

COSWORTH ENGINEERING LIMITED.,

MARK 17 1,100 c.c. COSWORTH - FORD RACING ENGINE.

GENERAL INFORMATION

No. 176 40517

Capacity 1,098 c.c. Bore 85 m.m. Stroke 48.4 m.m. 4 Cylinder.

Compression ratio: 11.0 - 11.5/1

Gross horsepower rating: 120 b.h.p. @ 8,500 r.p.m.

" torque " 79 lb.ft. @ 6,500 r.p.m.

SPECIFICATION:

Cylinder head:

This is a modified 105E casting fitted with brazed in steel tubular inlet tracts and other modifications, particularly to the water circulation, and the engine is supplied with a water manifold which is bolted to the original inlet manifold faces.

Cylinders:

C.I. - Bored in block Bore dia. 85 mm. + .001"
- .000"

Crankcase:

C.I. - Monobloc type.

Crankshaft:

Forged-Nitrided-steel. End play .002" - .011" thrust taken by two half thrust washers. Main journal dia. 2.1255"/2.1260".
Conn-rod journal dia. 1.9370/1.9375. Stroke 1.902"/1.910".

NB.

This crankshaft is specially designed for this engine and should not be replaced by any other type of crankshaft.

Main Bearings:

Shells - 'Vandervell' lead indium-copper, steel backed. Cosworth part number F.0012
Main bearing caps are special steel, housing bored .015" oversize.

Camshaft:

Type is Cosworth A8-100. This is a special Cosworth casting and the cam width is much greater than the standard Ford camshaft.

Tappets:

Tappets are not standard Ford but are modified by Cosworth specially to suit the camshaft fitted to this engine.

Cam bearings:

These are not standard Ford, being of special bearing material, replacements obtainable from these Works only.

- Camshaft gear drive: This is by three gears, one of which is mounted on an extension to the front main bearing cap. This idler gear runs on a needle roller bearing on a hardened steel pin which is a press fit into the main bearing cap. This sub-assembly should not need disturbing during normal overhauls.
- Valve mechanism: Push-rod overhead valve, special push rods, rocker shaft and pillars. Rocker arm ratio 1.54:1
- Valve timing: A8-100 Cosworth Camshaft:
Maximum valve lift : Inlet - 100° A.T.D.C.
Maximum valve lift : Exhaust - 100° B.T.D.C.
- Connecting rods: Material EN.24 Length, centre to centre 4.826/4.825"
End play .002"/.006". Shells - Trimetal (steel backed).
- Valves: Inlet Material silicon-chrome steel. Head diameter 1.45"
Exhaust Material KE 965 Austenitic steel. Head diameter 1.25"
Both inlet and exhaust valves have a seat angle of 45° and the stem dia. is 5/16" nominal.
- Valve springs: Very special double springs. Outer: variable-pitch wound. Rate 235-270 lb./in. Free length 1.7", fitted length 1.30" (both measured on outer.) Outer fitted with close coils towards head.
These springs are very expensive but make for greater reliability and do not generally require replacement.
- Pistons: Special Cosworth/Hepolite forged, one compression ring one split oil control ring.
- Gudgeon pins: Hollow taper ground, 13/16" dia. nominal. Offset .040". Retained by flat circlips.
- Compression Ring: Material C.I. - Dykes type pressure backed, ring gap .019".
- Oil control rings: Two separate scrapers in single groove.
- Water pump: Driven from special steel pulleys and toothed belt.
- Lubrication: See diagram, - Page 5.
Dry sump full pressure system.
Main bearings - pressure fed.
Conn. rods - pressure fed.
Gudgeon pins - splash.
Cylinder walls - splash.

Camshaft bearings - pressure fed.
Tappets - splash.
Timing gears - jet.

Oil pumps:

'Hoborn - Eaton' type, incorporated in front cover.

Oil Filter:

Not supplied with engine. Should be full-flow with special felt cartridge. By-Pass relief valve in filter body should be blanked off.

Distributor:

Lucas. 40731 - 10° - 1,000 r.p.m. Rotation anti-clockwise.

Firing order: 1 2 4 3

Contact breaker arm spring tension 32 oz.

Centrifugal advance 20° on crank.

Carburettors:

Two Weber down-draught 40 DCM2 units which are specially modified to Cosworth specification particularly to suit this engine when installed in the chassis with the cylinders at 30° from the vertical.

Inlet manifolds:

Castings machined to suit this engine and fitted with anti-vibration rubber 'O' rings.

NB.

These 'O' rings are special larger section type and not to be confused with earlier ones used in Cosworth engines.

Valve guides:

These valve guides are not to Cosworth Mark XI specification, but specially made for this engine.

MAINTENANCE AND RUNNING DATA

- Oil Pressure: 60 min. p.s.i. 80 p.s.i. normal.
- Max. Oil Temperature: 110° C.
- Optimum Water Temperature: 70° C.
- Tappet clearance: .015" inlet .020" exhaust (cold)
- Valve springs: Fitted length 1.30". Close coils fitted at head end. Replace if outer free length falls below 1.55".
- Ignition Timing: Notch on pulley to indicate setting at full retard approximately $\frac{3}{8}$ " B.T.D.C. on the crankshaft pulley rim. If dyno pulley fitted, this dimension is approximately $\frac{9}{16}$ ".
- Contact breaker gap: .010" - .012"
- Oil: Vegetable 30, Mineral 40/50 S.A.E. running at 90 - 100° Any oil starvation will cause big end shell failure.
- Fuel: Normally Esso Golden Extra, but any 98 - 100 Octane satisfactory.
- Carburetter: Should hold their settings, but main jet holders should be kept tightened right down.
- Carburetter Fuel level: The carburetter fuel levels are adjusted during testing to be 22 - 24 mm. below the top face of the jet block, i.e. the part of the carburetter body into which the main jet holder/diffuser/air jet assembly is screwed, and after installation in the chassis and preliminary running, the fuel levels can best be checked by measuring with a small depth gauge down the hole into which the jet assembly is screwed. Adjustments can be made by either slightly bending the tag on the floats which operates the needle valve or by varying the thickness of the fibre washers fitted between the needle valve and the carburetter body.
- Carburetter Mounting: This is resilient by means of 'O' rings between the carburetters and manifolds and spring steel washers under the mounting bolt heads. The mounting bolt nuts should not be over tightened and there should be a gap between

the carburettor mounting flange and the manifold face, to allow movement of the carburetters in relation to the engine.

Sparking Plugs:

Champion L. 58R Lodge R. 47 KIG. 250

NB. MUST BE SHORT REACH.

Bolt Tightnesses:

Cylinder Head	:	70 - 75lb.ft. torque.
Main bearing cap	:	55 - 60lb.ft. torque.
Rocker pillar	:	35 - 40lb.ft. torque.
Big end	:	30 - 32lb.ft. torque.
Flywheel to crankshaft	:	45 - 50lb.ft. torque.

Head tightening:

Number bolts starting from front 1 - 5 on manifold side, 6 - 10 on distributor side, then order of tightening is 8, 3, 7, 4, 9, 2, 10, 1, 6, 5.

Rev. limits:

Safe limit 9,000 r.p.m. 8,500 r.p.m. in first and second gears. Crack detect rods every 600 racing miles.

OILING CONNECTIONS:

