

SPECIFICATIONS

MATERIAL SPECIFICATIONS

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Item	Specification	Fill Capacity
Motorcraft® SAE 5W-20 Premium Synthetic Blend Motor Oil (US); Motorcraft® SAE 5W-20 Super Premium Motor Oil (Canada) XO-5W20-QSP (US); CXO-5W20-LSP12 (Canada)	WSS-M2C945-A	4.05L (4.3 qt) includes filter change/3.75L (3.96 qt) without filter change

GENERAL SPECIFICATIONS

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Item	Specification
Engine	
Displacement	1.6L GTDI
No. of cylinders	4
Bore/stroke	79.0/81.4 mm (3.11/3.20 in)
Firing order	1-3-4-2
Oil pressure (hot @ 800 rpm)	100 kPa (14.5 psi)
Oil pressure (hot @ 2, 000 rpm)	200 kPa (29.0 psi)
Compression ratio	10:1
Engine weight - (with flexplate)	81.0 kg (178.6 lb)
Engine and transaxle weight - automatic transaxle	157.2 kg (346.6 lb)
Cylinder Block	
Cylinder bore diameter	79.005-79.025 mm (3.110-3.111 in)
Cylinder bore maximum out-of-round	0.008 mm (0.0003 in)
Main bearing bore diameter	54.000-54.018 mm (2.126-2.127 in)
Head gasket surface flatness	0.1 mm/general 0.05 mm/200 x 200 (0.004 in/general) (0.0019 in/7.87 x 7.87)
Piston	
Piston grade - single	0.0135-0.0485 mm (0.0005-0.0019 in)
Piston-to-bore clearance	0.0225-0.0575 mm (0.0009-0.0023 in)
Ring groove width - top	1.25-1.27 mm (0.049-0.05 in)
Ring groove width - 2nd	1.22-1.24 mm (0.048-0.049 in)
Ring groove width - oil	2.01-2.03 mm (0.079-0.080 in)
Piston skirt coating thickness	0.011 mm (0.0004 in)
Piston Pin	
Diameter	20.994-21.000 mm (0.826-0.827 in)
Length	45.7-46.0 mm (1.80-1.81 in)
Piston-to-pin clearance	0.006-0.017 mm (0.0002-0.0007 in)
Floating pin	-

Cylinder Head	
Cylinder head flatness	0.1 mm (0.003 in) overall
Valve lift @ zero lash (exhaust)	8.6 mm (0.338 in)
Valve lift @ zero lash (intake)	8.7 mm (0.342 in)
Valve guide diameter	6.000-6.030 mm (0.242-0.244 in)
Valve seat width - intake/exhaust	1 mm \pm 0.15 mm (0.039 in \pm 0.006 in)
Valve seat angle	45 degrees
Valve seat runout	0.029 mm (0.001 in)
Valve tappet bore diameter	28.8-29.2 mm (1.13-1.15 in)
Cam bore diameter	25.0-25.03 mm (0.98-.099 in)
Valve	
Valve head diameter - intake	30.1 mm \pm 0.15 mm (1.18 in \pm 0.006 in)
Valve head diameter - exhaust	24.1 mm \pm 0.15 mm (0.95 in \pm 0.006 in)
Valve stem diameter - intake	5.968 mm \pm 0.0075 mm (0.235 in \pm 0.0003 in)
Valve stem diameter - exhaust	5.958 mm \pm 0.0075 mm (0.234 in \pm 0.0003 in)
Valve stem-to-guide clearance - intake	0.0245-0.0695 mm (0.0010-0.0027 in)
Valve stem-to-guide clearance - exhaust	0.0295-0.0745 mm (0.0011-0.003 in)
Valve face runout	0.03 mm (0.001 in)
Valve face angle	44.5 degrees \pm 0.15 mm (0.005 in)
Valve Spring - Compression Pressure	
Intake and exhaust (installed)	180 N \pm 11 N
Intake (valve open) 8.9 mm (0.35 in) of lift	320 N \pm 20 N
Exhaust (valve open) 8.94 mm (0.351 in) of lift	320 N \pm 20 N
Free length	48.7 mm \pm 0.8 mm (1.92 in \pm 0.031 in)
Assembled height	35.60 mm (1.401 in)
Crankshaft	
Main bearing journal diameter	47.980-48.000 mm (1.888-1.889 in)
Production repair	47.730-47.750 mm (1.878-1.879 in)
Main bearing clearance	0.022-0.051 mm (0.0008-0.0020 in)
Connecting rod journal diameter	43.980-44.000 mm (1.731-1.732 in)
Production repair	43.730-43.750 mm (1.721-1.722 in)
End play	0.12-0.43 mm (0.005-0.017 in)
Rings	
Width - top	1.17-1.19 mm (0.046-0.047 in)
Width - 2nd	1.17-1.195 mm (0.046-0.0471 in)
Width - oil	2 mm (0.078 in)
Ring gap - top	0.18-0.28 mm (0.0070-0.011 in)
Ring gap - 2nd	0.7-0.9 mm (0.027-0.035 in)
Ring gap - oil	0.2-0.9 mm (0.00787-0.0354 in)
Valve Tappet	
Diameter	27.965-27.980 (1.100-1.101 in)
Tappet-to-valve clearance - intake	0.17-0.23 mm (0.007-0.009 in)
Tappet-to-valve clearance - exhaust	0.31-0.37 mm (0.012-0.015 in)

Tappet-to-bore clearance	0.020-0.065 mm (0.0008-0.0025 in)
Camshaft	
End play	0.07-0.20 mm (0.003-0.008 in)
Lobe lift - intake	8.9 mm (0.35 in)
Lobe lift - exhaust	8.94 mm (0.351 in)
Runout (1) ⁽¹⁾	0.02 mm (0.0008 in)
Thrust clearance	30.960-30.980 mm (1.21-1.22 in)
Journal diameter	24.97 mm ± 0.01 mm (0.98 in ± 0.0004 in)
Journal-to-bore clearance	0.020-0.070 mm (0.0008-0.0027 in)
Connecting Rod	
Running clearance	0.024-0.050 mm (0.0009-0.0019 in)
Bearing clearance	0.024-0.044 mm (0.0009-0.0017 in)
Bearing thickness (grade 1)	1.499-1.506 mm (0.0590-0.0592 in)
Bearing thickness (grade 2)	1.506-1.513 mm (0.0592-0.0595 in)
Bearing thickness (grade 3)	1.513-1.520 mm (0.0595-0.0598 in)
Bearing thickness (grade 4)	1.520-1.527 mm (0.0598-0.0601 in)
Crank bore diameter	47.025-47.045 mm (1.851-1.852 in)
Pin bore diameter	21.018-21.024 mm (0.8274-0.8277 in)
Length (center to center)	134 mm (5.3 in)
(1) No. 3 Journal - Supported by No. 1 and No. 5 journals.	

TORQUE SPECIFICATIONS

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Description	Nm	lb-ft	lb-in
Accessory drive belt tensioner bolts	48	35	-
A/C compressor bolts and stud bolt	25	18	-
A/C line nut	15	-	133
Battery tray bracket nuts	48	35	-
Bitron valve bolts	10	-	89
Block heater nut	3	-	27
Camshaft bearing caps ⁽¹⁾	-	-	-
Camshaft phaser and sprocket bolt - Exhaust ⁽¹⁾	-	-	-
Camshaft phaser and sprocket bolt - Intake ⁽¹⁾	-	-	-
Camshaft phaser and sprocket plugs	16	-	142
CMP bolts	9	-	80
Catalytic converter bracket-to-subframe bolts	25	18	-
Catalytic converter bracket-to-transaxle nuts	25	18	-
Catalytic converter bracket-to-transaxle studs	8	-	71
Catalytic converter-to-muffler nuts	48	35	-
Catalytic converter-to-turbocharger bolts	30	22	-
CAC tube-to-transaxle nut	10	-	89
CAC tube-to-oil pan nuts	20	-	177

CAC tube clamps	5	-	44
CAC tube-to-turbocharger retaining nut	5	-	44
Connecting rod cap bolts ⁽¹⁾	-	-	-
Coolant outlet nut and bolts	18	-	159
Coolant pump bolts ⁽¹⁾	-	-	-
Coolant pump pulley bolts	24	18	-
Crankshaft rear seal bolts ⁽¹⁾	-	-	-
CKP sensor bolt	8	-	71
Crankshaft pulley bolt ⁽¹⁾	-	-	-
Crankcase vent oil separator bolts	10	-	89
Cylinder head bolts ⁽¹⁾	-	-	-
Engine appearance cover mounting stud	5	-	44
Engine lifting eye bolts - RH	19	-	168
Engine mount bracket bolts - LH	55	41	-
Engine mount bolts	90	60	-
Engine mount nuts	80	59	-
Engine mount studs	8	-	71
Engine wiring harness stud bolt	10	-	89
EOP switch	18	-	159
Engine plug bolt	20	-	177
Exhaust manifold nuts	21	15	-
Exhaust manifold studs	10	-	89
Exhaust manifold-to-turbocharger nuts	30	22	-
Exhaust manifold-to-turbocharger studs	20	-	177
Engine-to-transaxle bolts	48	35	-
Flexplate bolts ⁽¹⁾	-	-	-
Fuel pump mounting bracket bolts ⁽¹⁾	-	-	-
Fuel rail bolts	23	17	-
Generator B+ cable nut	15	-	133
Generator nut and bolts	48	35	-
Generator stud	10	-	89
Ground wire-to-frame rail bolts	23	17	-
Halfshaft bracket bolts	48	35	-
Halfshaft retaining bracket nuts	25	18	-
High current BJB wire nut	12	-	106
High pressure fuel pump bolts	13	-	115
High pressure fuel pump-to-fuel rail tube nuts ⁽¹⁾	-	-	-
High pressure fuel pump tube stud bolt	7	-	62
HO2S	48	35	-
HO2S connector bracket nut and bolt	10	-	89
Ignition coil-on-plug bolts	10	-	89
Intake manifold lower bolts	10	-	89
Intake manifold upper bolts	17	-	150

Knock Sensor (KS) bolts	18	-	159
Main bearing beam bolts ⁽¹⁾	-	-	-
Oil cooler bolt	55	41	-
Oil filter	15	-	133
Oil pan drain plug	28	21	-
Oil pan bolts ⁽¹⁾	-	-	-
Oil pan-to-transaxle bolts	48	35	-
Oil pump bolts ⁽¹⁾	-	-	-
Oil pump screen and pickup tube bolts	10	-	89
Piston cooling jet bolts	9	-	80
Selector lever cable bracket bolts	25	18	-
Spark plugs	12	-	106
Starter motor bolts	35	26	-
Starter motor B+ terminal nut	12	-	106
Starter motor S-terminal nut	6	-	53
Thermostat housing bolts	9	-	80
Timing belt cover bolts	10	-	89
Timing belt tensioner bolt	25	18	-
Torque converter nuts	48	35	-
Transaxle-to-engine bolts	48	35	-
Transaxle roll-restrictor bolts	125	92	-
Transaxle shift cable bracket bolts	25	18	-
Transaxle support insulator bolt	148	109	-
Turbocharger coolant tube banjo bolts	25	18	-
Turbocharger coolant tube bolts	23	17	-
Turbocharger heat shield bolts	18	-	159
Turbocharger oil feed tube bolts	10	-	89
Turbocharger oil feed tube banjo bolt	10	-	89
Turbocharger oil return tube bolts	10	-	89
Turbocharger-to-exhaust manifold nuts	25	18	-
Turbocharger-to-exhaust manifold stud	20	-	177
Vacuum pump mounting bracket nuts	10	-	89
Vacuum pump mounting stud bolts	10	-	89
Valve cover retainers ⁽¹⁾	-	-	-
VCT bridge bolts ⁽¹⁾	-	-	-
VCT oil control solenoid bolts	8	-	71
Windage tray bolts	9	-	80

(1) Refer to the appropriate procedure in this information.