration 25°C	mm/10	40-50	60-70	85-100	120-150	150-200	200-300	AST M D5
Softening Point	°C	49 min	46 min	42 min	38 min	36 min	32 min	ASTM D36
Ductility 25°C	cm	100 min	100 min	100 min	100 min	100 min	100 min	ASTM D113
Loss on heating	wt%	0.2 max	0.2 max	0.5 max	0.5 max	0.5 max	1 max	ASTM D6
Drop in penetration after heating	%	20 max	20 max	20 max	20 max	20 max	37 min	ASTM D5
Flash point	°C	232 min	232 min	232 min	218 min	218 min	in min	ASTM D92
Solubility in Trichloroethylene	wt%	99.0 min	99.0 min	99.0 min	99.0 min	99.0 min	99.0 min	ASTM D2042
Spot test	—	Negative	Negative	Negative	Negative	Negative	Negative	AASHTO T 102
Viscosity @60 c	P	4000±800	2000±400	1000±200	450±90	250±50	200±50	AST M D 2171
Viscosity @ 135 c	cSt	400 min	300 min	250 min	170 min	150 min	80 min	ASTM D 2170
Test on Residue From Thin Film Oven Test (ASTM D1754)								
Retained Penetration after (T.F.O.T),%	%	58 min	54 min	50 min	46 min	46 min	40 min	ASTM D5
Ductility, (25 °C),5cm/min , cm after TFOT	cm	50	50	75	100	100	100	ASTM D113
Viscosity c	P	20000 max	10000 max	5000 max	2250 max		1250 max	ASTM D 2171

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	Test Method	Penetration Grade - EN							
		30/45	35/50	40/60	50/70	70/100	100/150	160/220	250/300
Penetration at 25°C	IP 49	30-45	35-50	40-60	50-70	70-100	100-150	160-220	250-300
Softening point °C	IP 58	52-60	50-58	48-56	46-54	43-51	39-47	35-43	30-38
Resistance to hardening at 163°C	IP 460 part 1 or IP 460 part 3								
- change of mass % (max.) -		0.5	0.5	0.5	0.5	0.8	0.8	1,0	1,0
retained penetration (min.) -	IP 49	53	53	50	50	46	43	37	35
softening point after hardening, minimum (°C)	IP 58	54	52	49	48	45	41	37	32
Flash point, minimum (°C)	IP 36	240	240	230	230	230	230	220	220
Solubility, minimum (%)	IP 47	99,0	99,0	99,0	99,0	99,0	99,0	99,0	99,0
Kinematic viscosity at 135°C, minimum (mm <sup>2</sup> /s)	IP 319	400	370	325	295	230	175	135	100



Jey Oil Refining Company

**Performance Grade (PG)**

PERFORMANCE GRADE	PG 52-				PG 58-				PG 64-				PG 70-				PG 76-										
	10	16	22					16	22					10	16	22					10	16	22				
Average 7-day maximum pavement design temperature, °C	<52				<58				<64				<70				<76										
Minimum Pvement design temperature, °C	>-10	>-16	>-22					>-16	>-22					>-10	>-16	>-22					>-10	>-16	>-22				
ORIGINAL BINDER																											
Flash point temp, T 48, minimum, °C	230																										
Viscosity, T 316: maximum 3 Pas, test temp, °C	135																										
Dynamic shear, T 315: G'/sin δ, minimum 1.00 kPa test temp @ 10 rad/s, °C	52				58				64				70				76										
ROLLING THIN-FILM OVEN RESIDUE (T 240)																											
Mass Change, maximum, percent	1.00																										
Dynamic shear, T 315: G'/sin δ, minimum 2.20 kPa test temp @ 10 rad/s, °C	52				58				64				70				76										
PRESSURE AGING VESSEL (R 28)																											
PAV aging temperature, °C	90				100				100				100 (110)				100 (110)										
Dynamic shear, T 315: G'/sin δ, maximum 5000 kPa test temp @ 10 rad/s, °C	25	22	19					25	22					31	28	25					34	31					37
Creep stiffness, T 313: S, maximum 300 Mpa m-value, minimum 0.300 test temp @ 60s, °C	0	-6	-12					-6	-12					0	-6	-12					0	-6					0
Direct tension, T 314: Failure strain, minimum 0.300 test temp @ 60s, °C	0	-6	-12					-6	-12					0	-6	-12					0	-6					0
Critical low cracking temp, PP 42: Critical cracking temp determined by PP 42, test temp, °C	0	-6	-12					-6	-12					0	-6	-12					0	-6					0

## Viscosity Grade Bitumen

	Specification				Test Method
	VG 0	VG 30	VG 20	VG 10	
<b>Absolute Viscosity at 60°C, Poises</b>	Min. 3200	Min. 2400	Min. 1600	Min. 800	IS 1206 (Part 2)
<b>Kinematic Viscosity at 135°C, cSt</b>	Min. 400	Min. 350	Min. 300	Min. 250	IS 1206 (Part 3)
<b>Flash Point (Cleveland Open Cup,) °C</b>	Min. 220	Min. 220	Min. 220	Min. 220	IS 1209
<b>Solubility in trichloroethylene, %</b>	Min. 99	Min. 99	Min. 99	Min. 99	IS 1206
<b>Softening Point.(R&amp;B), °C</b>	Min. 50	Min. 47	Min. 45	Min. 40	IS 1205
<b>Penetration @ 25°C, 0.1 mm 100 gm, 5 sec.</b>	40-60	50-70	60-80	80-100	IS 1203
<b>Testson residue from thin film oven tests/RTFOT</b>					
<b>i) Viscosity ratio at 60°C</b>	Max. 4.0	Max. 4.0	Max. 4.0	Max. 4.0	IS 1206 (Part 2)
<b>ii) Ductility at 25°C, cm, after thin-film oven test</b>	Min. 25	Min. 40	Min. 50	Min. 75	IS 1208
<b>Specific Gravity @ 27/27 °C</b>	Min. 0.99	Min. 0.99	Min. 0.99	Min. 0.99	IS 1202
<b>Conforms to BIS (IS 73:2006) Specifications</b>					