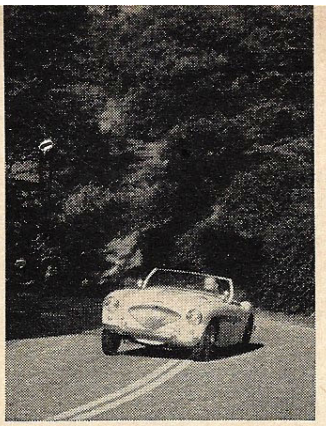
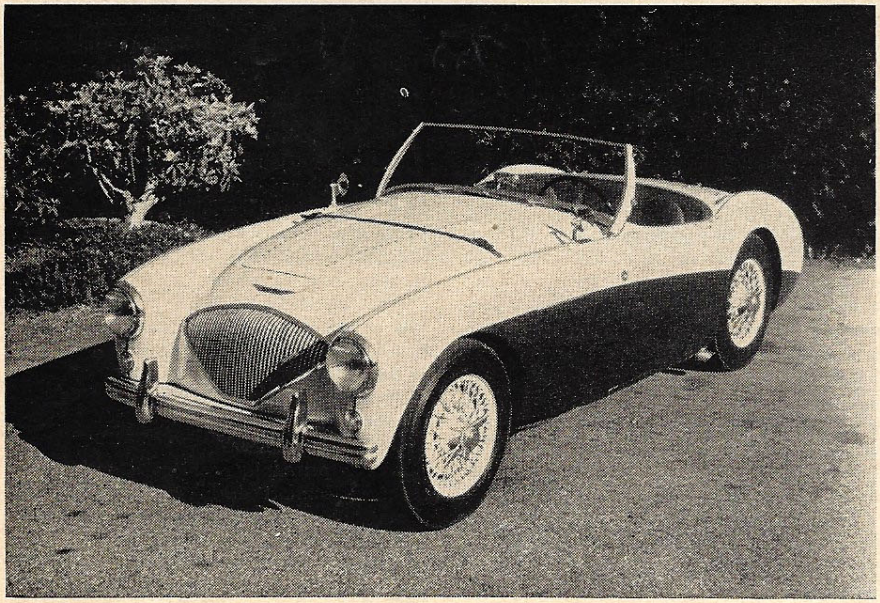
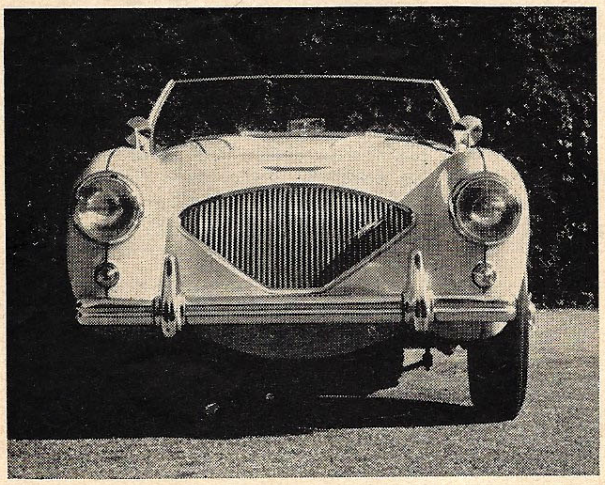
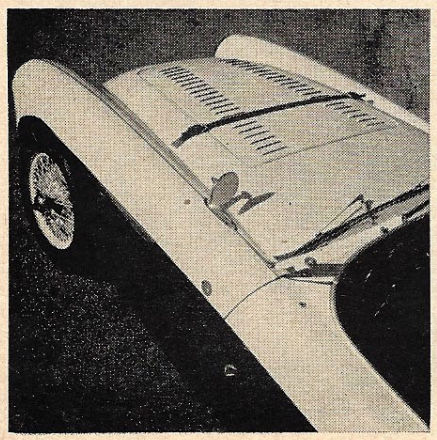


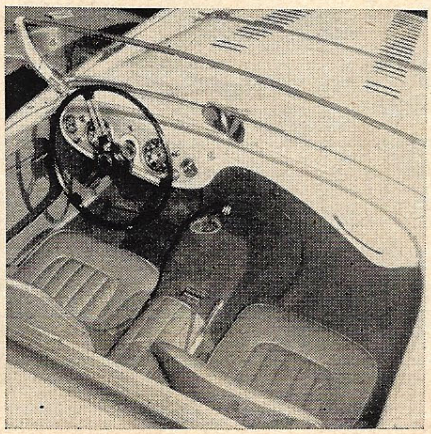
Road Test:
THE AUSTIN-HEALEY 100-M
improved performance thanks to the "LeMans kit"





photography
Ralph Poole





Ever since the "LeMans" kit was announced as optional equipment for the Austin-Healey "100," we have been besieged by inquiries—what is included, what is the cost, how much is performance improved, etc.—and some answers are about due.

For 1956, the Austin company have announced a third model for the Healey line-up, the 100-M. For $290 more than the price of a standard 100 model, one gets the following extras, factory installed.

1. An 8.10-to-1 compression ratio obtained by a steel head gasket.
2. A high-lift camshaft.
3. Special valve springs, cups and seats.
4. Two 1¾" S. U. carburetors and necessary attaching parts.
5. A cold-air box for the carburetors.
6. A special advance-curve distributor.
7. A new 4-speed gearbox (overdrive is also standard equipment).

The above items give an engine output of 110 bhp at 4500. Thus the 100M falls between the 90 bhp (at 4000) of the standard 100 model and the 132 bhp at 4700 of the strictily-for-competition 100-S model tested last September. The performance, as might be expected also falls about midway between models, per the following data.

Model	100	100M	100S
top speed	102	109	119
0-60 mph	11.7	9.6	7.8
SS ¼ mile	18.1	17.4	16.1

The 100 model was tested in our July, 1954, issue and all data applies to the cars in "showroom" condition; running with top and side curtains installed except on the 100 S which has neither. In addition, the above performance data can be duplicated by the average owner, driving a car in good tune and making brisk but not brutal gear changes. Furthermore, the performance figures given in the tabulation are all the more remarkable when we take note of the fact that this car weighed 235 lbs more than our earlier 100 model test car.

The 100 M has the stiffer Le Mans type rear springs, front shocks and anti-roll bar. Consequently it rides a little firmer than the normal 100 model and in our opinion suffers somewhat in comparison—because of the really excellent ride in the 100. However, there is no denying that the 100 M suspension is better suited for competition work, and the tendency to bottom (at the rear) on fast starts from a standstill is greatly reduced. The test car was also equipped with the latest type Dunlop Road Speed tires which have sipes (small cuts) in the tread. These were a tremendous improvement over earlier equipment, not only on dry roads, but more especially in the wet. Adhesion on slippery curves is almost uncanny.

The new transmission unit is the same as supplied on the 100 S model, but with overdrive added. This is actually a modified Austin "Princess" unit, designed to withstand over 200 ft-lbs of torque. Durability should be almost unlimited.

Our test car was brought over for the Nassau races by Donald Healey, and it garnered a 9th place in class D, beaten by one other A-H and a flock of Ferraris. The driver was Roy Jackson-Moore, who then drove the car to California and was also at the wheel during our performance tests. Despite nearly 5000 miles on the clock, the car was in good condition and got only minor attention (plugs, points and tappets) before the test. Roy reports that at Nassau, with windshield removed, he indicated 4400 rpm on the long straight, equivalent to about 116 mph, with tire expansion. The best we could get during the timed high speed runs was 4150 rpm, due to the extra drag of top and windshield.

As shown in the data panel, the 3rd-od and 4th-direct ratios are nearly identical, consequently all acceleration tests were made by flipping the overdrive switch from direct to od when 4500 rpm was attained in 3rd gear. This gives a quicker shift and better times than using 4th-direct. The engine is red-lined at 4800 rpm, but there was no improvement in acceleration times by exceeding the 4500 rpm point in each gear. The overdrive unit is available with 3 ratio options: .756, .778, or .820. This car was equipped with the .778 ratio which, when multiplied by the rear axle ratio of 4.10, gives an overall ratio of 3.1898. As now supplied, the overdrive is operable at any speed in any gear—in effect 8 speeds forward, 2 in reverse. However, most owners will prefer to use the overdrive only on the open highway as an extra "5th speed" for cruising. Direct drive (4.10) is a very useful gear for city driving, thanks to the very good lugging power of the large, four-cylinder engine. Top speed in direct drive is limited by the red-line—though the engine will run well beyond 5000 rpm in this ratio if allowed to do so.

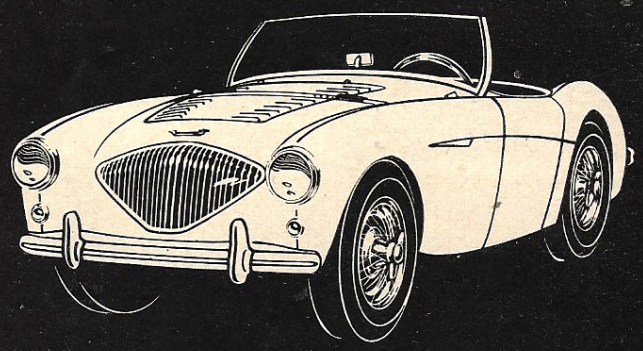
The "Le Mans" kit is certainly designed to give a worthwhile performance gain, yet still retain the low speed pulling power (torque) and ruggedness of the large, four-cylinder engine. However, the valve timing of the 100 M is still extremely conservative at only 10° overlap, and for those who are not interested in production car competition a reground camshaft can be used to good advantage. Such a change is described this month in "Tune Up Clinic" on page 42.

Other items which are listed by the Austin Company as options include an 18.7 or a 31 gallon fuel tank, Alfin brake drums and aero screens, all at extra cost. A heater is still supplied and included in the price.

The 100 M can be identified at a glance by the hood louvers and leather hood strap. In all other appearance details the car is identical to previous models, though the overdrive switch and the ignition lock have been interchanged. The seats are comfortable, the driving position is just right and there is ample storage space for odds and ends. In fact, the popularity of the Austin-Healey is due to only two things: (1) it's a genuine sports car and (2) it is reliable and trouble free. The 100 M will enhance that reputation.

ROAD & TRACK ROAD TEST NO. F-3-56

AUSTIN-HEALEY 100M



SPECIFICATIONS

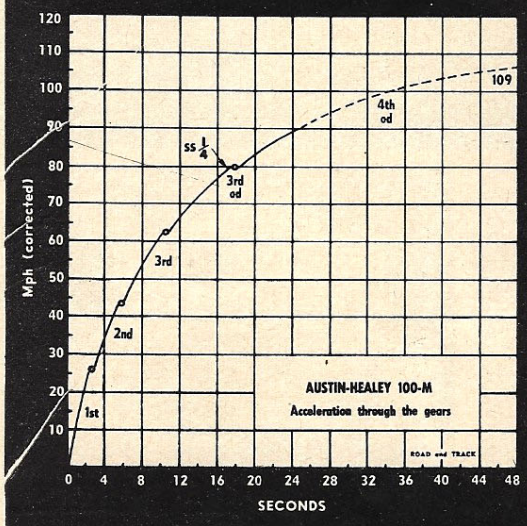
List price	$3275
Wheelbase	90 in.
Tread, front	49.0 in.
rear	50.8 in.
Tire size	5.90-15
Curb weight	2385
distribution	48/52
Test weight	2700
Engine	4 cyl.
Valves	pohv
Bore & stroke	3.44 x 4.38 in.
Displacement	2660cc
Compression ratio	8.10
Horsepower	110
peaking speed	4500
equivalent mph	105
Torque, ft/lbs (est.)	160
peaking speed	2500
equivalent mph	58
Mph per 1000 rpm (od)	23.4
Mph at 2500 fpm (od)	80.1
Gear ratios (overall)	
4th (od)	3.19
4th (high)	4.10
3rd (od)	4.24
3rd	5.45
2nd	7.84
1st	12.6
R & T high gear perf. factor	65.5

PERFORMANCE

Timed top speed	109
Max. speeds in gears	
4th (4800)	87
3rd (4800)	67
2nd (4800)	46
1st (4800)	28
Shift points from	
3rd od (4500)	80
3rd (4500)	62
2nd (4500)	43
1st (4500)	26
Mileage range	22/28 mpg

ACCELERATION

0-30	3.4 secs.
0-40	4.7 secs.
0-50	7.2 secs.
0-60	9.6 secs.
0-70	13.1 secs.
0-80	17.9 secs.
0-90	24.3 secs.
standing ¼ mile	17.4 secs.



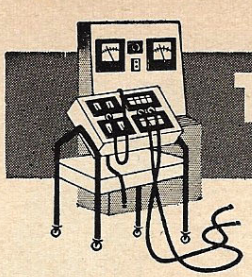
TAPLEY READINGS

Gear	Lbs/ton	Mph	Grade
1st	600	23	32%
2nd	530	35	28%
3rd	430	44	22%
od	330	52	17%
4th	330	55	17%
od	240	62	12%

Total drag at 60 mph, 125 lbs.

SPEEDO ERROR

Indicated	Actual
30	29.4
40	39.0
50	48.1
60	57.0
70	67.0
80	78.6
90	90.0



TUNE UP CLINIC

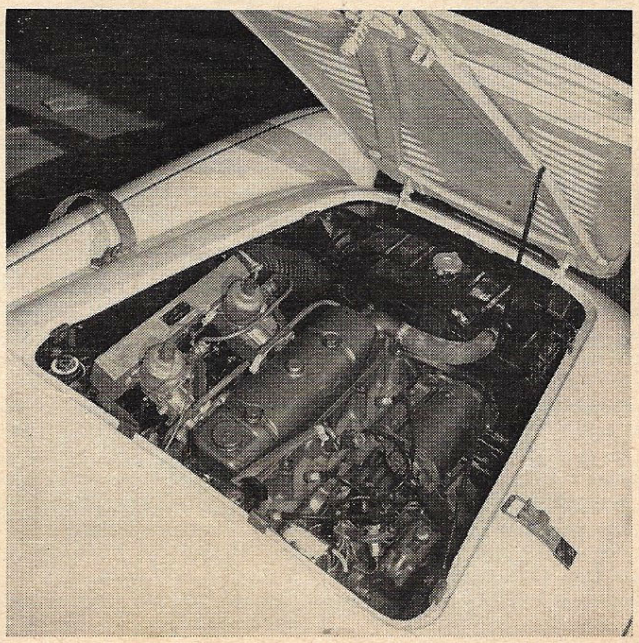
by Bill Corey

CONTINUING our remarks from last month about the Austin-Healey, all the engines are basically similar, and adding a LeMans kit is not as difficult as it might seem and can certainly be accomplished within the price differential of the two latest models. If you are interested in learning how this can be done, pay close attention, for my shop recently modified a Healey at a surprisingly moderate cost, and we were most gratified to achieve more rear wheel horsepower than the price charged seemed to justify!

Our first step was to remove the engine from the chassis and to disassemble it completely. The crankshaft, flywheel, clutch and crankshaft pulley were balanced electronically to achieve perfect static and dynamic balance. When this was done, approximately eight pounds of surplus metal was also removed from the flywheel. The only effect the lighter flywheel seemed to have was a slightly rougher idle and some faltering in getting off of the mark if engine rpms were allowed to drop too low. At all normal speeds, the engine was far smoother than before, and it is my personal opinion that a large four-cylinder engine such as this benefits greatly from accurate balancing. New pistons were installed, which were made up specially with a compression ratio of 9-to-1, and piston pins and connecting rods were all matched for weight. Pistons were fitted wih a clearance of .005". Main and connecting rod inserts were maintained at standard factory specifications. Two compression rings and one oil ring replaced the standard four ring set-up and the compression rings were exceptionally narrow to eliminate flutter and possible loss of compression seal at high rpms.

From the beginning, we felt that the stock camshaft left much to be desired. Even with standard compression ratio, the piston displacement-to-weight ratio is quite favorable, and the car certainly does not suffer from lack of low speed pulling power. It was my opinion that the new 9-to-1 pistons would permit a considerable change in the mid-range torque characteristics of the stock cam. For this reason, a so-called "full race" cam was decided upon, with stock lift but of considerably longer duration and overlap. Surprisingly enough, the final dynamometer tests showed little change at low speed but a remarkable increase at the top end of the rpm range. This new camshaft, combined with the breathing improvements listed below transformed the rather docile, uninteresting engine to a fire-breathing, Jag-chewing powerhouse!

Needless to say, the manifolding was cleaned out thoroughly and polished to resemble chromium. Both intake and exhaust ports were matched to perfection and the combustion chambers received a like polishing treatment. All radii were carefully blended and extreme care was taken to eliminate conditions in the manifold and cylinder head which would cause sudden changes in velocity. The valves, however, were left stock with a small amount of metal removed from the heads to achieve a tulip shape, and the seats were narrowed as much as consistent with a gas tight seal. Valve gear received loving care and each rocker arm was carefully polished and the complete set matched for weight. The push rods were also carefully weighed and matched and a small amount of metal removed to gain a slight advantage at critical valve bounce speed. Valve springs remained stock. They were, however, carefully



matched for tension and, believe it or not, matched for weight!

I can visualize some shaking of heads when I state that carburetion remained stock. We attribute our good low-end torque to this fact, and simple venturi-area calculations will show that the equipment carburetion on the Healey is quite adequate to serve breathing requirements at any speed of which the engine is capable. It was necessary, however, to fabricate special needles to match the other modifications correctly, and a cool air intake with a remotely mounted air cleaner added some four horsepower under high temperature conditions. It was also necessary to tailor the advance curve of the distributor to match the new compression ratio and the higher speeds of which the engine was capable. Carburetion and ignition required a lot of hours on the dynamometer, and one of my conclusions was that it is certainly a pity that engine dynos are not more widely available. I am always somewhat skeptical of the comparative figures achieved by rear wheel measurement, particularly when one is at the mercy of small rollers and the changing friction coefficient of rubber-to-metal at high temperatures.

Most authorities feel that a dual exhaust system is not needed on a four cylinder engine because of the wide spacing of firing impulses. It is my contention, however, that high output engines definitely need a dual system. Upon consideration, it will be realized that, as an example, number two cylinder is on top dead center, starting the intake stroke when number one cylinder is on bottom dead center starting the exhaust stroke. With anything more than very mild valve timing, this means that the exhaust valves on both cylinders are open at the same time with the pressure differential to the disadvantage of cylinder #2. Since a certain amount of back pressure is a necessary evil with mufflers designed for street use, cylinder #2 can never obtain a full charge of fresh mixture unless it is divorced from #1 by a dual system which ties cylinders 2 and 3 together and divorces them from 1 and 4.

This theory has been borne out in my practical experience a number of times and, in the case of the Austin-Healey, the dual header system which we made up for the car did as much as any other single modification to increase output at maximum rpm. A dual system is certainly not an easy job to install on a Healey, and I would hesitate to recommend it, unless I were quite sure that the results would be worth the cost.

The sum result of all the modifications we made to this engine amounted to an increase in horsepower at the rear wheels of some 41%. Ordinarily, if we are able to modify an engine to achieve as much as a 20% increase we feel indeed fortunate, so it is easy to see why we were quite gratified about what could be done to the Healey if cost were no object. And, speaking of cost, the owner spent $750.00 for this kind of performance. Considering the fact that he now has only 20% less horsepower at the rear wheels than a well tuned "M" type Jaguar, but is driving a car which weighs 40% less, he is quite well satisfied with his investment! ●