

SPECIFICATIONS

GENERAL SPECIFICATIONS

Item	Specification
Displacement (CID)	6.8L (415)
No. Cylinder	10
Bore/Stroke	90.215/105.8 mm
Fire Order	1-6-5-10-2-7-3-8-4-9
Oil Pressure 93.33°C (200°F)	18 psi @ 650 rpm-100 psi @ 4,000 rpm
Cylinder Head/Valve Train	
Combustion Chamber Volume	52.6 - 51.6 cc
Valve Seat Width - Intake	2.1-1.9 mm
Valve Seat Width - Exhaust	2.1-1.9 mm
Valve Seat Angle	45.00-44.50 degrees
Valve Seat Runout (T.I.R.)	0.025 mm
Valve Arrangement (Front to Rear)	
Valve Stem Guide Clearance	
Intake	0.069-0.020 mm
Exhaust	0.095-0.045 mm
Valve Head Diameter	
Intake	44.63-44.37 mm
Exhaust	34.12-33.88 mm
Valve Face Runout (Limit)	0.05 mm
Valve Face Angle	45.75-45.25 degrees
Valve Stem Diameter	
Intake	6.995-6.975 mm
Exhaust	6.970-6.949 mm
Valve Spring Compression Pressure	
Intake (N @ Spec. Length)	667.3 N @ 28.02 mm
Exhaust (N @ Spec. Length)	667.3 N @ 28.02 mm
Valve Spring Free Length	
Intake	50.2 mm
Exhaust	50.2 mm
Valve Spring Installed Pressure N @ Spec. Length	
Intake	289.1 N @ 40.01 mm
Exhaust	289.1 N @ 40.01 mm
Valve Springs Installed Pressure N @ Spec. Length - Service Limit	
Intake	274.6 mm @ 40.01 mm
Exhaust	274.6 mm @ 40.01 mm
Valve Springs - Out of Square Limit	
Intake	2.5 degrees
Exhaust	2.5 degrees
Valve Guide Inside Diameter	7.044-7.015 mm
Camshaft	

Lobe Lift	
Intake	6.58077 mm
Exhaust	6.58551 mm
Lobe Lift - Allowable Lift Loss	0
Valve Lift @ Zero Lash	
Intake	12.00 mm
Exhaust	12.00 mm
Camshaft End Play	0.25-0.188 mm
End Play Service Limit	0.025-0.188 mm
Journal to Bearing Clearance	0.076-0.025 mm
Journal Diameters	26.962-26.936 mm
Journal Inside Diameter (Cap Assembled)	27.012-26.987 mm
Camshaft Runout: Full Indicator Measurement on all journals when supported on front and rear journals.	0.09 mm (5 Places)
Cylinder Bore Diameter	
Grade 1	90.200-90.210 mm
Grade 2	90.210-90.220 mm
Grade 3	90.220-90.230 mm
Piston	
Piston Diameter (Grade 2) at Right Angle to Pin Bore	90.180 ± 0.005 mm
Piston to Bore Clearance	(-0.005) to +0.025 mm
Pin Bore Diameter (Piston)	22.008-22.014 mm
Pin Diameter	22.0005-22.0030 mm
Clearance (Neg. or Pos.)	0.01395-0.005 mm
Pin Bore Diameter (Rod)	22.012-22.024 mm
Clearance	0.009-0.0235 mm
Ring Groove Width	
Top	1.503-1.505 mm
Intermediate	1.502-1.504 mm
Oil Control	3.030-3.050 mm
Piston Ring Gap	
Top	0.13-0.28 mm
Intermediate	0.25-0.40 mm
Oil Control	0.15-0.65 mm
Crankshaft	
Main Bearing Journal Diameter	67.482-67.504
Maximum Out-of-Round	0.0075 mm Between Cross Sections
Maximum Taper (Straightness)	0.004 mm
Runout: FIM of center journals when located on front and rear journal	0.05 mm 3 Places
Clearance - Crankshaft Journal to Main Bearing Clearance	0.048-0.024 mm
Connecting Rod Journal Diameter	53.003-52.983 mm

Maximum Out-of-Round	0.0075 mm Between Cross Sections
Maximum Taper	0.004 mm
Crankshaft End Play	0.075-0.377
Connecting Rod	
Big End Journal Inside Diameter with Assembled Liners	53.049-53.027 mm
Rod Bearing to Journal Clearance	0.064-0.026 mm
Pin Bore Diameter (Rod)	22.024-22.012 mm
Balance Shaft System	
Balance Shaft Journal Diameter	26.962 - 26.936 mm
Clearance - Balance Shaft Journal to Cylinder Head	0.076 - 0.025 mm
Cylinder Head B/S Journal Diameter	27.012 - 26.987 mm
Gear Backlash	0.0076 - 0.1295 mm
Balance Shaft Endplay	0.04 - 0.18 mm
Rod Length (Centerline Bore-to-Bore)	169.1 mm
Alignment Bore-to-Bore Max. Twist	± 0.05 mm
Bore-to-Bore Max. Bend	± 0.038 mm
Side Play (As Assembled to Crank)	
Standard Play	0.410 ± 0.26 mm
Max Play	0.670 mm
Sealant and Lubricants	
Silicone Gasket and Sealant F7AZ-19554-EA	WSE-M4G323-A4
Motorcraft Premium Engine Coolant VC-4-A (VC-5 in Oregon, CXC-10 in Canada)	ESE-M97B44-A
Motorcraft Premium Gold Engine Coolant VC-7-A	WSS-M97B51-A1
Super Premium SAE 5W-20 Engine Oil XO-5W20-QSP	WSS-M2C153-H
Metal Surface Cleaner F4AZ-19A536-RA	WSE-M5B392-A

TORQUE SPECIFICATIONS

Description	Nm	lb-ft	lb-in
Balancer shaft bearing cap bolts and studs	10	-	89
Valve cover bolts	10	-	89
Camshaft bearing cap bolts	10	-	89
Camshaft sprocket bolts	(1)	(1)	(1)
Cylinder head temperature sensor (cht)	26	19	-
Camshaft position sensor bolt	10	-	89
Crankshaft position sensor bolt	10	-	89
Connecting rod bolts	(1)	(1)	(1)

Crankshaft damper pulley bolt	(1)	(1)	(1)
Crankshaft main bearing bolts (cross mounted)	(1)	(1)	(1)
Crankshaft main bearing bolts (vertical)	(1)	(1)	(1)
Cylinder heads bolts	(1)	(1)	(1)
EGR valve to intake manifold bolts	(1)	(1)	(1)
Exhaust manifold nuts	25	18	-
Exhaust manifold studs	12	9	-
Drive belt idler pulley bolt	25	18	-
Flexplate bolts	80	59	-
Engine front cover bolts (1-7)	25	18	-
Engine front cover bolts (6-15)	47	35	-
Fuel injection supply manifold bracket bolts	10	-	89
Heater return tube studs	47	35	-
Ignition coil	6	-	53
Knock sensor bolt	20	15	-
Lower intake manifold to upper intake manifold bolts	(1)	(1)	(1)
Upper intake manifold to cylinder head bolts	(1)	(1)	(1)
Intake manifold tuning valve screws	(1)	(1)	(1)
Oil cooler assembly to oil filter adapter bolts	58	43	-
Oil bypass filter	16	12	-
Oil filter adapter bolt	25	18	-
Oil filter adapter bolt	47	35	-
Oil filter adapter nut	25	18	-
Wiring harness bracket nut	15	11	-
Oil filter adapter stud	12	9	-
Oil level indicator bolt	7	-	62
Oil pan bolts	(1)	(1)	(1)
Oil pan drain plug	14	10	-
Oil pressure sender	14	10	-
Oil pump bolts	10	-	89
Oil pump screen cover and tube bolts	10	-	89

Oil pump screen and pickup tube spacer	25	18	-
Power steering pump bolts	25	18	-
Rear main oil seal retainer bolts	10	-	89
Spark plugs	10	-	89
Thermostat housing bolts	18	13	-
Idle air control valve screws	(1)	(1)	(1)
Throttle body spacer to intake manifold bolts	(1)	(1)	(1)
Throttle body to throttle body spacer bolts	(1)	(1)	(1)
Timing chain guide bolts	10	-	89
Timing chain hydraulic tensioner bolts	25	18	-
Water pump bolts	25	18	-
Water pump pulley bolts	25	18	-
Water temperature sensor	20	15	-
EGR valve to exhaust manifold tube fittings	(1)	(1)	(1)
Brake booster vacuum hose bracket nut	11	8	-
Power steering bracket upper bolts	10	-	89
Power steering bracket lower bolts	40	30	-
Fuel charging wiring connector bolt	6	-	53
42-pin bulkhead connector bolts	6	-	53
Transmission cooler line nut	25	18	-
Wiring harness bracket nut	15	11	-
42-pin connector bolt	6	-	53
Accelerator control splash shield bolts	7	-	62
Oil cooler insert	57	42	-
Engine mount cross bolts	63	46	-
Engine mount through bolts	80	59	-
Engine mount nuts	90	66	-
Engine mount nuts	90	66	-
Engine mount bolts	80	59	-
Frame extension nuts and	150	111	-

bolts			
Second cross member to frame extension nuts and bolts	133	98	-
Crossbody brake line fittings	25	18	-
Cable bracket nut	25	18	-
Ground strap nut	25	18	-
Dual converter Y-pipe nuts	40	30	-
Transmission mount nuts	95	70	-
Power steering pump bolts	25	18	-
Torque converter nuts	40	30	-
Transmission to engine bolts	48	35	-
Transmission shift cable bracket bolt	10	-	89
Accelerator cable bracket bolts	10	-	89
Engine oil indicator tube bracket bolt	10	-	89
Transmission oil pan bolts	15	11	-
Oil pressure sensor	14	10	-
Fan shroud bolts	9	-	80
EGR back pressure transducer nuts	10	-	89
Radio interference capacitor bolt	10	-	89
EVR solenoid bracket bolts	10	-	89
EGR transducer bracket bolts	10	-	89
Accumulator suction line nut	8	-	71
Wiring bracket nut	25	18	-

(1) Refer to the procedure in this section.