

## SPECIFICATIONS

### General Specifications

Item	Specification
Displacement	2.3L
No. of cylinders	4
Bore/stroke	87.5/94.0
Firing order	1-3-4-2
Oil pressure (hot @ 2,000 rpm)	29-39 psi 200-268 kPa
Oil capacity	4.1 qts. + 0.4 qt. with filter
<b>Cylinder Block</b>	
Cylinder bore diameter	87.5-87.53 mm (3.444-3.446 in.)
Cylinder bore maximum out-of-round	0.008 mm (0.0003 in.)
Main bearing bore diameter	57.020-57.038 mm (2.244-2.245 in.)
Head gasket surface flatness	0.1 mm/general 0.05 mm/200 x 200 (0.003 in./general) (0.0019 in./7.87 x 7.87)
<b>Piston</b>	
Diameter (1)	87.5-87.51 mm (3.444-3.445 in.)
Diameter (2)	87.51-87.52 mm (3.4452-3.4456 in.)
Diameter (3)	87.52-87.53 mm (3.445-3.446 in.)
Piston-to-bore clearance	0.025-0.045 mm (0.0009-0.0017 in.)
Ring groove width — top	1.203-1.205 mm (0.0473-0.0474 in.)
Ring groove width — 2nd	1.17-1.19 mm (0.0460-0.0468 in.)
Ring groove width — oil	2.501-2.503 mm (0.0984-0.0985 in.)
Piston skirt coating thickness	0.008-0.020 mm (0.0003-0.0007 in.)
<b>Piston Pin</b>	
Diameter	20.995-21.0 mm (0.8265-0.8267 in.)
Length	59.6-60.4 mm (2.346-2.377 in.)
Piston-to-pin clearance	0.008-0.016 mm (0.0003-0.0006 in.)
Pin-to-rod clearance	Press fit

### General Specifications (Continued)

Item	Specification
<b>Cylinder Head</b>	
Valve lift @ zero lash (exhaust)	7.4 mm
Valve lift @ zero lash (intake)	7.9 mm
Valve guide diameter	5.509-5.539 mm (0.216-0.218 in.)
Valve seat width — intake/exhaust	0.99-1.84 mm (0.038-0.072 in.)
Valve seat angle	45 degrees
Valve seat runout	0.075 mm (0.0029 in.)
Valve lash adjuster bore diameter	31.00-31.03 mm (1.220-1.221 in.)
Cam bore diameter	25.015-25.040 mm (0.984-0.985 in.)
<b>Valve</b>	
Valve head diameter — intake	34.85-35.15 mm (1.372-1.383 in.)
Valve head diameter — exhaust	29.85-30.15 mm (1.175-1.187 in.)
Valve stem diameter — intake	5.470-5.485 mm (0.2153-0.2159 in.)
Valve stem diameter — exhaust	5.465-5.480 mm (0.2151-0.2157 in.)
Valve stem-to-guide clearance — intake	0.0027 mm (0.00010 in.)
Valve stem-to-guide clearance — exhaust	0.0029 mm (0.00011 in.)
Valve face runout	0.05 mm (0.0019 in.)
Valve face angle	45 degrees
<b>Valve Spring — Compression Pressure</b>	
Intake and exhaust (installed)	38.667 lbs.
Intake (valve open) 8.9 mm (0.35 in) of lift	97.032 lbs.
Exhaust (valve open) 7.4 mm of lift	93.338 lbs.
Free length	44.92 mm (1.768 in.)
Assembled height	37.9 mm (1.492 in.)
<b>Crankshaft</b>	
Main bearing journal diameter	51.980-52.000 mm (2.046-2.047 in.)
Production repair	51.730-51.750 mm (2.036-2.037 in.)

**SPECIFICATIONS (Continued)****General Specifications (Continued)**

Item	Specification
Main bearing clearance	0.019-0.035 mm (0.0007-0.0013 in.)
Connecting rod journal diameter	49.980-50.000 mm (1.967-1.968 in.)
Production repair	49.730-49.750 mm (1.957-1.958 in.)
End play	0.22-0.43 mm (0.008-0.016 in.)
<b>Rings</b>	
Width — top	1.17-1.185 mm (0.0460-0.0466 in.)
Width — 2nd	1.197-1.199 mm (0.0471-0.0472 in.)
Width — oil	2.38-2.45 mm (0.093-0.096 in.)
Ring gap (in bore) — top	0.16-0.31 mm (0.006-0.012 in.)
Ring gap (in bore) — 2nd	0.33-0.48 mm (0.012-0.018 in.)
Ring gap (in bore) — oil	0.2-0.7 mm (0.007-0.027 in.)
<b>Valve Tappet</b>	
Diameter	30.97-30.98 mm (1.2192-1.2196 in.)
Tappet-to-valve clearance — intake	0.22- 0.28 mm (0.008-0.011 in.)
Tappet-to-valve clearance — exhaust	0.27-0.33 mm (0.010-0.013 in.)
Tappet-to-bore clearance	0.02-0.06 mm (0.0007-0.0023 in.)
<b>Camshaft</b>	
Lobe lift — intake	—
Lobe lift — exhaust	7.80007 mm (0.307 in.)
Runout (1) <sup>a</sup>	0.03 mm (0.001 in.)
Thrust clearance	0.09-0.24 mm (0.003-0.009 in.)
Journal diameter	24.96-24.98 mm (0.982-0.983 in.)
Journal-to-bore clearance	0.035-0.080 mm (0.001-0.003 in.)
<b>Connecting Rod</b>	
Bearing clearance	0.027-0.052 (0.001-0.002 in.)
Bearing thickness	1.496-1.520 mm (0.058-0.059 in.)

**General Specifications (Continued)**

Item	Specification
Crank bore diameter	53.025-53.045 mm (2.087-2.088 in.)
Pin bore diameter	20.965-20.985 mm (0.825-0.826 in.)
Length (center to center)	154.8 mm (6.094 in.)
Side clearance	1.95-3.05 mm (0.076-0.120 in.)
Axial clearance	0.14-0.36 mm (0.005-0.014 in.)

a No. 3 Journal — Supported by No. 1 and No. 5 journals.

All dimensions are in mm unless noted.

**General Specifications**

Item	Specification
Motorcraft Metal Surface Cleaner ZC-21	WSE-M5B392-A
Thread Sealant with PTFE TA-24	WSK-M2G350-A2
Silicone Gasket Remover ZC-30	—
Motorcraft Metal Surface Prep ZC-31	—
Silicone Gasket and Sealant TA-30	WSE-M4G323-A4
Multi-Purpose Grease XG-4 and/or XL-5	ESB-M1C93-B
Silicone Brake Caliper Grease and Dielectric Compound XG-3-A	ESE-M1C171-A
Motorcraft SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (in Canada Motorcraft SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12) or equivalent	WSS-M2C930-A
Motorcraft Premium Gold Engine Coolant VC-7-A (in California, Oregon and New Mexico VC-7-B, in Canada CVC-7-A) or equivalent (yellow color)	WSS-M97B51-A1

**SPECIFICATIONS (Continued)****Torque Specifications**

Description	Nm	lb-ft	lb-in
Camshaft bearing caps <sup>a</sup>	—	—	—
Coolant outlet bolts	25	18	—
Oil pan bolts <sup>a</sup>	—	—	—
Oil pump-to-engine block bolts <sup>a</sup>	—	—	—
Cylinder head bolts <sup>a</sup>	—	—	—
Intake manifold bolts	18	13	—
Flywheel bolt <sup>a</sup>	—	—	—
Crankshaft pulley bolt <sup>a</sup>	—	—	—
Crankshaft position (CKP) sensor	7	—	62
Rear crankshaft oil seal retainer <sup>a</sup>	—	—	—
A/C compressor mounting bolts	25	18	—
Oil pump sprocket bolt	25	18	—
Knock sensor (KS)	20	15	—
Engine mount bracket-to-mount bolt	90	66	—
Engine mount bracket-to-engine nuts	90	66	—
Engine mount bolts (W500233-S439)	48	35	—
Engine roll-restrictor bolts	90	66	—
Engine-to-transmission bolts	48	35	—
Block-off plate bolts	25	18	—
Powertrain control module (PCM) wiring connector	6	—	53
Coolant pump bolts	10	—	89
Engine front cover bolts <sup>a</sup>	—	—	—
Camshaft sprocket bolt	65	48	—
Valve cover bolts	10	—	89
Exhaust gas recirculation (EGR) valve assembly bolts	25	18	—
Thermostat housing bolts	10	—	89
Oil pump screen and cover assembly	10	—	89
Exhaust manifold studs	17	13	—

**Torque Specifications (Continued)**

Description	Nm	lb-ft	lb-in
Catalytic converter-to-cylinder head nuts	47	35	—
Coolant pump pulley bolts	25	18	—
A/C compressor mounting bolts	48	35	—
Oil level indicator tube bolt	10	—	89
Oil pressure sender	15	11	—
A/C manifold tube bolt	20	15	—
A/C tube bracket nut	10	—	89
Oil drain plug	28	21	—
Oil pump chain tensioner bolts	10	—	89
Oil pump chain guide bolts	10	—	89
Timing chain guide bolts	10	—	89
Timing chain tensioner bolts	10	—	89
Crankcase vent oil separator bolts	10	—	89
Oil filter adapter bolts	25	18	—
Air cleaner outlet tube clamps	3	—	27
Manifold absolute pressure (MAP) sensor retainer nut	10	—	89
Coil-on-plug retaining stud bolts	10	—	89
Engine timing plug bolt	20	15	—
Belt tensioner bolt	25	18	—
Oil filter cup	33	24	—
Oil pan-to-bellhousing bolts	48	35	—
Rear main seal mounting plate bolts	10	—	89
Camshaft position (CMP) sensor bolt	20	15	—
Cylinder head temperature (CHT) sensor	12	9	—
Spark plug	15	11	—

**SPECIFICATIONS (Continued)****Torque Specifications (Continued)**

Description	Nm	lb-ft	lb-in
Fuel rail bolts	10	—	89
Damper bolts	29	21	—

a See procedure for specification.

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