SECTION 303-01A Engine — 3.7L

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SPECIFICATIONS

Material

Item	Specification	Fill Capacity
Motorcraft® High Performance Engine RTV Silicone TA-357	WSE-M4G323-A6	—
Motorcraft® Metal Surface Prep ZC-31-A	—	—
Motorcraft® SAE 5W-20 Premium Synthetic Blend Motor Oil XO-5W20-QSP (US); Motorcraft® SAE 5W-20 Super Premium Motor Oil CXO-5W20-LSP12 (Canada); or equivalent	WSS-M2C930-A	5.7L (6.0 qt) includes filter change
Motorcraft® Specialty Orange Engine Coolant VC-3-B (US); CVC-3-B (Canada); or equivalent	WSS-M97B44-D	—
Motorcraft® Silicone Gasket Remover ZC-30	—	—
Multi-Purpose Grease XG-4 and/or XL-5	ESB-M1C93-B	—
Thread Sealant with PTFE TA-24	WSK-M2G350-A2	—
Threadlock and Sealer TA-25	WSK-M2G351-A5	—

General Specifications

Item	Specification
Engine	
Displacement	3.7L (4V) (226 CID)
No. cylinders	6
Bore/stroke	95.5/86.7 mm (3.759/3.413 in)
Fire order	1-4-2-5-3-6
Oil pressure	Minimum 30 psi @ 1,500 rpm with engine at normal operating temperature
Compression ratio	10.5:1
Spark plug	CYFS12F-5 Gap = 1.25-1.35 mm (0.049-0.053 in)
Engine weight (without accessory drive components)	161 kg (355 lb)
Engine and transaxle assembly weight (without accessory drive components)	260.8 kg (575 lb)
Cylinder Head and Valve Train	
Cylinder head gasket surface flatness	Flat within 0.08 mm (0.003 in) length end to end, area 150 mm (5.9 in) x 150 mm (5.9 in) (or full width) should be less than 0.05 mm (0.002 in)
Combustion chamber volume	56.651 cc (3.46 CI)
Valve tappet clearance — intake	0.15-0.25 mm (0.006-0.01 in)
Valve tappet clearance — exhaust	0.360-0.460 mm (0.0142-0.0181 in) Engine must be at room temperature before measuring
Valve guide bore inner diameter	5.519-5.549 mm (0.217-0.218 in)
Valve stem diameter — intake	5.479-5.497 mm (0.2157-0.2164 in)
Valve stem diameter — exhaust	5.466-5.484 mm (0.2151-0.2159 in)
Valve stem-to-guide clearance — intake	0.022-0.070 mm (0.0008-0.0027 in)
Valve stem-to-guide clearance — exhaust	0.035-0.083 mm (0.0013-0.032 in)
Valve head diameter — intake	37.0 mm (1.46 in)
Valve head diameter — exhaust	31.0 mm (1.22 in)
Valve face runout	0.05 mm (0.0001 in)

SPECIFICATIONS (Continued)

General Specifications (Continued)

Item	Specification
Valve face angle	45.25-45.75°
Valve seat width — intake	1.3-1.5 mm (0.051-0.059 in)
Valve seat width — exhaust	1.4-1.7 mm (0.055-0.067 in)
Valve seat runout	0.04 mm (0.0001 in) MAX
Valve seat angle	44.5-45.5°
Valve spring free length (approx.)	48.0 mm (1.889 in)
Valve spring compression pressure (N @ spec. length)	525 N @ 27.0 mm (114.7 lb @ 1.06 in)
Valve spring installed height	37.0 mm (1.45 in)
Valve spring installed height pressure (N @ spec. length)	235 N @ 37.0 mm (53 lb @ 1.45 in)
Valve spring installed pressure — service limit	10% force loss @ specified height
Camshaft	
Theoretical valve lift @ 0 lash — Intake	10.0 mm (0.39 in)
Theoretical valve lift @ 0 lash — Exhaust	9.6798 mm (0.38 in)
Lobe lift — intake	10.0 mm (0.39 in)
Lobe lift — exhaust	9.6798 mm (0.38 in)
Allowable lobe lift loss	0.062 mm (0.0024 in)
Camshaft journal bore inside diameter — 1st journal	39.0375-39.0625 mm (1.536-1.537 in)
Camshaft journal bore inside diameter — intermediate journals	25.9875-26.0125 mm (1.023-1.024 in)
Camshaft bearing outside diameter — 1st journal	38.99-39.01 mm (1.5350-1.5358 in)
Camshaft bearing outside diameter — intermediate journals	25.937-25.963 mm (1.021-1.022 in)
Camshaft journal-to-bearing clearance, 1st journal — service limit	0.0725 mm (0.0029 in) MAX
Camshaft journal-to-bearing clearance, intermediate journals — service limit	0.0755 mm (0.0029 in) MAX
Runout camshaft journals	0.040 mm (0.0015 in) MAX
End play — standard	0.032-0.170 mm (0.0012-0.0066 in)
End play — service limit	0.190 mm (0.00748 in) MAX
Cylinder Block	
Cylinder bore diameter — grade 1	95.500-95.520 mm (3.760-3.761 in)
Cylinder bore roundness	0.013 mm (0.0005 in)
Cylinder bore taper	0.010 mm (0.0004 in) per 25.4 mm (1 in)
Block main bore roundness	0.008 mm (0.003 in)
Main bearing bore inside diameter	72.400-72.424 mm (2.8503-2.8513 in)
Head gasket surface flatness	Flat within 0.150 mm (0.005 in) overall 0.050 mm (0.001 in) per 150 mm (5.905 in) x 150 mm (5.905 in) 0.025 mm (0.0009 in) per 25 mm (0.98 in) x 25 mm (0.98 in)
Crankshaft	
Main bearing journal diameter	67.5 mm (2.657 in)
Main bearing journal maximum taper	0.004 mm (0.00015 in)
Main bearing journal maximum out-of-round	0.006 mm (0.00023 in)
Main bearing journal-to-main bearing clearance	0.026-0.041 mm (0.0010-0.0016 in)
Connecting rod journal diameter	55.983-56.003 mm (2.204-2.205 in)
Connecting rod journal maximum taper	0.004 mm (0.00015 in)
Connecting rod journal maximum out-of-round	0.006 mm (0.00023 in)
Crankshaft maximum end play	0.051-0.291 mm (0.0020-0.0114 in)
Piston and Connecting Rod	

SPECIFICATIONS (Continued)

General Specifications (Continued)

Item	Specification
Piston diameter — single grade	95.490-95.476 mm (3.7594-3.7589 in)
Piston-to-cylinder bore clearance	0.010 to 0.044 mm (0.0003-0.0017 in)
Piston ring end gap — compression (top, gauge diameter)	0.17-0.27 mm (0.0067-0.0106 in)
Piston ring end gap — compression (bottom, gauge diameter)	0.30-0.55 mm (0.0118-0.0216 in)
Piston ring end gap — oil ring (steel rail, gauge diameter)	0.15-0.45 mm (0.0059-0.0177 in)
Piston ring groove width — compression (top)	1.230-1.25 mm (0.0484-0.0492 in)
Piston ring groove width — compression (bottom)	1.530-1.55 mm (0.0602-0.0610 in)
Piston ring groove width — oil ring	2.53-2.55 mm (0.0996-0.1004 in)
Piston ring width — upper compression ring	1.17-1.19 mm (0.0460-0.0468 in)
Piston ring width — lower compression ring	1.47-1.49 mm (0.0578-0.0586 in)
Piston ring-to-groove clearance (upper and lower compression rings)	0.040-0.080 mm (0.0015-0.0031 in)
Piston pin bore diameter	23.004-23.008 mm (0.9056-0.9058 in)
Piston pin diameter	22.997-23.000 mm (0.9053-0.9055 in)
Piston pin length	55.975 mm (2.203 in)
Piston pin-to-piston fit	0.004 to 0.011 mm (0.00015-0.00043 in)
Piston-to-connecting rod clearance	2.7 mm (0.1 in)
Connecting rod-to-pin clearance — standard	0.007-0.022 mm (0.0002-0.0009 in)
Connecting rod pin bore diameter	23.007-23.019 mm (0.905-0.906 in)
Connecting rod length (center-to-center)	152.68 mm (6.01 in)
Connecting rod maximum allowed bend	0.038 mm (0.0014 in)
Connecting rod maximum allowed twist	0.050 mm (0.0019 in)
Connecting rod bearing bore diameter — grade 1	59.866-59.872 mm (2.3569-2.3571 in)
Connecting rod bearing bore diameter — grade 2	59.873-59.879 mm (2.3572-2.3574 in)
Connecting rod bearing bore diameter — grade 3	59.880-59.886 mm (2.3574-2.3577 in)
Connecting rod bearing-to-crankshaft clearance	0.020-0.054 mm (0.0007-0.0021 in)
Connecting rod side clearance (assembled to crank) — standard	0.175-0.425 mm (0.0068-0.0167 in)
Connecting rod side clearance (assembled to crank) — service limit	0.175-0.425 mm (0.0068-0.0167 in)

Torque Specifications

Description	Nm	lb-ft	lb-in
A/C compressor bolt, stud bolt and nut	26	19	—
A/C compressor stud	9	—	80
Accessory drive belt tensioner bolts	11	—	97
Bellhousing-to-engine bolts and stud bolts	48	35	—
Bellhousing-to-oil pan bolts	48	35	—
Block coolant drain plug — RH [a]	—	—	—
Block coolant drain plug — LH [b]	—	—	—
Block heater	40	30	—
Block oil plug — LH	48	35	—
Block oil plug — RH	32	24	—
Block oil plug — Rear	85	63	—
Camshaft bearing cap bolts [c]	—	—	—
Camshaft Position (CMP) sensor bolts	10	—	89
Catalytic converter nuts	45	35	—

SPECIFICATIONS (Continued)

Torque Specifications (Continued)

Description	Nm	lb-ft	lb-in
Connecting rod cap bolts[c]	—	—	—
Coolant pump bolts[c]	—	—	—
Coolant pump pulley bolts	24	18	—
Crankcase rear seal retainer plate bolts[c]	—	—	—
Crankshaft Position (CKP) sensor bolt	10	—	89
CKP sensor heat shield nut and bolt	10	—	89
Crankshaft pulley bolt[c]	—	—	—
Crossmember brace nuts and bolts	48	35	—
Cylinder block water pump hole cover bolts[c]	—	—	—
Cylinder head bolts[c]	—	—	—
Cylinder head M6 bolt	10	—	89
Cylinder Head Temperature (CHT) sensor	10	—	89
Engine front cover bolts[c]	—	—	—
Engine lifting eye bolts	24	18	—
Engine mount bolt	55	41	—
Engine mount bracket-to-engine mount nut	63	46	—
Engine mount bracket bolts and stud bolts	55	41	—
Engine oil filter [d]	—	—	—
Engine-to-bellhousing bolts	45	35	—
Engine Oil Pressure (EOP) switch[c]	—	—	—
Exhaust camshaft bolt[c]	—	—	—
Exhaust manifold heat shield bolts	12	—	106
Exhaust manifold nuts[c]	—	—	—
Exhaust manifold studs	12	—	106
Flexplate bolts[c]	—	—	—
Flywheel bolts[c]	—	—	—
Front crossmember brace nuts	48	35	—
Fuel rail bolts	10	—	89
Generator B+ terminal nut	17	—	150
Generator bolt and nut	48	35	—
Generator stud	8	—	71
Generator wiring harness nut	10	—	89
Ground strap bolt	10	—	89
Ground wire-to-engine bolt	10	—	89
Hood bolts	12	—	106
Ignition coil-on-plug bolts	7	—	62
Intermediate steering shaft bolt	25	18	—
Knock Sensor (KS) bolts	20	—	177
Lower intake manifold bolts[c]	—	—	—
Main bearing bolts[c]	—	—	—

SPECIFICATIONS (Continued)

Torque Specifications (Continued)

Description	Nm	lb-ft	lb-in
Main bearing cap support brace bolts[c]	—	—	—
Oil filter adapter bolts[c]	—	—	—
Oil pan bolts[c]	—	—	—
Oil pan drain plug	27	20	—
Oil pan-to-bellhousing bolts	48	35	—
Oil pump bolts	10	—	89
Oil pump screen and pickup tube bolts	10	—	89
Spark plugs	15	—	133
Strut tower brace	35	26	—
Steering column dash boot nuts	9	—	80
Steering shaft pinch bolt	47	35	—
Subframe nuts and bolts	115	89	—
Thermostat housing bolts[c]	—	—	—
Timing chain guide bolts	10	—	89
Timing chain tensioner bolts	10	—	89
Torque converter nuts	44	32	—
Transmission cooling tube retainer nut	20	—	177
Transmission crossmember bolts	63	46	—
Upper intake manifold bolts[c]	—	—	—
Upper intake manifold support bracket bolts	10	—	89
Under body shield	10	—	89
Valve cover bolts and stud bolts[c]	—	—	—
Variable Camshaft Timing (VCT) bolts[c]	—	—	—
Wiring harness retainer bracket nut	20	—	177

a Tighten to 16 Nm (142 lb-in) plus an additional 180 degrees.

b Tighten to 10 Nm (89 lb-in) plus an additional 720 degrees.

c Refer to the procedure in this section.

d Tighten to 5 Nm (44 lb-in) plus an additional 180 degrees.