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TVR 450 SEAC

1978 LE MANS 24 HOURS: RENAULT'S FIRST

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TVR 450 SEAC

Very high performance at relatively low cost is what TVR have been known for since their first large-capacity sports cars of the 1960s. The super-light, super-quick 450 SEAC maintains that tradition into the 1990s.

Above: The SEAC is a lighter, shorter and more aerodynamically efficient aramid-composite-bodied version of an already fast car.

Inset: 'TVR' was an abbreviation of the first name of the firm's founder, Trevor Wilkinson.

It is clear that TVR do not subscribe to the old adage that says 'power corrupts'. It is equally clear that they *do* subscribe to the one that says 'give the people what they want'. So if what you want is maximum power and performance for minimum outlay, it has usually been available (to special order, even if not off-the-peg) from the Blackpool-based sports car specialists.

Having established a comfortable if small niche in the US market in the late 1950s, TVR could offer a choice of V8-engined cars by the 1960s, like the fearsome Griffith with its Cobra-clone 4.7-litre 285-bhp Ford engine, or the equally rapid Tuscan V8 in which *Motor* magazine recorded a 0-100 mph time of just 13.8 seconds and a maximum speed of 155 mph in 1967. That was faster than any of the E-types, DB6s, Sting Rays or Mustangs with which they compared it, and cheaper than all except the E-type.

That, in a nutshell, is what has remained special about TVR right up to the present day, when the company is extracting more power from the ubiquitous all-alloy Rover V8 than anyone else.

They used it first early in 1983, in the new 350i convertible, to produce a top-of-the-range model beyond the existing Ford 2.8 V6-engined 280i. In the 350i, TVR used the fuel-injected Vitesse engine (and its excellent five-speed manual gearbox) in standard, 190-bhp tune. In September 1984 they replaced the rather agricultural Rover cast-iron exhaust manifolds with some lighter and more effective tubular ones, gaining 7 bhp. And, in the same month, they made a much larger leap ahead in the form of the 390 SE – the first step on the ladder to steadily-bigger engines and the ultimate 450 SEAC.

Maximum power increased dramatically

The 390 engine was developed for TVR by British Saloon Car Champion Andy Rouse, who had just won the title for the third time, driving a Rover Vitesse prepared by his own highly-respected tuning company. For TVR's purposes, he increased the bore from 88.9 to 93.5 mm, giving a capacity of 3905 cc. Rouse fitted Cosworth pistons and gas-flowed heads; with various other modifications, maximum power increased dramatically, to no less than 275 bhp at 5,500 rpm. With their usual philosophy that racing improves the breed, TVR sponsored two 390 SEs in the 1985 Production Sports Car racing series, and thereby learned a lot about making the chassis handle so much extra power. Having acknowledged that the existing fabricated semi-trailing-arm rear suspension was no longer adequate, they devised a new system, with wide-based lower wishbones, inclined coil spring/damper units, trailing torque-control arms, and uprated, fixed-length driveshafts still serving as upper links. Late in 1985, there was another size and power increase. It came via racing again, when one of the 390s was enlarged to 4228 cc, leading to a new production model, the 420 SE – which also had a revised chassis, with a lower and slightly narrower backbone to improve cabin space. TVR themselves built the engine this time, using a new steel crankshaft to take the stroke to 77.0 mm, which meant that the engine was still very over-square. It retained the Cosworth pistons but had further improvements to the cylinder heads, camshaft and valve gear – notably in adopting solid tappets instead of the hydraulic ones of earlier cars.

The injection system was upgraded, with

Right: TVR subscribe to the philosophy that racing improves the breed, and in 1985 they sponsored 390 SEs in Production Sports racing. Both 420 and 450 engines were then developed through a Modified Sports racing programme. This is Gerry Marshall at the wheel of Steve Cole's 1987 420 SEAC.

Below: Whether in 450 or 420 (as here) form, the SEAC is a powerful car. The long-nosed, stub-tailed wedge of a body first used on the awkward-looking 1980 Tasmin has been much refined and restyled, and now looks purposeful and more than a little aggressive.

bigger injectors, a bigger plenum chamber and a larger-capacity airflow meter. A dry sump was offered for racing, while the ordinary system had been uprated, with a higher-capacity pump, a bigger sump and a new oil cooler. For racing, as much as 385 bhp was offered, and for road use standard power was now 300 bhp at 5,500 rpm, while torque went up to 290 lb ft at 4,500 rpm.

. . . as much as 420 bhp was quoted

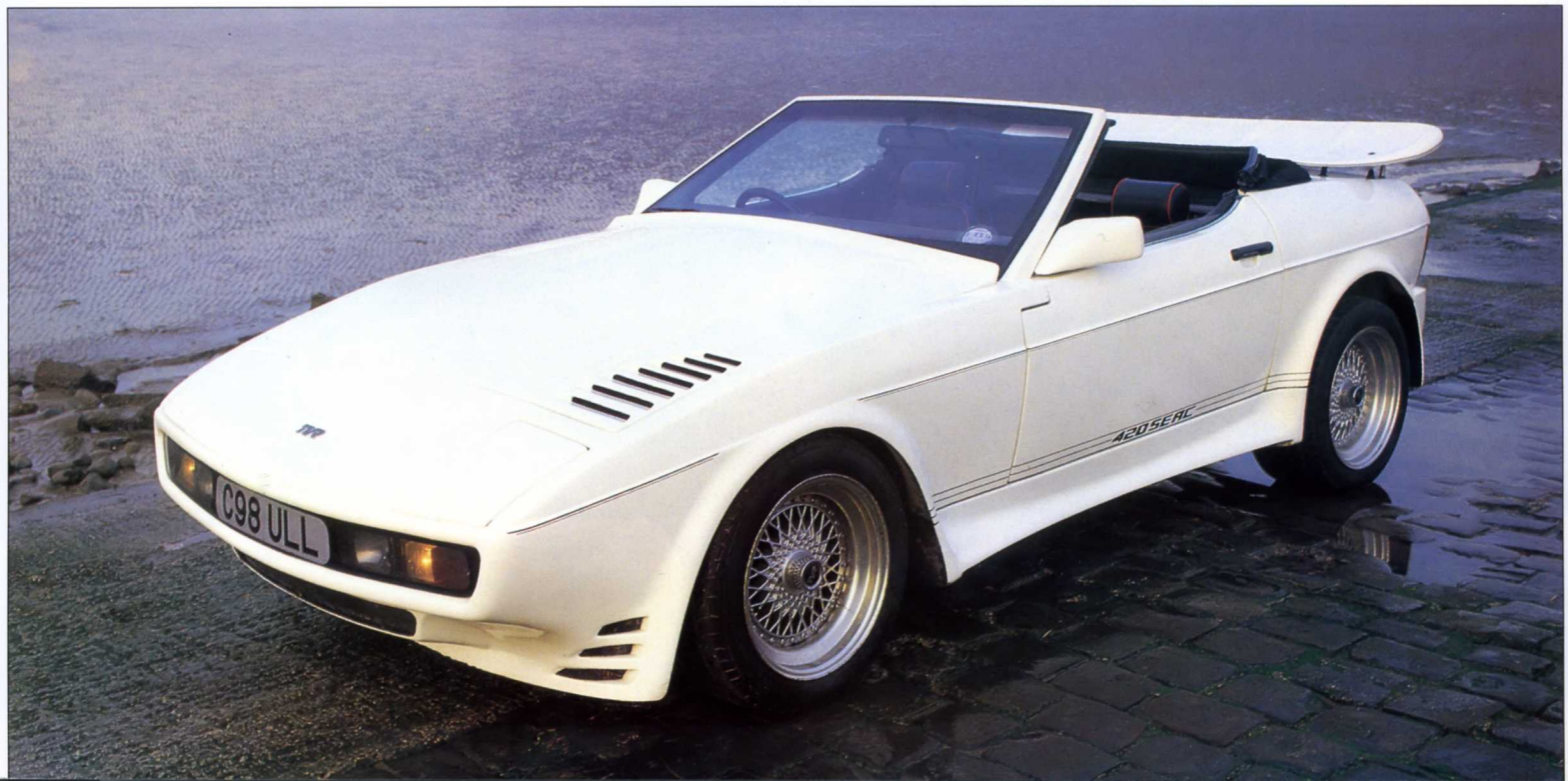
Even then, this extraordinarily versatile engine hadn't reached its limits, and in 1988 TVR (who were already extracting more power from it than anyone else) stretched it yet again, by increasing the stroke to 80.0 mm and the bore to 94.0 mm; this simultaneously upgraded the 390 into the 450.

That gave a capacity of 4441 cc and power and torque peaks of 320 bhp at 5,700 rpm and 310 lb ft at 4,000 rpm, in a car which naturally became the 450 SE. This engine was also used for the limited-edition Tuscan, in a rounder body shape, which was theoretically available as a road car but in reality was principally used for a one-model racing series, the Tuscan Challenge.

For that, TVR offered a lighter shell, full safety equipment and a controlled engine spec offering 375 bhp at 6,500 rpm and 362 lb ft of torque at 5,000 rpm – although as much as 420 bhp was quoted for an unrestricted Tuscan engine.

The 450 SE still wasn't quite the ultimate V8-series model. In 1987 TVR offered a variant of the 420 called the 420 SEAC, in which the SEAC stood for Special Equipment Aramid Composite. The aramid composite was the ultra-lightweight, race-bred material Kevlar, which was substituted for most of the normal glassfibre in the SEAC's shell, producing a stronger structure for markedly less weight. Kevlar costs around four times as much as glassfibre, unfortunately, and because it isn't good for large, flat areas it demanded some extra reinforcement (including plastic honeycomb sections in the nose, boot lid and transverse bulkheads), but TVR considered the weight-saving worthwhile. The shell was also slightly restyled – made a bit shorter, wider and more rounded, for better aerodynamics, and with a big spoiler.

Inevitably, of course, when the 450 SE version came along, you could also have a 450 SEAC, to special order just as all SEACs had been; in theory, that availability continued right through to late 1991 when TVR's fastest car of all was finally taken off the price list in favour of the new Griffith.



Top: In profile, the SEAC's overall wedge shape and the steep angle of its large windscreen are accentuated. Perhaps surprisingly, cabin occupants do not suffer too much buffeting with the roof down.

Above: Earlier SEs had an unusual wing-like appendage below the rear bumper line; on the SEAC that's replaced by a neat integral lower spoiler lip and a far-from-subtle Porsche-style boot lid 'tea-tray'.

Driving the 450 SEAC: *shatteringly fast*

A short-wheelbased, open sports car with this much power for so little weight guarantees a very special driving experience, and the 450, especially in lightweight SEAC form, delivers. It *feels* like a sports cars, *sounds* like a sports car (from the off-beat V8 tickover to a magnificent racing-car howl at speed), and *goes* like a sports car. Even to a driver used to Ferraris and Lamborghinis, the SEAC is shatteringly fast. In a straight line (if you can keep it in one!) it offers 0-60 mph in the mid-four-second range, and 100 mph in not much over 10 seconds. Its power-to-weight ratio of 312 bhp per ton is better than that of a Porsche Turbo and on a par with a Countach's; its astonishing mid-range acceleration in any gear reflects that. For the very brave, TVR suggest a top speed of more than 165 mph, but the best thing about the SEAC is that its compact size and superbly competent suspension make it a thrilling car to drive on almost any kind of road, using the awesome power to squirt between corners, the excellent brakes to keep it in check, and the massive grip just to have fun. If it has faults, they are in the harsh ride and the severe steering kickback on bad surfaces, but then an SEAC is barely one-third the price of a Countach.

PERFORMANCE & SPECIFICATION COMPARISON	Engine	Displacement	Power	Torque (lb ft)	Max speed	0-60 mph	Length (in/mm)	Wheelbase (in/mm)	Track front/rear	Weight (lb/kg)	Price
TVR 450 SEAC	V8, overhead-valve	4441 cc	320 bhp 5700 rpm	310 lb ft 4000 rpm	165 mph 266 km/h	4.7 sec	158.0 in 4013 mm	94.0 in 2388 mm	57.1 in 58.3 in	2315 lb 1050 kg	£37,499 (1991)
BMW Z1	Inline-six, overhead-cam	2494 cc	170 bhp 5800 rpm	164 lb ft 4300 rpm	136 mph 219 km/h	7.9 sec	154.4 in 3922 mm	96.3 in 2446 mm	53.3 in 57.9 in	2948 lb 1337 kg	£36,295 (1990)
Lotus Esprit Turbo SE	Inline-four, 16-valve, turbo	2174 cc	264 bhp 6500 rpm	261 lb ft 3900 rpm	161 mph 259 km/h	4.9 sec	171.0 in 4343 mm	96.0 in 2438 mm	60.0 in 61.2 in	2650 lb 1202 kg	£47,310 (1991)
Morgan Plus 8	V8, overhead-valve	3528 cc	190 bhp 5300 rpm	220 lb ft 4000 rpm	122 mph 196 km/h	5.6 sec	156.0 in 3962 mm	98.0 in 2489 mm	53.0 in 54.0 in	2022 lb 917 kg	£22,849 (1991)
Nissan 300 ZX	V6, quad-cam, 24-valve, turbo	2960 cc	280 bhp 6400 rpm	274 lb ft 3600 rpm	155 mph 249 km/h	5.6 sec	178.1 in 4525 mm	101.2 in 2570 mm	58.9 in 60.4 in	3485 lb 1581 kg	£31,250 (1991)

TVR 450 SEAC Data File

TVR can trace its origins back to the tubular-frame sports cars made by Trevor Wilkinson in the 1940s. Indeed the TVR name stems from Wilkinson's first name, TreVoR. The company first made its name producing glassfibre-bodied sports cars like the Grantura of the late 1950s using proprietary Ford, Coventry Climax or MGA engines. V8 power was soon being used for the fearsome Griffith version of the mid-1960s, but the company grew by producing mostly British Ford-engined cars like the 3000M, the 3000S of the late 1970s (itself the inspiration for one of TVR's current models), and the Taimar. The current generation of cars is a direct descendant of the Tasmin range that first appeared in 1980, but although the basic shape is quite recognisable, there have been many significant changes under the glassfibre skin to make the chassis capable of handling more power.

Above: TVR have devised an effective drop-head formula, with hard 'Targa' roof panels and a soft, folding rear hood section.

Styling

The 450 is part of TVR's 'angular' family – as opposed to the softer, rounded shapes of cars like the Tuscan, the current S and V8S, and the new Griffith. In essence, the shape dates back to 1977, when TVR had started work on a wholly new car that emerged in 1980 as the sharp-edged, square-jawed Tasmin – dominated by the inevitable racing-inspired wedge profile. The Tasmin appeared first as a coupé but was joined by a convertible version the following year, and although the closed shape soon disappeared, the open one recognisably continued through the Ford V6-powered models and into these V8-engined cars. Beauty, of course, is in the eye of the beholder, but the long, sharp-edged nose, steeply-reclined and well-set-back windscreen and exaggeratedly stubby tail of this family proved instantly identifiable, popular, and very long-running. It changed only in detail, becoming a bit more aggressive as the engines and power outputs grew, with deeper front spoilers and extended sills on later examples, starting with the 1987 390 SE. There was also a distinctive rear wing on bigger-engined models, under the rear bumper line, and the increased power also demanded some additional louvres in the bonnets, for better engine-bay cooling. The aggressive SEACs, as well as having lighter bodywork, had subtly revised shapes. They were some six inches shorter (mainly in the nose), and a little more rounded on the edges, with wider wheel arches and more pronounced sill covers. They also had a huge rear 'tea-tray' wing on the boot lid, but then these cars were supposedly capable of around 165 mph.

Below: The SEAC's enormous rear aerofoil is not integral with the boot lid but sits on short, slim struts.

Above and right: The SEAC's headlamps retract; its side, indicator and driving lamps share a single outer lens. In place of the rear undertray wing is a vestigial 'skirt'.

Above: TVR have progressively improved the ex-Tasmin body, rounding off its odd angles and softening it further with details like sill mouldings.

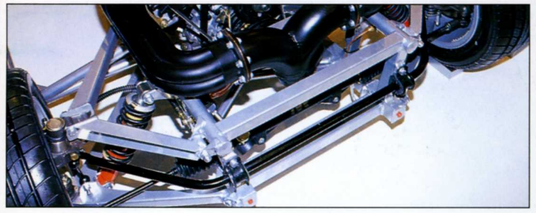
Below: Louvres at the left-hand front and right-hand rear of the bonnet aid engine compartment airflow.

Above: Its 165-mph capability justifies the SEAC's big wing.

Below: The SEAC has a good range of instruments, but the dials are rather small.

Running gear

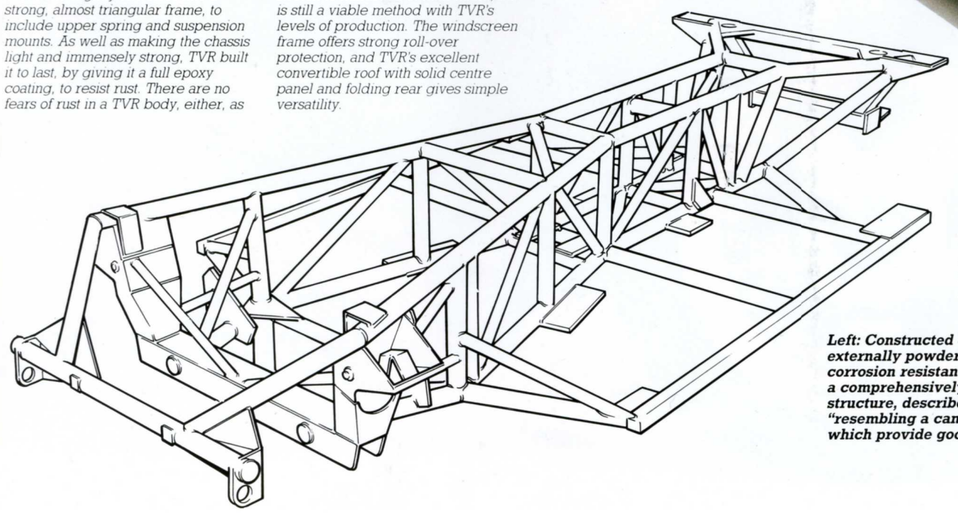
The 450's V8 engine sits well back in the fairly short-wheelbase chassis, actually behind the front axle line, for excellent weight distribution. It is mated to a five-speed all-synchromesh manual gearbox, through a hydraulic single-dry-plate clutch. A short propshaft takes the power to a chassis-mounted Salisbury final drive unit at the rear, and, not surprisingly, TVR specified a limited-slip differential as standard equipment, to cope with the ample power. Suspension is independent all round, by conventional upper and lower wishbones at the front, and a four-point-mounted, fabricated lower wishbone and hub-carrier with torque-reaction arm, plus the fixed-length driveshafts acting as upper links at the rear. Coil springs and gas-filled telescopic dampers are used all round, and there is an anti-roll bar at the front. The car sits on 8J × 15, split-rim, five-spoke alloy wheels, typically shod with Bridgestone RE71 225/50 VR15 tyres; and, if the customer has trouble pointing them in the right direction, there is the option of power assistance for the rack-and-pinion steering – which also offers an adjustable and collapsible column. TVR make sure that the brakes are in line with the performance capability by specifying ventilated front discs, mounted outboard and with four-piston competition-type calipers, plus solid rear discs, mounted inboard. There is servo-assistance, front-to-rear split circuits with a tandem master-cylinder, and asbestos-free pads, but no anti-lock option – the car isn't that sophisticated, despite its exotic body shell and high performance.



Above: Front suspension is by double wishbones. At the rear are lower wishbones with the driveshafts forming the upper links.

Chassis

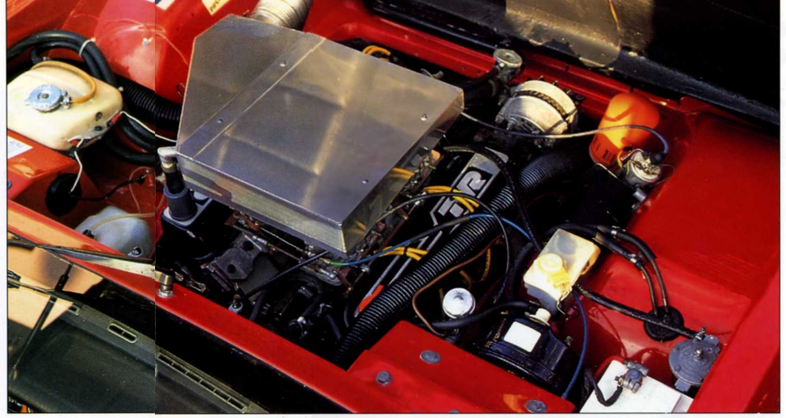
Even with such power as the 450 can offer, TVR's well-proven chassis is more than adequate. It is an all-steel multi-tubular backbone, with floor-level outriggers joining full-length sill rails – to provide fine side-impact protection. The spaceframe-type backbone is a skeleton of fairly large tubes, properly triangulated and forming a deep, wide, central transmission tunnel opening out into a broad fork at its front end, to accommodate the engine and transmission and to provide suspension pick-ups. At the back, it broadens slightly and rises into a strong, almost triangular frame, to include upper spring and suspension mounts. As well as making the chassis light and immensely strong, TVR built it to last, by giving it a full epoxy coating, to resist rust. There are no fears of rust in a TVR body, either, as that is made entirely in glass-reinforced polyester resin, and isolated from the chassis by silent-block mountings. In normal TVR fashion, the 450 is laid-up by hand, the shell using top and bottom mouldings bonded along the waistline, with internal crumple zones, moulded polyester resin bumpers, and intrusion beams in the doors. The assembled shells are filled and finished by hand and then given multiple, hand-rubbed coats of paint. The labour-intensive building and finishing process for each shell can stretch to hundreds of man-hours, but is still a viable method with TVR's levels of production. The windscreen frame offers strong roll-over protection, and TVR's excellent convertible roof with solid centre panel and folding rear gives simple versatility.



Left: Constructed of 14- and 16-gauge tubing, externally powder-coated and internally oiled for corrosion resistance, the SEAC's backbone chassis is a comprehensively triangulated and very rigid structure, described in one American review as "resembling a cantilever bridge", with outriggers which provide good side-impact protection.

Engine

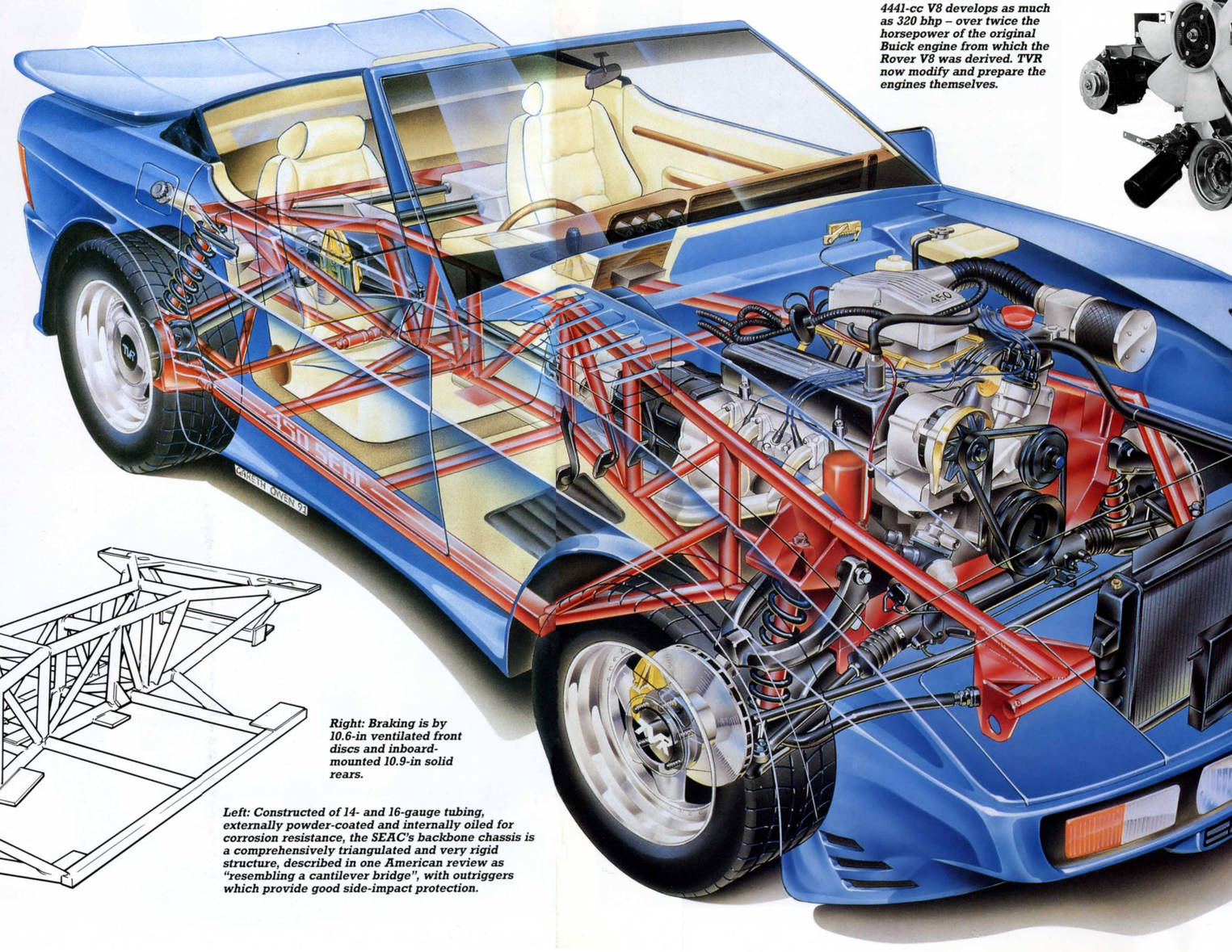
The current mighty V8 is built by TVR Power, but its origins stretch back to 1950, when it was schemed by General Motors in the USA. It was designed for new 'compact' cars such as the Buick Special and the Pontiac Tempest – as a lightweight, all-aluminium 3½-litre marvel giving around 155 bhp. Unfortunately, it was extremely expensive to make (especially for a low-priced car) and Ford had a better idea with their new 'thin-wall' iron-block V8s, at a fraction of the price. GM's loss was Rover's gain and in 1965 they finalised a manufacturing licence, planning to use the engine (cleverly updated and 'Europeanised') to spice up their rather staid range. The unit gives massive power from very little weight, it is a classic 90-degree V8 with a five-bearing crankshaft, an aluminium block and heads, a chain-driven single central camshaft, and pushrod operation of two valves per cylinder. The inlet ports are in the centre of the 'V', with the exhausts on the outside, and the plugs near the exhaust ports in part-spherical combustion chambers. In 450 guise, the engine has a bore and stroke of 94.0 mm × 80.0 mm and a capacity of 4441 cc. With a compression ratio of 9.75:1, uprated Lucas electronic injection and TVR's further modifications, the balanced and blueprinted 450 V8 gives 320 bhp at 5,700 rpm and 310 lb ft of torque at 4,000 rpm.



Above: The 450 SEAC's 4441-cc V8 develops as much as 320 bhp – over twice the horsepower of the original Buick engine from which the Rover V8 was derived. TVR now modify and prepare the engines themselves.

Below: Seen here in decidedly 'exploded' form as exhibited by Leyland Cars in 1976, the lightweight V8 that (in much-developed form) now powers TVR's SEACs was initially a General Motors design, snapped up by the British company when the Americans decided not to persevere with it in 1965. Although an overhead-valve (pushrod) design, it is light (thanks to all-aluminium-alloy construction), very strong, and – evidently – capable of being tuned to give an impressive output.

Below left: Forward-facing louvres on the bonnet ensure good airflow for engine breathing.



Right: Braking is by 10.6-in ventilated front discs and inboard-mounted 10.9-in solid rears.

Above left: Air for the radiator and oil cooler enters via a nose intake; slots at the ends of the spoiler aid brake cooling.

TVR 450 SEAC

In the 1960s Blackpool-based TVR made a reputation for themselves producing very powerful sports cars like the Griffith and Tuscan, using the simple solution of a large American V8 in a British chassis. That approach fell out of favour in the more fuel-economy-conscious decades to come, but has now undergone a revival. The 450 SEAC is both the resurrection of that early TVR 'muscle car' concept and the ultimate development of a far more modern TVR line that started with the wedge-shaped Tasmin, introduced over a decade ago in 1980. The modern car also uses a V8, but it is a TVR modification of the Rover powerplant rather than an American engine.

Ultra-short wheelbase

The 450 SEAC's front and rear overhang is at an absolute minimum, masking the fact that the wheelbase, at 94 inches, is very short. That makes the car very responsive and extremely quick to change direction.

Two-into-one exhaust

The two banks of the V8 engine exhaust run into two pipes under the car and, in a very unusual arrangement, those two pipes are joined in a plenum chamber at the rear to exit in one large-bore pipe.

Adjustable suspension

The 450 SEAC features double-wishbone front suspension along with a wishbone rear suspension system. An anti-roll bar is used at the front, and all the dampers are adjustable for rate.

Electrically-operated boot lid

The door catch for the boot is electrically operated via a switch in the door jamb. Consequently, there are no external catches on the boot lid.

Rear boot spoiler

The shattering performance of the 450 SEAC dictated increased rear downforce. That is achieved by the use of a curved wing firmly mounted on the boot lid.

Stretched Rover V8 engine

The engine in the TVR 450 SEAC is a bored and stroked development of the old Rover V8, which itself was a development of an American Buick engine. TVR's reworking has taken the engine from its original output of 155 bhp from 3.5 litres to 320 bhp from 4.5 litres.

Kevlar and glassfibre bodywork

All TVRs have had glassfibre bodywork; but the SEAC takes that one stage further. SEAC stands for Special Equipment Aramid Composite and refers to the Kevlar composite body panels, which are stronger and lighter than conventional glassfibre.

Walnut trim

Although the 450 SEAC's bodywork is as modern as that of any other vehicle produced today, the interior still features traditional walnut wood trim on the dashboard and console.

Brake cooling vents

The triple vents at each end of the front air dam allow cooling air to be directed over the ventilated disc brakes to ensure their efficiency under hard or continuous braking.

Equal-size split-rim alloy wheels

Somewhat unusually for a car of the 450 SEAC's performance, equal-size wheels and tyres (rather than a larger size at the rear) are used. That would make the choice of a spare wheel easy but, because of the TVR's very small boot, only a spacesaver is carried.

SPECIFICATION

1991 TVR 450 SEAC

ENGINE

Type:	V8, overhead-valve
Construction:	light-alloy block and heads, five main bearings
Bore × stroke:	94.0 mm × 80.0 mm
Displacement:	4441 cc
Compression ratio:	9.75:1
Valve gear:	two valves per cylinder, operated via pushrods and rockers by single block-mounted camshaft
Fuel system:	Lucas L-type electronic fuel injection
Ignition:	electronic
Maximum power:	320 bhp at 5,700 rpm
Maximum torque:	310 lb ft at 4,000 rpm

TRANSMISSION

Type:	five-speed manual
Ratios:	1st 3.32:1 2nd 2.09:1 3rd 1.40:1 4th 1.00:1 5th 0.79:1
Final drive ratio:	3.43:1

BODY/CHASSIS

Type:	multi-tubular steel-frame backbone chassis, Kevlar- and carbonfibre-based two-seater convertible body

RUNNING GEAR

Steering:	rack and pinion, power-assisted
Suspension:	front: independent with double wishbones, coil springs, adjustable dampers and anti-roll bar rear: independent with lower wishbones and torque-reaction arms, using driveshafts as upper links, coil springs, adjustable dampers and anti-roll bar
Brakes:	10.6-in ventilated discs front, 10.9-in inboard solid discs rear
Wheels:	light-alloy, 8J × 15-in diameter
Tyres:	Bridgestone RE71 225/50 ZR15

DIMENSIONS AND WEIGHT

Length:	158.0 in (4013 mm)
Width:	68.0 in (1727 mm)
Height:	47.4 in (1204 mm)
Wheelbase:	94.0 in (2388 mm)
Track:	57.1 in (1450 mm) front, 58.3 in (1481 mm) rear
Kerb weight:	2,315 lb (1050 kg)

PERFORMANCE (figures are for the less powerful 390 SE)

Acceleration:	0-30 mph 2.1 sec 0-40 mph 3.3 sec 0-50 mph 4.4 sec 0-60 mph 5.7 sec 0-70 mph 7.8 sec 0-80 mph 9.8 sec 0-90 mph 12.1 sec 0-100 mph 15.4 sec 0-110 mph 19.5 sec 0-120 mph 26.7 sec
Standing ¼ mile:	14.2 sec
Standing km:	25.6 sec

Acceleration in gear:

mph	fifth	fourth	third
30-50	9.7	5.9	4.0
50-70	8.9	5.9	3.4
70-90	11.4	5.7	4.1
90-110	11.2	6.7	–

Maximum speed:	143 mph (230 km/h)
Overall fuel consumption:	16.6 mpg
Price (1991):	£37,499

Performance figures from AUTOCAR & MOTOR

TVR 450 SEAC kindly supplied by the TVR Centre, Barnet