

KN Filters on Europe Peter Bødker, October 2003 Since I read Victor Hollnagel's article in Lotus News No. 4/2001 on the intake air temperature and its impact on the engine power, I have been joking about the revision of Europe's intake. In order to rehearse, colder air fills less than warm air, and higher air pressure around the intake helps to breathe. The effect is increased by: 0.22% per degree celsius colder air, and 0.12% per mbar higher air pressure at suction. In this article I would like to tell you how I (with expert assistance!) Got the job done and found 10 extra HK. First, a little about the theory ... The Europe is designed to have a low-pressure area above the tailgate, which should supposedly pull the warm air up and out through the openings in the flap. The engine compartment does not have a direct suction from the outside, such as front-engine cars have, so except that the bottom is open, nothing else has been done to get cold, fresh air. Therefore, I assume that the engine compartment must have an air pressure at the same or slightly below ambient pressure. With regard. the temperature in there, anyone who has opened down to a Europa engine can prove that it is quite hot. Here is a picture of the engine compartment that used to look like. If you notice the position of the intake just above the sound pit, you can figure out where the story is going ... I did not even have the opportunity to measure the air pressure, but the temperature could be done with one of the usual indoor / outdoor thermometers with the outdoor sensor. That's why I placed the sensor in different places in the engine room, while reading from the cabin the temperature to find the best place to suck the air. It gave the following - somewhat surprising - result: 19 °C temp. increase at the carburetors where they would suck air if the suction box was not there. 12 °C temp. elevation at the ignition coil between the chassis and the right tank, that is where I figured the cold air came into the engine compartment. 3 °C temp. elevation at the rear left corner of the chassis, almost out of the bumpers. ... and the winner became ... 24 (!) °C temp. increase in the suction funnel on the air filter. All measurements were made at an ambient temperature of 20°C, and with the car in 5'th gear at 90km / h until the temperature display was constant. Originally, I was going to replace the original air filter and flex hose with a conical filter that would fit right on the suction box, and would make it easier to take the luggage box on and off. But the above measurements made me drop that idea. Another idea was to put either a large or two small K & N air filters directly on the carburetors. And a third idea was to modify the air filter box to suck cold air from the bottom of the engine compartment.

The good temperature measurement (+3 °C) at the back of the car made me think about a hose or tube that crossed backwards, but the thought of the engine breathing through it made it barely appealing. ... And so on to practice I had been wondering a little bit about the cases for some time, but it did not happen until the club visited August at the Danish K & N dealer, DOT Engineering. The plan was that they should tell us the theory behind the filters and demonstrate the effect that the engine could get enough air, so it was clear that I saw something forward to that visit. And when Jan Bolvig asked, if they could. could borrow a lottery before the visit, to prepare something to demonstrate on the scroll bar, I joined. The first thing they did was to pellet the old filter. It was very dirty and there was obviously trouble getting enough air. In fact, the engine was so bad with the filter that they could not reproduce the results over 3000 rpm. I probably had a little on the feel, but thought it was ignite or too bland, and really had to check it out for winter with the exhausted exhaust. After trying different settings and filters, DOT-E found the following solution: First and foremost, the original suction box and filter were replaced by a K & N filter on each of the carburetors. Inside the filters there is a small funnel placed increases the intake. Next, the filters and intake air are packed into a heat insulating blanket that is open to the top, just below the previously mentioned hole in the tailgate. Another very important thing is the two flexible pipes that go from just under the filters and below the car, and always ensure that the

filters are surrounded by nice fresh and cold air. The pipes are closed in a rubber band, so even if they move slightly below the bottom of the car, they should be able to hold a bit of a knock. So it was clear that I was excited to reunite with my car and see the final result on the scrollbar. It was 10hp and 15nm extra on the wheels and it can really be felt on the road. At low revolutions, the sound is the same or slightly less, over 3000 o'min. is it somewhat higher. And away, the crowds are at 4-5000 rpm. The roller field also measures the transmission loss / rolling resistance, which on my car is 6-8HK, and that has to be added to the basket before comparing to the factory reports. How many of the 10HK comes from the colder air, how much from the easier breathing and how much from the higher air pressure? One can never be sure, but according to the theory, they will $24^{\circ}\text{C} * 0.22\% * 90\text{HK}$ give about 5HK, and this should be achieved by the Powerblank and the flexible pipes. The changed intake via the filters and fungi is more a matter of where the curve one wants to optimize and it is something beyond my capabilities. The ignition and carburetors still need a check, the latter now also because of the changed intake. With the modifications made on the engine (American Stromberg model), it should have 115-120HK, so there is still a bit to look for. On DOT Engineering's website, www.dot-e.dk, you can read more about air filters and suction. I hope that along with this article gives a little inspiration for the long winter evenings in the garage. Spare part list KN56-9155, K & N Filter bolt on, 150mm x 54mm, 2 pieces KN85-5032, Ram Pipe DSS45 / 14, 2 pcs. to inside the filters. KN62-1340, K & N Filter clamp on (for crankcase venting that went to the suction box before) Power blank, 1 pc. Cool Pipes, 2 pcs.