2005 ENGINE Technical Data - MX-5 Miata

### **2005 ENGINE**

# **Technical Data - MX-5 Miata**

# **ENGINE TECHNICAL DATA**

Minimum   1,009 {10.29 146} [300]   Maximum difference between cylinders   196 {2.0, 28}	Item				Specification		
Drive belt deflection	Engine type				BP	BP WITH TC	
Drive belt deflection	MECHANICAL						
Drive belt deflection				New	5.5—7.0 {0.22—0.27}		
Maximum difference between cylinders   Maximum distance of the camshaft oil seal   Mmm {in}   M			Generator	Used	6.07.5 {0	5 {0.24—0.29}	
P/S, A/C, P/S+A/C	Drive belt deflection			Limit	8.0 {(	3.0 {0.31}	
P/S+A/C   Used   Si.D=Int. (0.3:5)   Used   Used   491-745 (50-76, 111-167)   Used   491-706 (50-72, 111-158)   Used   491-706 (50-72, 111-158   Used   491-706 (50-72, 110-108   Used	(mm {in}/98 N {10 kgf, 2	2 lbf})	D/O A/C	New			
Limit				Used	9.0—10.0 {0.36—0.39}		
Drive belt tension			1701740	Limit			
Limit   343 {35, 77}				New	491—745 {50—76, 111—167}		
New   588—686 (59—70, 130—154				Used	491—706 {50—	06 {50—72, 111—158}	
P/S, A/C, P/S+A/C	Drive helt tension (N /kg	f Ihf\\		Limit	343 {35, 77}		
P/S+A/C   Used   422—490 (43—50, 95—110)   Limit   245 [25, 55]	Dive belt tellelell (14 (kg	, 1013)	DIC AIC	New			
National Compression pressure   In				Used		3—50, 95—110}	
Valve clearance [Engine cold]   (mm {in})   EX   (0.21±0.03 (0.008±0.0012))				Limit	,		
Valve clearance   Engine cold   (mm {in})   EX			IN				
Standard   1,363 {13.9, 198} [300]   1,442 {14.7, 209} [300]   1,420 {14,12} [300]   1,420 {14,12} [300]   1,420 {14,12} [300]   1,420 {14,12} [300]   1,420 {14,12} [300]   1,420 {14,12} [300]   1,4	Valve clearance [Engine cold] (mr	n (in))					
Standard   1,363 {13.9, 198} [300]   1,442 {14.7, 209} [300]   1,442 {14.7, 209} [300]   1,442 {14.7, 209} [300]   1,009 {10.29 146} [300]   1,442 {14.7, 209} [300]   1,442 {14.7, 209} [300]   1,009 {10.29 146} [300]   1,009			EX				
Minimum   1,009 {10.29 146} [300]   Maximum difference between cylinders   196 {2.0, 28}			Standard		1,363 {13.9, 198} [300]   1,442 {14.7, 209} [300]		
Detween cylinders   Detw	Compression pressure		Minimum				
Tensioner spring free length (mm {in}) 59.2 {2.33}  Timing belt deflection (mm {in})/98 N {10 kgf, 22 lbf}) 8.5—11.5 {0.34—0.45}  Pushing distance of the camshaft oil seal (mm {in}) (From the edge of the cylinder head)  Pushing distance of the front oil seal (mm {in}) (From the edge of the oil pump body)  Pushing distance of the rear oil seal (mm {in}) (From the edge of the oil pump body)  Pushing distance of the rear oil seal (mm {in}) 0—0.5 {0—0.019} (From the edge of the rear cove ldle speed (rpm) 750—850 (800±50)  Ignition timing (BTDC/rpm) 6—18°/750—850 (6—18°/800±50)  Idle-up speed*1 (rpm) MT 950—1,050 (1,000±50)  A/C ON*3 MT 950—1,050 (1,000±50)  P/S ON*4 750—850 (800±50) Within regulation	(kPa {kgf/cm², psi}) [rpm]				196 {2.0, 28}		
Timing belt deflection (mm {in})98 N {10 kgf, 22 lbf}) 8.5—11.5 {0.34—0.45}  Pushing distance of the camshaft oil seal (mm {in}) (From the edge of the cylinder head)  Pushing distance of the front oil seal (mm {in}) (From the edge of the oil pump body)  Pushing distance of the rear oil seal (mm {in}) (From the edge of the oil pump body)  Pushing distance of the rear oil seal (mm {in}) 0-0.5 {0-0.019} (From the edge of the rear cove ldle speed (rpm) 750—850 (800±50)  Ignition timing (BTDC/rpm) 6-18°/750—850 (6-18°/800±50)  E/L ON*2 750—850 (800±50) 800—900 (850±50)  Idle-up speed*1 (rpm) MT 950—1,050 (1,000±50)  P/S ON*4 750—850 (800±50) Within regulation	Oil control valve (OCV) Resistance	e [20°	C {68°F}]	(ohms)	6.9—7.9	_	
Pushing distance of the camshaft oil seal (mm {in}) (From the edge of the cylinder head)  Pushing distance of the front oil seal (mm {in}) (From the edge of the cylinder head)  Pushing distance of the front oil seal (mm {in}) (From the edge of the oil pump body)  Pushing distance of the rear oil seal (mm {in}) 0-0.5 {0-0.019} (From the edge of the rear cove lidle speed (rpm) 750-850 (800±50)  Ignition timing (BTDC/rpm) 6-18°/750-850 (6-18°/800±50)  E/L ON*2 750-850 (800±50) 800-900 (850±50)  Idle-up speed*1 (rpm) MT 950-1,050 (1,000±50)  A/C ON*3 MT 950-1,050 (1,000±50)  P/S ON*4 750-850 (800±50) Within regulation	Tensioner spring free length			(mm {in})	59.2 {2.33}		
Pushing distance of the front oil seal (mm {in}) (From the edge of the cylinder head)  Pushing distance of the front oil seal (mm {in}) (From the edge of the oil pump body)  Pushing distance of the rear oil seal (mm {in}) 0—0.5 {0—0.019} (From the edge of the rear cove lidle speed (rpm) 750—850 (800±50)  Ignition timing (BTDC/rpm) 6—18°/750—850 (6—18°/800±50)  E/L ON*2 750—850 (800±50) 800—900 (850±50)  Idle-up speed*1 (rpm) MT 950—1,050 (1,000±50)  A/C ON*3 MT 950—1,050 (1,000±50)  P/S ON*4 750—850 (800±50) —  P/S ON*4 750—850 (800±50)  Within regulation	Timing belt deflection	(mm {ir	1)/98 N {10 l	(gf, 22 lbf})			
Pushing distance of the front oil seal   (mm {in})   (From the edge of the oil pump body)	Pushing distance of the camshaft oil seal (mm {in			(mm {in})	0—0.4 {0—0.015} (From the edge of the cylinder head)		
Pushing distance of the rear oil seal (mm {in}) 0—0.5 {0—0.019} (From the edge of the rear cove idle speed (rpm) 750—850 (800±50)  Ignition timing (BTDC/rpm) 6—18°/750—850 (6—18°/800±50)  E/L ON*2 750—850 (800±50) 800—900 (850±50)  Idle-up speed*1 (rpm) MT 950—1,050 (1,000±50)  A/C ON*3 MT 950—1,050 (1,000±50)  P/S ON*4 750—850 (800±50)  HC concentration Within regulation	Pushing distance of the front oil seal (mm {in};			(mm {in})			
Ignition timing (BTDC/rpm) 6—18°/750—850 (6—18°/800±50)  E/L ON*2 750—850 (800±50) 800—900 (850±50)  A/C ON*3 MT 950—1,050 (1,000±50)  A/C ON*4 750—850 (800±50)  HC concentration Within regulation	Pushing distance of the rear oil seal	(mm {in})		0—0.5 (0—0.019) (From the edge of the rear cover)			
Ignition timing (BTDC/rpm) 6—18°/750—850 (6—18°/800±50)  E/L ON*2 750—850 (800±50) 800—900 (850±50)  A/C ON*3 MT 950—1,050 (1,000±50)  A/C ON*4 750—850 (800±50) —  P/S ON*4 750—850 (800±50)  HC concentration Within regulation	Idle speed			, ,,			
Idle-up speed*1 (rpm) A/C ON*3 MT 950—1,050 (1,000±50) AT 750—850 (800±50) — P/S ON*4 750—850 (800±50) HC concentration Within regulation	Ignition timing			6—18°/750—850 (6—18°/800±50)			
Idle-up speed*1 (rpm) A/C ON*3 MT 950—1,050 (1,000±50) AT 750—850 (800±50) — P/S ON*4 750—850 (800±50) HC concentration Within regulation	Idle-up speed*1 (rpm)		E/L ON*2		750—850 (800±50)	800—900 {850±50}	
P/S ON*4 750—850 (800±50) —  HC concentration Within regulation				MT	950—1,050	(1,000±50)	
HC concentration Within regulation			A/C ON*3	AT	750—850 (800±50)		
HC concentration Within regulation			P/S ON*4		750—850 (800±50)		
	Idle mixture				Within regulation		
Ildle mixture					Within regulation		

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Fig. 1: Engine Technical Data Chart (1 Of 3) Courtesy of MAZDA MOTORS CORP.

### 2005 ENGINE Technical Data - MX-5 Miata

Item				Specification		
Engine type				BP	BP WITH TC	
LUBRICATIO	N SYSTEM					
Oil pressure (kPa {kgf/cm², psi}) [3,000 rpm]			295—392 {3.0—4.0, 43—56}			
011	Total (dry engine	ne) (L {US qt, Imp qt})		4.0 {4.2, 3.5}		
Oil capacity (approx. quantity)	Oil replacement		(L {US qt, Imp qt})	3.6 {3.8, 3.2}		
quantity	Oil and oil filter replacement (L {US qt, Imp qt})			3.8 {4.0, 3.3}		
	Tip clearance	(mm {in})	Standard		0.02-0.18 (0.0008-0.0070)	
	Tip clearance	(11111 (111))	Minimum	0.20 {0		
Oil pump	Body	(mm {in})	Standard	0.090.17 {0.		
Oil purip	clearance	(11111 (1111)	Minimum	0.22 {0	· · · · · · · · · · · · · · · · · · ·	
	Side clearance	(mm {in})	Standard	0.030.11 {0.	00120.0043}	
	Side clearance	(11111 (1113)	Minimum	0.14 {0	0.0055}	
Pressure spring	Pressing force at pressure (N {kgf, lbf}) H: 35.37 mm spring height (1.393 in)			88.1 {8.98, 19.8}		
COOLING S	YSTEM					
Coolant capa	city (approx. quar	ntity)	(L {US qt, Imp qt})	6.0 {6.3, 5.3}	6.2 {6.6, 5.5}	
Radiator cap valve opening pressure (ki		(kPa {kgf/cm <sup>2</sup> , psi})	94122 (0.95	1.25, 13.517.7}		
			(°C {°F})	83.5—86.5 {183—187}		
Thermostat	Full-opening ten	nperature	(°C {°F})	100 {212}		
Full-open lift		(mm {in})		8.5 {0.3	33} min.	
Cooling fan n	notor current [12 \	/]	(A)	4.506.49	10	
FUEL SYST	EM					
FP hold pressure (kPa {kgf/cm², psi})				More than 343 {3.5, 50}		
FP maximum pressure (kPa {kgf/cm², psi}			Less than 637 {6.5, 92}			
Fuel injector Vo		Leakage	(drop/2 min)	Less than 1		
		Volume	(ml {cc, floz}/15 s)	66-82 {66-82, 2.3-2.7}		
		Resistance [20°C {68°F}] (ohms)		1213		
Pressure regulator Fuel li		Fuel line pressure	(kPa {kgf/cm², psi})	370—420 {3.7	370420 {3.74.3, 5361}	
		Fuel hold pressure	(kPa {kgf/cm <sup>2</sup> , psi})	More than 250 {2.55, 36.3}		

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Fig. 2: Engine Technical Data Chart (2 Of 3) Courtesy of MAZDA MOTORS CORP.

# 2005 ENGINE Technical Data - MX-5 Miata

		Item			Specif	
Engine type				BP BP WITH TC		
CHARGING	SYSTEM					
	Electrolyte grav	ity	[20	°C {68 °F}]	1.22-	-1.29
	Back-up current	t* <sup>5</sup>		(mA)	Max	. 20
Battery	Test load chart (A)	Battery type (5-h rate)	S46A24L (S) (32)		105	
	Slow charge	Battery type (5-h rate) S46A24L (S) (32)		3.0—4.0		
	Quick charge (A/30 min.)	Battery type		S) (32)	20	
		e (Between slip r	ings)	(ohms)	2.	67
	Brush length	Standard (mm {in})		22 {	0.87}	
	Brusit length	Minimum (mm {in})		6 {0.24}		
	Brush spring	Standard	(	N (kgf, lbf))	3.43 {0.35, 0.77}	
	force	Minimum	(	N (kgf, lbf))	1.03 {0.10	05, 0.231}
				В	Е	+
	Standard	Ignition switch ON	Terminal	P	Belo	ow 1
Generator	voltage			D	Appr	ox. 0
	(V)	1-11-		В	13-	-15
	. ,	Idle	Terminal	Р	Approx	c. 3—8
		[20 °C{68 °F}]		D		
	Generated current (Reference)	Engine speed	1,000	Terminal B current	0*6-	<b>–</b> 65
	(A)	(rpm)	2,000	Terminal B current	0*6-	<b>–77</b>
IGNITION SY						
ii!!	Resistance	Secondary coil		(kilohma)	7	
ignition coli	[20 °C {68 °F}]	Secondary con		(kilohms)	1–3- (ignition occurs	-11 -4-2 simultaneously ers 1 - 4, 2 - 3)
	[20 °C (68 °F)]	Secondary con		(KIOTITIS)	(ignition occurs in paired cylind CYLINI CRANKSHAF PULLEY	-4–2 simultaneously ers 1 – 4, 2 – 3) DER No.
	[20 °C (68 °F)]	Secondary Con	No.1 lead	(KIOTITIS)	(ignition occurs in paired cylind CYLINI CRANKSHAF PULLEY	DER No.  ENGINE  ENGINE
Firing order			No.1 lead No.2 lead	(KIOTITIS)	(ignition occurs in paired cylind CYLINI CRANKSHAF PULLEY	DER No.  ENGINE
Firing order	[20 °C {68 °F}]	(kilohms)		(KIOTITIS)	(ignition occurs in paired cylind CYLINI CRANKSHAF PULLEY	DER No.  ENGINE
Firing order			No.2 lead	(KIOTITIS)	(ignition occurs in paired cylind CYLINI CRANKSHAF PULLEY	H-2 simultaneously ers 1 - 4, 2 - 3) DER No. TENGINE DER No. TENGINE DER No. TENGINE
Firing order			No.2 lead No.3 lead	(KIOTITIS)	I-3- (ignition occurs in paired cylind CYLINI CRANKSHAF PULLEY  5- 1.5- BKR5E-11* <sup>7</sup> , BKR6E-11* <sup>8</sup> (NGK) K16PR-U11* <sup>7</sup> ,	SK16PR-F8 (DENSO)*
Firing order High-tension lead	Resistance		No.2 lead No.3 lead		1–3- (ignition occurs in paired cylind CYLINI CRANKSHAF PULLEY  5- 1.5- BKR5E-11* <sup>7</sup> , BKR6E-11* <sup>8</sup> (NGK) K16PR-U11* <sup>7</sup> , K20PR-U11* <sup>8</sup> (DENSO)	SK16PR-F8 (DENSO)*
Firing order High-tension lead	Resistance Type Plug gap		No.2 lead No.3 lead	(mm {in})	I-3- (ignition occurs in paired cylind CYLINI CRANKSHAF PULLEY  5- 1.5- BKR5E-11* <sup>7</sup> , BKR6E-11* <sup>8</sup> (NGK) K16PR-U11* <sup>7</sup> ,	SK16PR-F8 (DENSO)*
Firing order High-tension lead	Resistance  Type  Plug gap  Resistance [20 °C (68 °F)]	(kilohms)	No.2 lead No.3 lead No.4 lead	(mm {in}) (kilohms)	1–3- (ignition occurs in paired cylind CYLINI CRANKSHAF PULLEY)  5- 1.5- BKR5E-11*8 (NGK) K16PR-U11*7, K20PR-U11*8 (DENSO) 1.0—1.1 {0.040—0.043} 3.0—7.5	SK16PR-F8 (DENSO)*  0.7—0.8 (0.028—0.031 3.0—7.5
Firing order High-tension ead	Resistance  Type  Plug gap  Resistance [20 °C {68 °F}]  Tightening torqu	(kilohms)	No.2 lead No.3 lead No.4 lead	(mm {in})	(ignition occurs in paired cylind CYLINI CRANKSHAF PULLEY 5-1.5-1.5-1.5-1.5-1.5-1.5-1.5-1.5-1.5-1.	SK16PR-F8 (DENSO)*  0.7—0.8 (0.028—0.031 3.0—7.5
Firing order  High-tension ead	Resistance  Type  Plug gap  Resistance [20 °C {68 °F}]  Tightening torqu	(kilohms)	No.2 lead No.3 lead No.4 lead	(mm {in}) (kilohms) gf·m, ft·lbf))	1–3- (ignition occurs in paired cylind CYLINI CRANKSHAF PULLEY)  5— 1.5— BKR5E-11*7, BKR6E-11*8 (NGK) K16PR-U11*7, K20PR-U11*8 (DENSO) 1.0—1.1 {0.040—0.043} 3.0—7.5	SK16PR-F8 (DENSO)*  SK20PR-F8 (DENSO)*  0.7—0.8 (0.028—0.031 3.0—7.5
Firing order High-tension ead	Resistance  Plug gap Resistance [20 °C {68 °F}] "Ightening torqu YSTEM Commutator	(kilohms)	No.2 lead No.3 lead No.4 lead	(mm {in}) (kilohms) gf·m, ft·lbf}) (mm {in})	1–3- (ignition occurs in paired cylind CYLINI CRANKSHAF PULLEY)  5— 1.5-  BKR5E-11*7, BKR6E-11*8 (NGK) K16PR-U11*8 (DENSO) 1.0—1.1 {0.040—0.043} 3.0—7.5  15—22 {1.5—	-4-2 simultaneously ers 1 - 4, 2 - 3) DER No. T ENGINE 1 3 -4.0 -5 SK16PR-F8 (DENSO)* 0.7-0.8 (0.028-0.031 3.0-7.5 -2.3, 11-16) [1.16]
Firing order  High-tension ead	Resistance  Type  Plug gap  Resistance [20 °C (68 °F)]  Tightening torquitySTEM	(kilohms)	No.2 lead No.3 lead No.4 lead	(mm {in}) (kilohms) gf·m, ft·lbf))	1–3- (ignition occurs in paired cylind CYLINI CRANKSHAF PULLEY)  5— 1.5-  BKRSE-11* <sup>7</sup> , BKR6E-11* <sup>8</sup> (NGK) K16PR-U11* <sup>7</sup> , K20PR-U11* <sup>8</sup> (DENSO) 1.0—1.1 {0.040—0.043} 3.0—7.5  15—22 {1.5—	-4-2 simultaneously ers 1 - 4, 2 - 3) DER No. T ENGINE  -13 -4.0 - SK16PR-F8 (DENSO)* 0.7-0.8 (0.028-0.031 3.0-7.5 -2.3, 11-16) [1.16] [1.13]
Firing order  High-tension ead	Resistance  Plug gap Resistance [20 °C (68 °F)] Tightening torqu  YSTEM  Commutator diameter	(kilohms)	No.2 lead No.3 lead No.4 lead	(mm {in}) (kilohms) gf·m, ft·lbf}) (mm {in})	1–3- (ignition occurs in paired cylind CYLINI CRANKSHAF PULLEY)  5— 1.5-  BKRSE-11* <sup>7</sup> , BKR6E-11* <sup>8</sup> (NGK) K16PR-U11* <sup>7</sup> , K20PR-U11* <sup>8</sup> (DENSO) 1.0—1.1 {0.040—0.043} 3.0—7.5  15—22 {1.5—	-4-2 simultaneously ers 1 - 4, 2 - 3) DER No. T ENGINE 1 3 -4.0 -5 SK16PR-F8 (DENSO)* 0.7-0.8 (0.028-0.031 3.0-7.5 -2.3, 11-16) [1.16]
Firing order High-tension lead  Spark plug	Resistance  Plug gap Resistance [20 °C {68 °F}] "Ightening torqu YSTEM Commutator	(kilohms) Ie Standard Minimum	No.2 lead No.3 lead No.4 lead	(mm {in}) (kilohms) gf·m, ft·lbf)) (mm {in}) (mm {in})	1–3- (ignition occurs in paired cylind CYLINI CRANKSHAF PULLEY)  5— 1.5- BKR5E-11*8 (NGK) K16PR-U11*7, K20PR-U11*8 (DENSO) 1.0—1.1 {0.040—0.043} 3.0—7.5 15—22 {1.5—22 {1.5—29.4} 28.8 12.3	-4-2 simultaneously ers 1 - 4, 2 - 3) DER No. T ENGINE  -13 -4.0 - SK16PR-F8 (DENSO)* SK20PR-F8 (DENSO)* 3.0-7.5 -2.3, 11-16} [1.16] [1.13]
Firing order  High-tension lead  Spark plug  STARTING S	Resistance  Plug gap Resistance [20 °C (68 °F)] Tightening torqu  YSTEM  Commutator diameter  Brush length	(kilohms)  Standard  Minimum  Standard	No.2 lead No.3 lead No.4 lead	(mm {in}) (kilohms) gf·m, ft·lbf)) (mm {in}) (mm (in)) (mm {in})	1-3- (ignition occurs in paired cylind CYLINI CRANKSHAF PULLEY)  5- 1.5- BKR5E-11*8 (NGK) K16PR-U11*7, K20PR-U11*8 (DENSO) 1.0—1.1 {0.040—0.043} 3.0—7.5 15—22 {1.5- 29.4 28.8 12.3 7.0 {	-4-2 simultaneously ers 1 - 4, 2 - 3) DER No.  T ENGINE  -13 -4.0 - SK16PR-F8 (DENSO)* SK20PR-F8 (DENSO)* 0.7—0.8 {0.028—0.031} 3.0—7.5 -2.3, 11—16} [1.16] [1.13] [0.48]
Firing order High-tension lead  Spark plug	Resistance  Plug gap Resistance [20 °C (68 °F)] Tightening torqu  YSTEM  Commutator diameter	(kilohms)  le  Standard  Minimum  Standard  Minimum	No.2 lead No.3 lead No.4 lead	(mm {in}) (kilohms) gf·m, ft·lbf)) (mm {in}) (mm {in}) (mm {in}) (mm {in})	1–3- (ignition occurs in paired cylind CYLINI CRANKSHAF PULLEY)  5— 1.5— 1.5— BKR5E-11*8 (NGK) K16PR-U11*8 (DENSO) 1.0—1.1 {0.040—0.043} 3.0—7.5 15—22 {1.5— 29.4 28.8 12.3 7.0 { 15.05—20.35 {1.534—	-4-2 simultaneously ers 1 - 4, 2 - 3) DER No.  FENGINE  1 2 3 4 1 3 -4.0 -5 SK16PR-F8 (DENSO)* SK20PR-F8 (DENSO)* 0.7—0.8 {0.028—0.031 3.0—7.5 -2.3, 11—16} {1.18} (0.48) 0.28}

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Fig. 3: Engine Technical Data Chart (3 Of 3) Courtesy of MAZDA MOTORS CORP.

# **ENGINE OIL SPECIFICATION**

#### 2005 ENGINE Technical Data - MX-5 Miata

Item	U.S.A. and CANADA	Except U.S.A. and CANADA			
Engine oil grade	FOR GASOLINE ENGINES OF THE PARTY OF T	SAE SAE SON CONSERVICE ON SERVICE			
		API SL or ILSAC			
Engine oil viscosity	5W-20				

- : Turn the following electrical loads on and verify that the voltage reading increases.
- Headlights
- Blower motor
- · Rear window defroster
- \*1 : Excludes temporary idle speed drop just after the loads (E/L, A/C, P/S) are turned on.
- \*2 : Head light, fan switch (above 1st) and cooling fan are turned on.
- \*3 : A/C switch and fan switch are turned on.

  \*4 : Steering wheel is fully turned.
- \*5 : Back-up current is the constant flow of current present (for such as audio unit, clock, PCM.) when the ignition switch is off and with the key removed.
- \*6 : Lower limit of current must be more than 0A.
- \*7 : Standard plug
- \*8 : Cold type plug

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Fig. 4: Engine Oil Specification Courtesy of MAZDA MOTORS CORP.