

One question in summer in a VW bus will always be, "why does my oil light come on at idle?"

The simple answer is that the oil pressure is too low at idle. The cause is the oil is too thin. Ways to correct that are cool the oil or make it thicker. There are ways to do both. You can go to a 20W -50 oil safely if you want to make it thicker. The downside is that multi-grade oils are still not as stable as a single grade oil. The base stock on a 20W-50 oil is closer to SAE 20 than SAE 50 and chemicals are added that thicken the oil as it heats up. Over time those chemicals wear out. The other downside is that oils are formulated for water cooled cars that don't have the range of temperatures in them that our buses do. You can also cool the oil by adding an extended sump. By adding extra oil in an extended sump (has cooling fins) the oil has longer to cool in the air flow before being used again. The downside is that in winter the oil never gets up to temp so one has to remove the sump in fall and add it in early summer. They also hang lower so are easier for road debris to hit. Another solution is to add external oil coolers, fans, and thermostats that control the flow of oil in summer and winter. The downside is that systems like this are not bolt on, and they require fabrication. They can also be costly. Another method of cooling the oil is to not get it so hot in the first place. Plan the trip on roads where you can drive 35 mph - 45 mph and the bus engine won't get so hot. That is really what these buses were designed for anyway - utility vehicles and not as freeway fliers although most of us them for that. Gearing down can help by moving more air across the cylinders however it also increases the number of times per minute a cylinder fires so that is increased wear and heat. Frankly I have never found gearing down to be a perfect solution. Pulling over and resting until the engine cools a little is also a way to reduce heat.

When building an engine one thing that can increase the temperature is compression. The higher the compression ratio is, the more heat is created compressing the gases in the cylinder. The higher the compression the bigger the push when the fuel and air are burned, but it is a trade off because the increase in torque and HP also raises the amount of heat that needs to be shed to cool the engine. As a result, on a bus engine it is better to stay with lower compression and benefit from lower temperatures than raise the compression and deal with the extra heat. Buses are in general under powered so everyone wants to increase power. Easy to do - raise the compression, add a little camshaft duration and overlap, maybe lift too, clean up the exhaust, add dual carbs to add more air in, make the cylinders bigger, improve the intake porting and suddenly there is lots more power. But that creates a problem of overheating, especially on hot days. The outcome is like the guy who owns a Ferrari but lives in a city where he can never go faster than stop and go. Then it becomes all about looks and nothing about performance.

There are ways to detune a motor to cool it as well. Retard the timing a few degrees. This helps keep combustion pressures down too. The factory used 32 BTDC at RPM as the baseline for timing. Dropping that back to say 29 - 30 BTDC at RPM will help a little. Add a little more fuel to the mixture. This will cool things too - although the downside is the MPG drops and if too much is added it wears the cylinder walls. Go back to a single carb instead of duals - if the power isn't there you can't use it. Put the restrictive muffler back on - if the engine can't use extra fuel and air then the heat is never generated to begin with - the downside is now the bus lacks oomph again.

Conversion - one can convert to a water cooled engine and get away from the restrictions air cooled creates. Water cooled racers run into cooling problems as they raise compression and make more HP. A typical solution there is keep the water pump speed just below cavitation, make sure the suction side hoses don't collapse any at RPM, and add fins or a larger / extra radiator if more cooling is needed.

Keep all the proper tin and seals in place - buses do better when all the cooling air they get comes from the cooling vents. That is done best by keeping the engine tin and seals in place. When tin or seals are missing, hot air from the engine, and exhaust rises up and goes back into the engine again. Using hot air to cool isn't as effective as using cooler air to cool.

Larger oil pumps, thicker oil than 20W-50 etc., - this approach is really pushing rocks uphill. 20W-50 is already a thick oil so using it implies that you are already driving your bus in an environment that is 100F outside, or near it. Most buses do fine with this weight oil in a hot climate so if yours doesn't then something else is likely wrong. Larger oil pumps typically are used in racing because the bearing clearances are slightly increased - which causes a loss of pressure thru leakage. If you have an old worn engine with larger bearing clearances then adding a larger oil pump is a temporary fix but not a long term strategy.

Stronger Oil pressure relief springs etc. do not increase flow unless there is surplus oil available already. The purpose of the single and double relief springs and plungers is to dump excess oil pressure. If your engine lacks enough pressure, adding a larger dump spring won't help it get pressure. Sometimes the plungers get worn and leak, in which case a new plunger might help a little. One caveat is that some plungers have grooves that are designed to allow oil to leak around them at certain pressures. Make sure you use the correct plunger. Using a solid plunger when a slotted plunger is needed can make things a lot worse.

There is no magic solution to a buses inability to cool well on hot days. The easiest solution I personally found was use them as a recreational vehicle rather than a daily drive. Almost 500,000 miles in a 1971 bay as a daily driver taught me that. Now I use something air cooled, with A/C to make daily trips. My 1977 bus only goes out for recreation and vacations - or to maintain it. In the miles I have put on the 1977, many have been on days it was 100F+ outside. Its oil cooling behavior is worse than my 1971 was. This is because the 1971 was a 1600, and the 1977 is a 2L. The air cooling in the 1977 is inadequate for the engine size in my opinion. But, in VW's defense, when it was built the USA national speed limit was 55 mph and distracted drivers were less common. Driving 50 - 60 MPH was the flow of traffic many places so there was no overheating except on long trips climbing grades on hot days etc.. Today with the speed limit being up to 80 MPH in some states, and distracted drivers - doing 50 - 60 MPH can get you rear-ended, and be quite stressful. I pulled a camping trailer across country, and had the 1971 bus loaded with tools and spare engines when we were racing. Camping trips along the west coast on long

grades on hot days, and high speed trips out to Lake Havasu, even pulling a 2000 pound boat, taught me that the easiest solution to keeping a bus from overheating is to add a low-profile extended sump. It is an instant solution in a package. There is no engine pull, not adapting oil lines, no cutting holes etc., but as I said earlier, it can't stay on all year because in winter the oil will never warm up and oil pressure will be ballistic. If you chose to make an engine with more HP be aware that the completely stock type one engine will last a lot longer (double and triple) a performance engine. On a type 4 engine, the 091 transmission is the strongest transmission that the bay came with. Those will melt the plastic bearing sleeve on 4th gear and the needles will seize. When that happens the main shaft wears grooves and is not reusable when rebuilding. New stock main shafts are NLA. One person here, Paul who goes by Gears, added an oil pump and cooler to spray the 4th gear area to cool it so that when he was on long hot grades etc., he could avoid the 4th gear area in the 091 / 094 from overheating. I guess what I am saying is build a close to stock motor, take it easy, and you'll have lots of fun. Build a hot engine with lots of performance and you'll spend many days, hours and dollars earned of your life working on your bus rather than enjoying it.