

# Engine Test No.12

by Mike Billinton

## Enya 21CX Racing. G.

liner has an unusually thick wall of 0.145in.

3. All cylinder ports are also 'cast-in.' Transfers are angled up 15°, boost raked up 50°, whilst exhaust is at zero angle.

4. Medium silicon piston in chromed aluminium liner is used (Al-chrome), with bore diameter being .002in. tight at top of stroke. The ringless piston at 3.5gm weight is finish-milled internally — whereas most such silicon content pistons are left as cast. It has a 1mm groove just below crown which both assists retention of extra lubrication, and results in a very narrow band of material at the extreme top of the piston where, being at the highest expansion point, it more swiftly beds-in to correct sizing.

5. Crankshaft is unusually 12½mm diameter (most current car engines are at 12mm). However as its bore is only slightly over the standard 8mm this leads to a quite robust shaft.

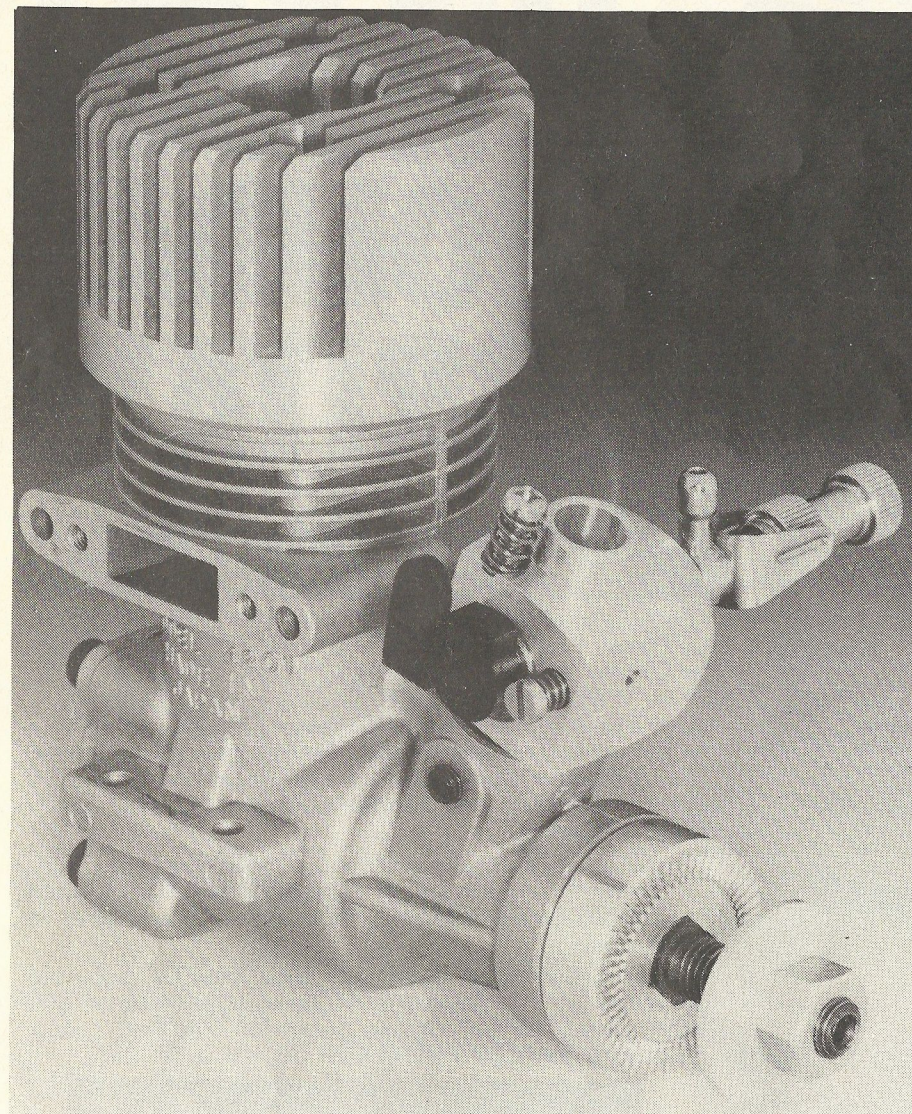
6. Solid gudgeon pin is used, located by wire circlips.

7. Connecting rod big-end has a vertical slot milled in the side facing the crank-web, plus two drilled holes to assist lubrication. There are phosphor bronze bushings at each end. Little end has one vertical drilled lubrication hole.

8. Tall heat-sink head weighs 2½oz, and has vertical milled fins. Material is normal light aluminium alloy.

9. Induction bore in crankcase is 13mm diameter to accept the largest carburettors available.

10. Exhaust stack is drilled/tapped to accept two alternative manifold flange sizes.



A TEST REPORT of an Enya car engine is somewhat overdue from this source, and it is opportune that a sample of the 'CX' model became available from UK distributor — Ripmax Models.

The CX Enya also appears in 1.8, 6½ and 7½cc sizes (Car, Aircraft and Marine form), the 1981 3½cc car engine incorporates several interesting features — confirming that development in this factory is far from static. In common with several other manufacturers Enya wish to make their mark in the 1/8th Scale Car class and the 'CX' design represents a strong push along this road.

There are similarities with Fox (USA) design philosophy, in that Enya continually seek new angles for methods of construction — and it is likely that a quite creative atmosphere exists within Enya's Tokyo factory.

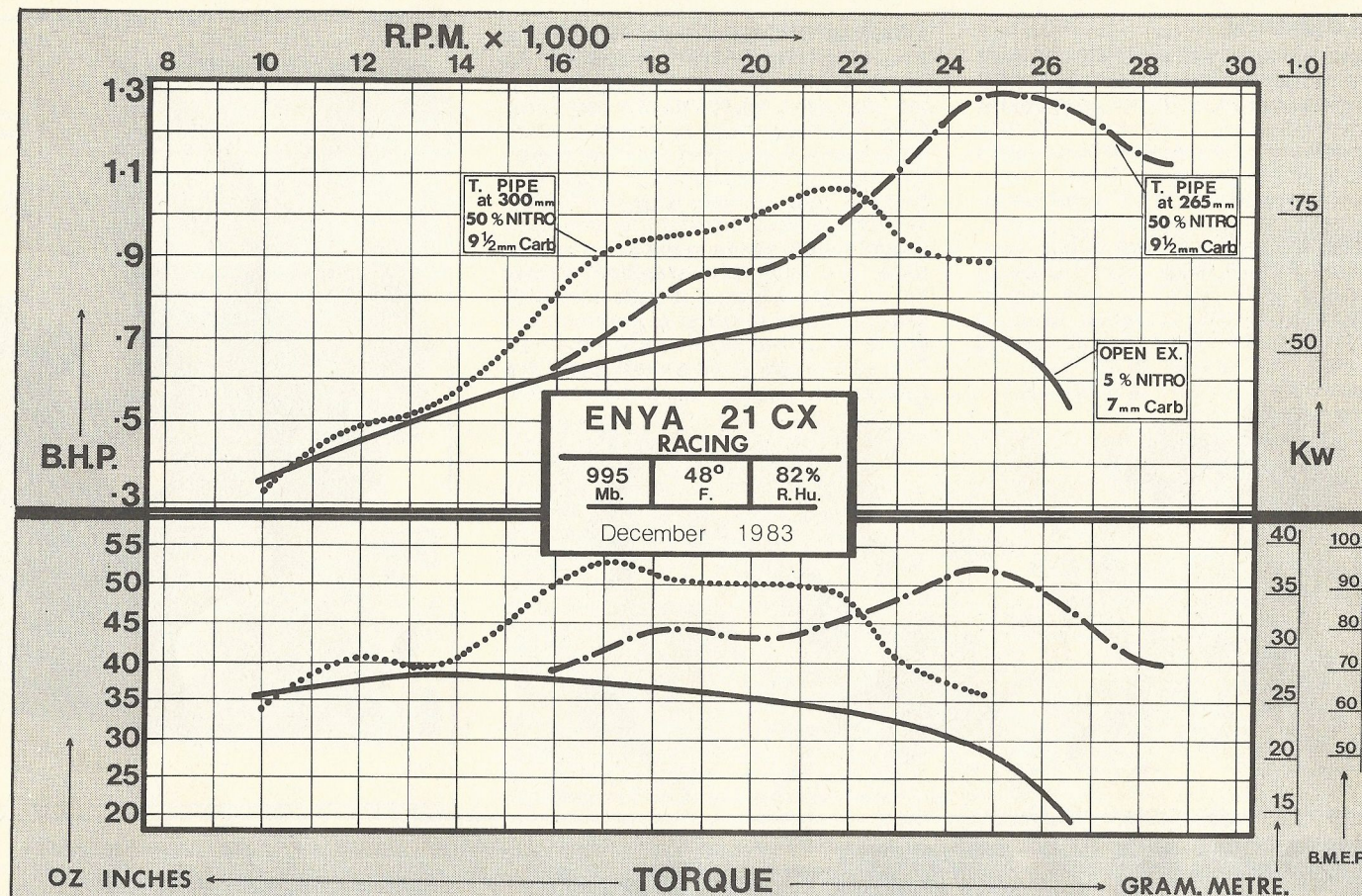
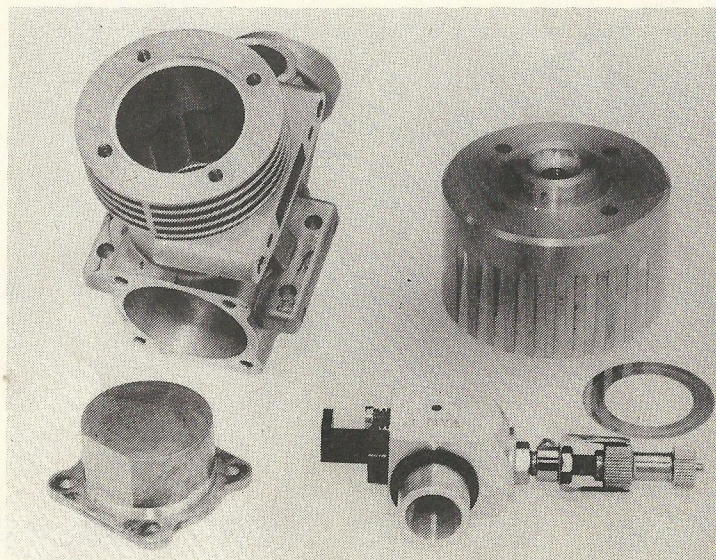
### Mechanical layout

The following points are noteworthy:

1. One-piece crankcase incorporates 'half-thickness' transfer passages — resulting in much rigidity.

2. The cylinder liner insert has the other matching halves of the transfer passages 'as cast' on the outer circumference. This is made possible as the

Right: crankcase, cylinder head, back plate and carburettor of Enya 21CX. The carburettor supplied with the Enya is of the rotary barrel variety with a 7mm bore. A slide barrel type is available.



## ENYA 21CX RACING. G.

### Dimensions and weights

Capacity — .212cu.in. (3.48cc)  
Bore — .654in. (16.6mm)  
Stroke — .6325in. (16.0mm nominal)  
Stroke/bore ratio .967/1

Timing periods —  
Exhaust — 164°  
Transfer — 122°  
Boost — 120°

Front induction  
— Opens 40° ABDC  
— Closes 52° ATDC  
— Total 192°

Exhaust port height — .248in.

Combustion chamber volume — .35cc

Compression ratios  
— Effective — 7.0/1  
— Geometric — 10.9/1

Cylinder head squish clearance — .018in.

Squish band angle — 0°

Squish band width — .11in.

Crankshaft dia. — .4918in. (12.5mm)

Crankpin dia. — .196in. (5mm)

Crank bore — .325in. (8.25mm)

Crank nose thread — ¼ UNF (28 TPI)

Gudgeon pin dia. — .157in. (4mm)

Con. rod centres — 28.2mm

Weight overall (with Enya 7mm carb) — 9¾oz (.276 kilo)

Mounting holes — 37mm x 16mm with 3mm holes  
Width between bearers — 29mm  
Length — 2.78in. (70.6mm)  
Height — 3.55in. (90.17mm)  
Width — 1.72in. (43.69mm)  
Frontal area — 4.7sq.in.

### Performance

Max BHP — 1.3 at 24,790rpm (OPS pipe/50% nitro/9½mm carb.)

.77 at 23,170rpm (Open Ex./5% nitro/7mm carb.)

Max torque — 53oz in. at 16,750rpm (OPS pipe/50% nitro.)

38oz in. at 13,400rpm (Open Ex./5% nitro.)

### RPM standard propellers

8 x 6 Zinger — 14,500 (Open Ex./5% nitro/7mm)

7 x 6 Taipan — 17,230 (Open Ex./5% nitro/7mm carb.)

7 x 4 Taipan — 22,540 (Open Ex./5% nitro/7mm carb.)

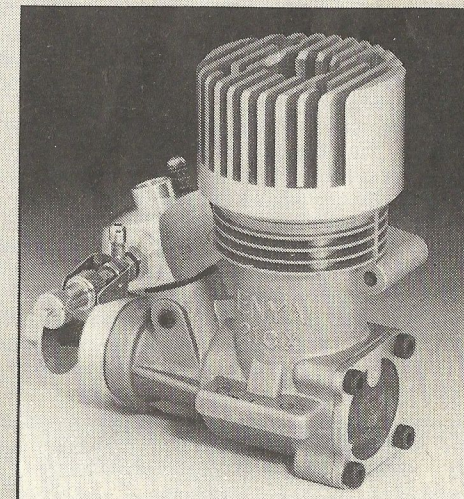
### Performance equivalents

BHP/cu.in. — 6.13  
BHP/cc — .373

Oz in./cu.in. — 250  
Oz in./cc — 15.23  
Gm metre/cc — 10.9  
BHP/lb — 2.13  
BHP/kilo — 4.71  
BHP/sq.in. frontal area — .276

Manufacturer: Enya Metal Products Co. Ltd., Tokyo, Japan.

UK Distributor: Ripmax Models Ltd., Green Street, Enfield, Middx.



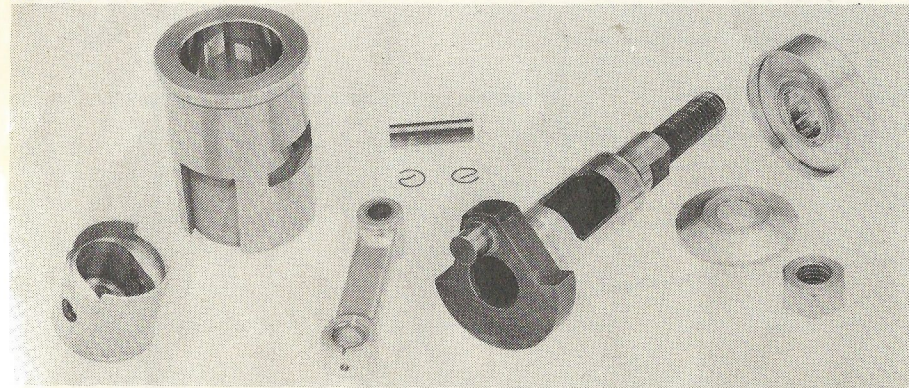
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## Performance

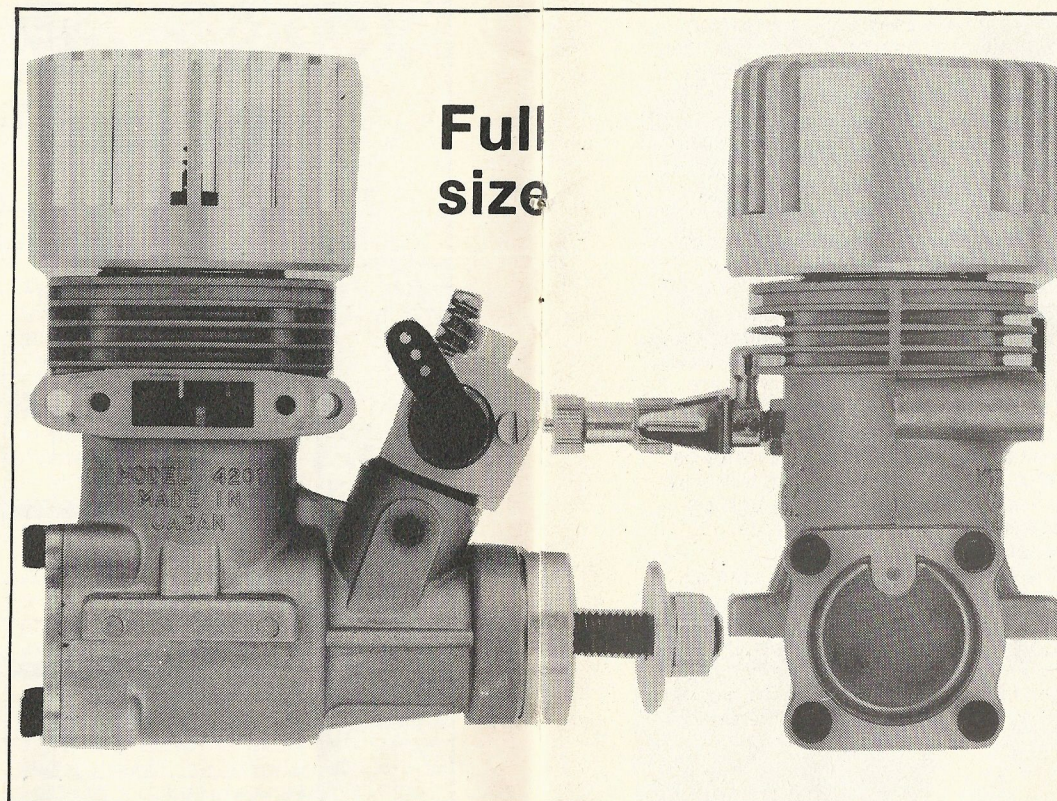
**Test 1.** Open exhaust/five per cent nitromethane/Enya 7mm carb/OPS 300 glowplug plus 20 per cent castor oil.

Following quite a short running-in period and subsequent RPM checks (which showed the 21CX to be 'in the ball park' for current racing performance) the torque figures in this open exhaust format were found to be in keeping with use of the small carburettor cross sectional area of 33sq.mm, and which probably caused the swift decline past 25,000 rpm.

Below: the Enya 21CX internals showing piston liner, piston, con-rod gudgeon pin, crankshaft and main ball-race.



**Test 2.** OPS Tuned pipe at 300mm from plug to end of rubber can with 50 per cent nitro, five per cent castor and ten per cent ML70/HB 9½mm carb/OPS 300 glow-plug. Enya's own slide carb was not available for this test, so the large HB bore slide carburettor was pressed into service. This required a reducing sleeve to match it to the large induction bore hole in the 21CX crankcase. The tuned pipe was deliberately set at slightly longer length than with previous tests in order to evaluate the effect on power levels at lower RPM. This combination did in fact result in a



lowering of peak BHP placement point — as the graph shows.

**Test 3.** Equipment as Test 2 — but with pipe length now at 265mm.

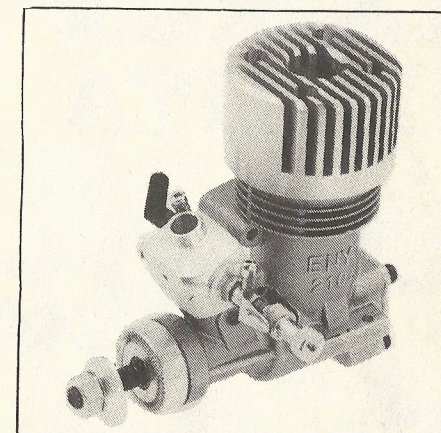
Reverting to a more customary pipe length enabled RPM and BHP peaks to rise. The 1.3 BHP result is (like the Cipolla result recently) again a good figure for a side-exhaust unit. During this and the open exhaust test, there was evidence of a slight vibration period in the 25/26,000rpm band. It is worth noting that virtually all engines so far tested in this series have exhibited some such period, though at different RPM points and of differing magnitudes. With a single cylinder unit these are virtually impossible to 'design-out' — as we know, and the alternative route of providing extremely rigid crankcase constraints around the reciprocating parts (with engine mounting points at top and bottom) has yet to be fully explored — commercially speaking.

Also it should be said that up to the 25,000rpm point the 21CX performance had seemingly a more rigid 'feel' to it than has been apparent with some other engines. This confirms what has become apparent throughout this set of tests (of nominally very similar engine type and size); that each engine

has exhibited a 'character' of its own — though this is easier to sense than to define. During this Test, 3, OPS 300 plugs were being consumed at rate of one per run which is unusual for these most durable of plugs.

## Summary

The Enya 21CX proved a solid practical performer, and ended the test period in 'as new' condition. Constructed as it is to the customary high Enya standard it should give much satisfactory service.



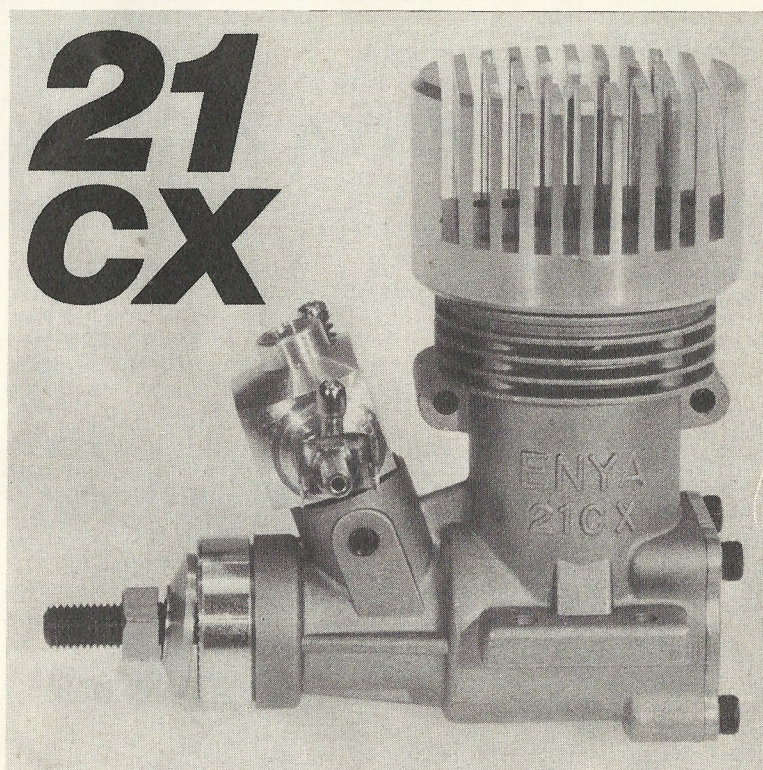
# ENYA

# 21 CX

0.77BHP around 23,000rpm with open exhaust, 7mm carb on 5% nitro fuel — and **1.3BHP around 25,000 rpm with tuned pipe, 9.5mm carb and 50% nitro** (see Test Report in this issue). On top of that, it's built strong — to last! A massive 12.5mm dia. crankshaft. Rigid one-piece crankcase. Extra-thick liner with precision-cast Schnuerle porting. Definitely in the ballpark for true and lasting racing performance in the 1/8 scale Car class. The engine that is going to appear in the winner's circle — regularly!

There's a lot more hidden detail, too. Like the ringless piston which is *finished-milled* internally. A solid gudgeon pin located by wire circlips. A top-grooved piston which beds in swiftly to an exact running fit. Bushed big and little ends with lubricating ports. And to take your own ideas on 'tuning' the crankcase induction bore is 13mm dia. to accept the largest carbs available (plus an exhaust stack drilled and tapped to take two alternative manifold flange sizes).

Check the independent Test Report for more information. It all adds up to the ENYA 21CX being THE engine for 1/8 Cars. (And its smaller brother the ENYA 11CX is the first choice for 1/12th Buggies).



Displacement .212 cu.in. (3.48cc). Bore .654in. (16.6mm). Stroke .6325in. (16mm). Weight (with Enya 7mm carb.) 9¾ ounces. Mounting holes (3mm dia.) 37mm x 16mm. Shaft thread ¼UNF (28tpi). Al-chrome construction (aluminium-silicon piston in chromed aluminium liner).



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