

# SPECIFICATIONS

## GENERAL SPECIFICATIONS

Item	Specification
<b>Lubricants and Sealants</b>	
SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP	WSS-M2C153-H
Motorcraft Premium Engine Coolant VC-4-A (in Oregon VC-5, in Canada CXC-10). Do not mix coolant types.	ESE-M97B44-A (green in color)
Motorcraft Premium Gold Engine Coolant VC-7-A (in Oregon VC-7-B). Do not mix coolant types.	WSS-M97B51-A1 (yellow in color)
Silicone Gasket Remover ZC-30	-
Metal Surface Prep ZC-31	-
Silicone Gasket and Sealant F7AZ-19554-EA	WSE-M4G323-A4
Instant Adhesive E8AZ-19554-A	WSK-M2G402-A4
<b>Engine</b>	
Displacement	5.4L (330 cu in)
Number of cylinders	8
Bore	90.2 mm (3.55 in)
Stroke	105.8 mm (4.17 in)
Firing order	1-3-7-2-6-5-4-8
Oil pressure (@ 2000 RPM - hot)	275.8-413.7 kPa (40-60 psi)
Oil capacity (includes filter change)	5.7 L (6.0 qts)
Compression ratio	9.0:1
<b>Cylinder Head and Valve Train</b>	
Combustion chamber volume	53.5-50.5 cc (3.2648-3.0817 cu in)
Valve arrangement (front to rear) - LH	E-I-E-I-E-I-E-I
Valve arrangement (front to rear) - RH	I-E-I-E-I-E-I-E
Valve guide bore diameter	7.044-7.015 mm (0.2773-0.2762 in)
Valve stem diameter - intake	6.995-6.975 mm (0.2754-0.2746 in)
Valve stem diameter - exhaust	6.970-6.949 mm (0.2744-0.2736 in)
Valve stem-to-guide clearance - intake	0.069-0.020 mm (0.0027-0.0008 in)
Valve stem-to-guide clearance - exhaust	0.095-0.045 mm (0.0037-0.0018 in)
Valve head diameter - intake	44.63-44.37 mm (1.7571-1.7469 in)
Valve head diameter - exhaust	36.01 mm (1.4177 in)
Valve face runout	0.05 mm (0.0020 in)
Valve face angle	45.75-45.25 degrees
Valve seat width	2.1-1.9 mm (0.0827-0.0748 in)
Valve seat runout (T.I.R.)	0.025 mm (0.0010 in)
Valve seat angle	45.50 degrees
Valve spring free length	50.2 mm (1.9764 in)
Valve spring squareness	2.5 degrees
Valve spring compression pressure	667.3 N @ 28.02 mm (150.015 lb @ 1.1032 in)
Valve spring installed height	42.9-42.3 mm (1.6890-1.6654 in)

Valve spring installed pressure - valve open	760 N @ 28.80 mm (170.855 lb @ 1.1339 in)
Valve spring installed pressure - valve closed	302 N @ 42.56 mm (67.8923 lb @ 1.6756 in)
Roller follower ratio	1.75:1
<b>Hydraulic Lash Adjuster</b>	
Diameter	16.000-15.988 mm (0.660-0.629 in)
Clearance-to-bore	0.018-0.069 mm (0.0007-0.0027 in)
Service limit	0.016 mm (0.0006 in)
Hydraulic leakdown rate	5-25 seconds
Collapsed lash adjuster gap	0.085-0.450 mm (0.0335-0.0177 in)
<b>Camshaft</b>	
Theoretical valve lift @ 0 lash - intake	12.02 mm (0.4732 in)
Theoretical valve lift @ 0 lash - exhaust	12.67 mm (0.4988 in)
Lobe lift - intake	7.1104 mm (0.2799 in)
Lobe lift - exhaust	7.4979 mm (0.2952 in)
Allowable lobe lift loss	0
Journal diameter	26.962-26.936 mm (1.0615-1.0605 in)
Camshaft journal bore inside diameter (cap assembled)	27.012-26.987 mm (1.0635-1.0625 in)
Camshaft journal-to-bearing clearance	0.076-0.025 mm (0.0030-0.0010 in)
Runout <sup>a</sup>	0.09 mm (0.0035 in) (4 places)
End play	0.027-0.190 mm (0.0011-0.0075 in)
<b>Cylinder Block</b>	
Cylinder bore diameter - grade 1	90.200-90.210 mm (3.5512-3.5516 in)
Cylinder bore diameter - grade 2	90.210-90.220 mm (3.5516-3.5520 in)
Cylinder bore diameter - grade 3	90.220-90.230 mm (3.5520-3.5524 in)
Cylinder bore maximum taper	0.006 mm (0.0002 in)
Cylinder bore maximum out-of-round	0.020 mm (0.0008 in)
Main bearing bore inside diameter	72.401-72.422 mm (2.850-2.851 in)
<b>Crankshaft</b>	
Main bearing journal diameter	67.483-67.503 mm (2.6568-2.6576 in)
Main bearing journal maximum taper (straightness)	0.004 mm (0.0002 in)
Main bearing journal maximum out-of-round	0.0075 mm (0.0003 in) between cross sections
Main bearing journal-to-cylinder block clearance	0.048-0.024 mm (0.0019-0.0009 in)
Connecting rod journal diameter	53.003-52.983 mm (2.0867-2.0859 in)
Connecting rod journal maximum taper	0.004 mm (0.0002 in)
Connecting rod journal maximum out-of-round	0.0075 mm (0.0003 in) between cross sections
Crankshaft maximum end play	0.075-0.377 mm (0.0030-0.0148 in)
<b>Piston and Connecting Rod</b>	
Piston diameter - grade 1 (at right angle to pin bore)	90.175-90.165 mm (3.5502-3.5498 in)
Piston diameter - grade 2 (at right angle to pin bore)	90.185-90.175 mm (3.5506-3.5502 in)
Piston diameter - grade 3 (at right angle to pin bore)	90.195-90.185 mm (3.5510-3.5506 in)

Piston-to-cylinder bore clearance	0.025-0.045 mm (0.0010-0.0018 in)
Piston ring end gap - top	0.13-0.28 mm (0.0051-0.0110 in)
Piston ring end gap - intermediate	0.25-0.40 mm (0.0098-0.0158 in)
Piston ring end gap - oil control	0.15-0.65 mm (0.0059-0.0256 in)
Piston ring groove width - top	1.53-1.55 mm (0.0602-0.0610 in)
Piston ring groove width - intermediate	1.52-1.54 mm (0.0598-0.0606 in)
Piston ring groove width - oil control	3.030-3.050 mm (0.1193-0.1201 in)
Piston ring width	1.49-1.46 mm (0.0575-0.0587 in)
Piston ring-to-groove clearance - top	0.030-0.050 mm (0.0012-0.0020 in)
Piston ring-to-groove clearance - intermediate	0.030-0.080 mm (0.0012-0.0031 in)
Piston pin bore diameter	22.008-22.014 mm (0.8665-0.8667 in)
Piston pin diameter	22.0005-22.0030 mm (0.8662-0.8663 in)
Piston pin length	61.8 mm (2.433 in)
Piston pin-to-piston fit	0.005-0.0135 mm (0.0002-0.0005 in)
Connecting rod-to-pin clearance	0.009-0.0235 mm (0.0004-0.0093 in)
Connecting rod pin bore diameter	22.024-22.012 mm (0.8671-0.8666 in)
Connecting rod length (centerline bore-to-bore)	169.1 mm (6.6575 in)
Connecting rod maximum allowed bend	± 0.038 mm (± 0.0015 in)
Connecting rod maximum allowed twist	± 0.05 mm (± 0.0020 in)
Connecting rod bearing bore diameter (with assembled liners)	53.049-53.027 mm (2.0885-2.0877 in)
Connecting rod bearing-to-crankshaft clearance	0.064-0.026 mm (0.0025-0.0010 in)
Connecting rod side clearance	0.475-0.125 mm (0.0187-0.0049 in)
a. Full indicator measurement on all journals when supported on front and rear journals.	

## TORQUE SPECIFICATIONS

Description	Nm	lb-ft	lb-in
Valve cover bolts	10	-	89
Camshaft bearing cap bolts	10	-	89
Camshaft sprocket bolts <sup>(1)</sup>	-	-	-
Cylinder head temperature sensor (CHT)	26	19	-
Camshaft position sensor bolt	10	-	89
Crankshaft position sensor bolt	10	-	89
Connecting rod bolts <sup>(1)</sup>	-	-	-
Crankshaft damper pulley bolt <sup>(1)</sup>	-	-	-
Crankshaft main bearing bolts (cross-mounted) <sup>(1)</sup>	-	-	-
Crankshaft main bearing bolts (vertical) <sup>(1)</sup>	-	-	-
Cylinder head bolts <sup>(1)</sup>	-	-	-
EGR valve to intake manifold bolts <sup>(1)</sup>	-	-	-
Exhaust manifold nuts	25	18	-

Exhaust manifold studs	12	9	-
Drive belt idler pulley bolt	25	18	-
Flywheel bolts	80	59	-
Engine front cover bolts (1-5)	25	18	-
Engine front cover bolts (6-15)	48	35	-
Fuel injection supply manifold bracket bolts	10	-	89
Heater return tube studs	40	30	-
Ignition coil bolts	6	-	53
Lower intake manifold to upper intake manifold bolts <sup>(1)</sup>	-	-	-
Upper intake manifold to cylinder head bolts <sup>(1)</sup>	-	-	-
Knock sensor	20	15	-
Remote oil cooler line to cylinder block	10	-	89
Oil cooler assembly to oil filter adapter bolts	58	43	-
Oil filter	16	12	-
Oil filter adapter bolt	25	18	-
Oil filter adapter nut	48	35	-
Oil filter adapter stud	12	9	-
Oil level indicator tube bolt	10	-	89
Oil line connector adapter assembly bolt	25	18	-
Oil pan bolts <sup>(1)</sup>	-	-	-
Oil pan drain plug	14	10	-
Oil pressure switch	14	10	-
Oil pump bolts	10	-	89
Oil pump screen and pickup tube bolts	10	-	89
Oil pump screen and pickup tube spacer	25	18	-
Oil pump screen and pickup tube spacer bolt	25	18	-
Power steering pump bolts	25	18	-
Rear main oil seal retainer bolts	10	-	89
Spark plugs	18	13	-
Thermostat housing bolts	25	18	-
Idle air control valve screws <sub>a</sub>	-	-	-
Throttle body spacer to intake manifold bolts <sup>(1)</sup>	-	-	-
Throttle body to throttle body spacer bolts <sup>(1)</sup>	-	-	-
Timing chain guide bolts	10	-	89
Timing chain hydraulic tensioner bolts	25	18	-
Water pump bolts	25	18	-
Water pump pulley bolts	25	18	-

EGR valve to exhaust manifold tube fittings <sup>(1)</sup>	-	-	-
42-pin bulkhead connector bolts	5	-	44
Accelerator control splash shield bolts	7	-	62
Remote oil filter adapter line bolts (4x4 vehicles)	10	-	89
Oil cooler insert	58	43	-
Oil cooler bolt (4x4 vehicles)	58	43	-
Motor mount bolts <sup>(1)</sup>	-	-	-
Fan shroud bolts	9	-	80
Differential pressure feedback EGR system nuts	10	-	89
Exhaust-to-manifold EGR valve tube	40-60	30-44	-
Radio ignition interference capacitor nuts	25	18	-
Transmission-to-engine bolts	48	35	-
Torque converter-to-flexplate nuts	35	26	-
Generator upper mounting bracket bolts	10	-	89
Generator lower mounting bolts	25	18	-

(1) Refer to the procedure in this section.