



TECHNICAL DATA - ENGINE

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GENERAL

Type designation	2ZZ-GE
Configuration & no. of cylinders	in-line 4
Capacity	1796 cm <sup>3</sup>
Bore	82.00 mm
Stroke	85.00 mm
Camshafts	Chain driven DOHC
Valves	4VPC in pentroof chambers
Valve control	Variable valve timing & lift
	Variable lift
Valve timing	33° BTDC to 10° ATDC
	- open
	- close
	15° ATDC to 58° ATDC
	- open
	- close
	58° BTDC to 15° BTDC
	- open
	- close
	54° ABDC to 97° ABDC
	14° BBDC
	34° ATDC
	36° BBDC
	60° ATDC
Compression ratio	11.5:1
Compression pressure (250 rpm)	1400 kPa (203 psi)
	- new
	1000 kPa (145 psi)
	- service limit
Firing order	1,3,4,2
Spark plugs	NGK IFR6A11
Spark plug gap	1.1 mm
Maximum continuous engine speed	8000 rpm
Maximum transient engine speed	8500 rpm
Idle speed	850 rpm
Ignition system	Direct ignition using individual H.T. coils for each cylinder
Fuel system	Fully sequential indirect fuel injection with Lotus T4 controller
Fuel requirement	Unleaded 95 RON minimum
Peak power (1999/99/EC)	141 kW (192 PS) @ 7,800 rpm
Peak torque (1999/99/EC)	181 Nm @ 6,800 rpm
Exhaust emissions	0.42 g/km
	- CO
	0.78 g/km
	- HC
	0.0121 g/km
	- NOx
	0.7921 g/km
	- HC + NOx
	208 g/km
	- CO <sub>2</sub>

CYLINDER BLOCK

Material	Aluminium alloy, MMC cylinder bores
Deck face flatness tolerance	0.05 mm
Cylinder bore diameter	82.000 - 82.013 mm

CYLINDER HEAD

Material	Aluminium alloy
Head face flatness tolerance	0.05 mm
Reface limit	No machining recommended

VALVES & SPRINGS

Angle of valve seats	45°
Stem diameter	5.46 mm
Cold valve clearance (between cam & follower)	0.15 - 0.25 mm
	- inlet
	0.35 - 0.45 mm
	- exhaust
Valve guide standout	15.3 - 15.7 mm



Valve spring free length	- inlet	46.4 mm
	- exhaust	46.5 mm
Valve spring installed tension @ 38.5 mm	- inlet	220 - 244 N
	- exhaust	208 - 230 N

**CAMSHAFTS**

End float	- new	0.04 - 0.14 mm
	- service limit	0.15 mm
Journal diameter	- no. 1	34.449 - 34.465 mm
	- others	27.949 - 27.965 mm

**PISTONS**

Diameter @ 90° to pin, 12.0 mm from bottom edge		81.975 - 81.993 mm
Ring gap, 110 mm from block top face	- std.	0.25 - 0.35 mm
	- no.1	0.35 - 0.50 mm
	- no.2	0.15 - 0.40 mm
	- oil rail	0.15 - 0.40 mm
	- max. - no.1	1.1 mm
	- no.2	1.2 mm
	- oil rail	1.1 mm
Ring groove clearance		0.030 - 0.070 mm

**CONNECTING ROD**

Small end bush inside diameter		20.011 - 20.023 mm
Big end side clearance		0.16 - 0.34 mm

**CRANKSHAFT**

Crankshaft endfloat	- new	0.04 - 0.24 mm
	- service limit	0.30 mm
Main journal diameter		47.988 - 48.000 mm
Crankpin diameter		44.992 - 45.000 mm
Max. taper & out of round, journals & crankpins		0.02 mm

**OIL PUMP**

Oil pressure at idle		39 kPa (6 psi) minimum
Outer rotor to housing clearance	- new	0.10 - 0.18 mm
	- service limit	0.30 mm
Inner rotor tip clearance	- new	0.06 - 0.18 mm
	- service limit	0.35 mm
Rotor end float	- new	0.025 - 0.075 mm
	- service limit	0.15 mm

**COOLANT THERMOSTAT**

Valve opening temperature		80 - 84°C
Valve lift at 90°C		10 mm
Header tank pressure cap		108 kPa
Cap opening pressure		93 - 123 kPa