

General

Manufacturer	TOYOTA		
Model/Year	1HZ (HZJ75, 80)	1989 -	
L/(CID)	4,163cc DIESEL	No. of Cylinders	6
Bore & Stroke	94.0mm X 100.0mm		
Firing Order	1 - 4 - 2 - 6 - 3 - 5		
Compression Ratio	22.7 : 1	Idle Speed	650 rpm manual
Comp. Pressure @ RPM	3.6 MPa @ 250 rpm	2.65 MPa min.	<490 kPa diff.
Oil Pressure	29 kPa min at idle	Oil Capacity & Grade	9.8 ltr dry CC-CD
Injection Timing	0° BTDC	Plunger stroke -	1.03 - 1.09 mm

Block

Bore Diameter Standard	94.000 - 94.030 mm
Maximum Overbore	1.00 mm
Liner Flange Height & Fit	N/A
Crankshaft Housing Bore	71.000 - 71.018 mm
Camshaft Housing Bore	38.000 - 38.02 mm
Block Deck Height	0.20 mm warp limit

Pistons & Rings

Piston to Bore Clearance	0.04 - 0.06 mm @ 58.6 mm down from the crown
Piston Protrusion	0.405 - 0.655 mm (Graded head gaskets - refer notes.)
Gudgeon Pin Diameter	29.000 - 29.012 mm
Gudgeon Pin Clearance	0.004 - 0.012 mm Limit: 0.03 mm
Ring Equipment	Top: 2.0 mm (½K), 2 nd : 2.0 mm, Oil: 4.00 mm
Piston Ring End Gap	Top: 0.27 - 0.54 mm, 2 nd : 0.40 - 0.62 mm, Oil: 0.20 - 0.52 mm
Ring to Groove Clearance	Top: 0.050 - 0.095 mm, 2 nd : 0.06 - 0.10 mm, Oil: 0.03 - 0.07 mm

Connecting Rods

Big End Bore	62.014 - 62.032 mm
Pin End Bore	32.000 - 32.030 mm
Centre to Centre	
Big End Width	
Bush ID Finished	29.008 - 29.020 mm
Rod Side Clearance	0.10 - 0.20 mm Limit: 0.30 mm
Bend/Twist	0.03 mm/100mm bend 0.15 mm/100 mm twist

Camshaft

Journal Diameters	1: 34.969 - 34.985 mm 2-7: 27.986 - 27.998 mm
End Play	0.10 - 0.20 mm Limit: 0.30 mm
Oil Clearance	1: 0.022 - 0.074 mm 2 - 7: 0.030 - 0.066 mm Limit: 0.1 mm
Minimum Lobe Height	Inlet 55.10 mm Exhaust 55.95 mm Limit In 54.6 & Ex 55.4 mm
Bend Limit	0.10 mm circle runout

Crankshaft

Main Journal Standard	66.994 – 67.004 mm	
Conrod Journal Standard	58.994 – 59.004 mm	
Harmonic Balancer Diam.		
Crank Gear Diameter		
Seal Diameter		
Thrust Thickness	2.930 – 2.980 mm	
Main Bearing Clearance	0.036 – 0.054 mm std. Limit: 0.10 mm	
Conrod Bearing Clearance	0.036 – 0.054 mm std. Limit: 0.10 mm	
Crankshaft End Play	0.040 – 0.240 mm Limit: 0.30 mm	
Journal Radius	Main	Conrod

Cylinder Head

Tappet Clearance	Inlet	0.15 – 0.25 mm Cold	Exhaust	0.35 – 0.45 mm Cold
Head Height	New		Limit	
Warp Limit		0.2 mm		
Valve Seat Angle	Inlet	45°	Exhaust	45°
Valve Seat Width	Inlet	1.5 – 1.9 mm	Exhaust	1.8 – 2.2 mm
Valve Head Margin	Inlet	1.1 mm min	Exhaust	1.2 mm min
Valve Face Angle	Inlet	44.5°	Exhaust	44.5°
Valve Length	Inlet	103.29 – 103.69 mm	Exhaust	103.14 – 103.54 mm
Valve Stem Diameter	Inlet	7.975 – 7.990 mm	Exhaust	7.960 – 7.975 mm
Valve Guide Height	Inlet	11.8 – 12.2 mm	Exhaust	11.8 – 12.2 mm
Valve Guide Clear. Std.	Inlet	0.020 – 0.055 mm	Exhaust	0.035 – 0.070 mm
Valve Guide Clear. Limit	Inlet	0.08 mm	Exhaust	0.10 mm
Valve Spring Pressure	Yellow	30.7 – 33.9 kg	Blue	30.7 – 33.9 kg
Valve Spring Free Length	Yellow	46.2 mm	Blue	49.14 mm
Valve Spring Install. Height	Yellow	37.0 mm	Blue	37.0 mm
Precom. Chamber Protrus.		-0.04 – +0.04 mm		

Torque Specifications

Main Bolts	10.5 kgf.m + 90° OILED Outer bolts: 1.85 kgf.m		
Conrod Bolts	3.75 kgf.m + 90° OILED		
Head Bolts	7.0 kgf.m + 90° + 90° OILED		
Camshaft Bearing Caps	1: 2.5 kgf.m 2 – 7: 1.85 kgf.m		
Manifold Bolts	Inlet	2.0 kgf.m	Exhaust 4.0 kgf.m
Flywheel Bolts	13.0 kgf.m OILED		
No.1 Crankshaft Pulley	50.0 kgf.m	No.2 Crankshaft Pulley: 2.5 kgf.m	

Torque Sequences

12 8 4 2 6 10 14

11 7 3 1 5 9 13

25 19 17 11 9 3 1 6 8 14 16 22 24

23 21 15 13 7 5 2 4 10 12 18 20 26

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Head Gasket Selection from Piston Protrusion

Piston Protrusion	Gasket Grade	Gasket Size
0.405 – 0.455 mm	Grade 1	1.15 – 1.25 mm
0.456 – 0.555 mm	Grade 3	1.25 – 1.35 mm
0.556 – 0.655 mm	Grade 5	1.35 – 1.45 mm