



0. 1963-1991 VEB Sachsenring Trabant 601; 594.4 cc; 27 HP @ 4,200 RPM (See Fig. 0)

As a change from racing engines, the author's IT Consultant thought that visitors would be amused by some details of the "Trabant", the "East German volkswagen" of which 3 million were made. [The West German Volkswagen "Beetle" sold over 21 million worldwide, which perhaps illustrates the difference between Capitalism and Communism!].

"Trabant" is German for "Satellite" or "Companion".

Trabant 1963*:-

2-stroke air-cooled; 2 cylinders, Bore (B) 72 mm by Stroke (S) 73 mm, Swept Volume (V) 594.4 cc.
 Compression ratio 7.8;
 Peak Power (PP) 27 HP @ 4,200 RPM;
 Peak torque (TP) 38 lb. Ft. @ 3,000 RPM;
 Red line 5,000 RPM.

Analysis

PP/V 45.4 HP/Litre;
 Brake Mean Effective Pressure at PP (BMPP) 4.8 Bar;
 @ Mean Piston Speed at PP (MPSP) 10.2 m/s.

As far as is known the engine was of the simple valveless type, undoubtedly with the Schnuerle port layout with flat-top piston for loop scavenging. This system had been used by DKW pre-WW2 and they had been part of the Auto Union combine whose Zwickau plant was taken over post-WW2 by VEB Sachsenring. The DKW technology probably passed with the plant.

Comparison with Villiers

A comparison can be made with another successful 2-stroke. In the post-WW2 British motorcycle industry the Villiers 2-stroke air-cooled 197 cc engine was supplied to many frame makers for many years. It was particularly successful in James trials bikes.

The 1953 details** were:-

2-stroke air-cooled; 1 cylinder, B = 59 mm, S = 72 mm, V = 196.8 cc.
 Compression ratio 8.25;
 PP 9 HP @ 4,000 RPM.

 PP/V 45.7 HP/Litre;
 BMPP 5.1 Bar;
 MPSP 9.6 m/s.

Clearly the Trabant and the Villiers 197 were very close in specific performance.

Comparison with a typical mass-production 4-stroke

A typical British mass-production engine of the '50s, with a power output similar to the Trabant was the BMC A-type as used in the 1952 Austin A30***. It was a push-rod Overhead Valve (PROHV) engine.

4-stroke water-cooled; 4 cylinders, B = 58 mm, S = 76.2 mm, V = 805.3 cc.
 Compression ratio 7.5;
 PP 28 HP @ 4,400 RPM;
 TP 40 lb.ft. @ 2,200 RPM.

 PP/V 34.8 HP/Litre;
 BMPP 7.1 Bar;
 MPSP 11.2 m/s.

*From <http://trabant.shocauto.com>. This firm sells reconditioned Trabants.

**From *Motor Cycling Yearbook 1954*. Temple Press.

*** From <http://www.aronline.co.uk>.

Discussion

The A30 4-stroke engine would have been much more efficient than the Trabant 2-stroke, the Brake Thermal Efficiency (BThE) probably around 25% against 15%. Specific Fuel Consumption figure are not available for these engines but a footnote gives data which leads to this conclusion****.

The A30 engine would have been heavier not only in itself but by needing an external cooling system filled with water. Again, figures are lacking.

The A30 would also have been much more costly, but at some mileage the greater fuel consumption of the Trabant would have cancelled out that factor.

Being lubricated on a total loss system by mixing oil with the petrol (“petroil”) the Trabant had a smoky exhaust. The ratio was actually only 1 part oil to 50 parts petrol, which is very low for a 2-stroke. Typically a ratio of 1: 16 was used but the Villiers 197 had an automatic system which provided oil proportional to load for a “faint blue haze” in the exhaust.

****The post-War Trojan 2-stroke 4 cylinder water-cooled engine, which had a more efficient twin-piston configuration and a system of pressure-charging, had a BThE of 18½% at PP.

The 1948 Standard *Vanguard* 4-stroke 4 cylinder water-cooled engine, of generally similar PROHV arrangement to the A30 but with the Square/Cube advantage in efficiency of larger size (2Litres v. 0.8) had BThE = 27% at PP.

A conclusion that the Trabant’s BThE would be about 15% and the A30’s about 25% seems reasonable from the above data, from:-

The Motor Vehicle. K.Newton & W.Steeds. 4th Ed. Iliffe. 1950.

Conclusion

At a time when virtually no one, East or West, worried about the environment (smoky exhaust ignored) and in a regime where travel restrictions meant that user mileage was low (high fuel consumption not significant), the Trabant 601 2-stroke transverse 2-cylinder air-cooled engine provided successfully a light, cheap, easily maintained unit making a compact powertrain for a small FWD car.

Fig. 0

1963 VEB Sachsenring Trabant 601
2-Stroke air-cooled IL2 72/73 = 0.986 594.4 cc

The carburettor was mounted to serve a crankcase port underneath the exhaust ports.
The gearbox and final drive to front wheel half-shafts were bolted behind the engine.



Picture credit shocauto