

# **Introduction to Low-EMF Cars**

*by Jens Bil*

Cars can be challenging for people who have electromagnetic hypersensitivity, EHS. This article is an introduction to low-EMF cars, while more technical details are covered in two additional articles. Few people with EHS will need the information in those two articles.

Just as the level of chemical sensitivity and allergy can vary greatly from person to person, so it is with sensitivity to electromagnetic fields. What works for one person may not work for others, even if their levels of sensitivity appear to be similar. Many people who are electrically sensitive do fine in regular cars, or only have problems with them temporarily.

Some people may just need a minor adjustment to their vehicle, while others have to buy one that emits less radiation. Some may even have to modify beyond that.

The reader is urged to seek competent help before embarking on significant modifications. The author assumes no responsibility of any kind for the use of this information. Some modifications may be illegal; some may impose an increased risk to the safe operation of the car. There is no guarantee that a modified vehicle will work as intended. This article reports on personal experiences, which may not be applicable to others.

This article is not medical advice. Anyone using this information assumes the full responsibility for their actions and results.

## **Measuring EMF Levels in Your Car**

Electromagnetic fields, EMF, is the electromagnetic radiation that bothers people who have the EHS illness. EMF is emitted from all sorts of electrical equipment, such as electrical motors, alternators, wiring and electronics. It is commonly measured in milliGauss, by a gaussmeter.

A gaussmeter is easy to use. It is essential for locating trouble areas in a car and for comparing the radiation levels with those in other cars.

It is important to know that a gaussmeter does not show all types of EMF present in a vehicle. It does not fully pick up the high frequencies emitted by digital electronic components, such as radio, computers, navigation system, voltage converters and other electronics in modern cars. Nor does it fully measure the wide-spectrum electrical noise from electrical motors and worn-out relays.

What it does measure accurately is the lower frequencies coming from the alternator and other moving parts, which usually are the strongest and most bothersome anyway.

Despite these limitations, the gaussmeter gives a good overall measurement, though it is just a guide—only the EHS sufferer can tell whether the car is good enough or not.

When measuring a car, it should be done with the engine turned on, and the car parked. It is best to try revving up the engine while measuring.

There is some controversy as to whether all areas of the human body are equally sensitive to EMF, or just some areas, such as the head. To be on the safe side, it is best to measure all areas where the human body will be, such as the location of the head, the abdomen, the knees and the feet.

The highest EMF reading is often found on the gas pedal, but not always. Other common “hot” areas are where the right knee is, or on the side of the seat.

It varies greatly how much radiation is acceptable. Some people do fine with 10 milliGauss or higher. Some need it to be around 1 or 2 milliGauss, while some exceptionally sensitive people need it to be less than 1/100<sup>th</sup> of a milliGauss. Modern cars usually measure between 30 and 80 milliGauss.

When buying a gaussmeter, choose one that can show less than 1 milliGauss. A good economic choice is the TriField meter, which is widely available.

### **Finding the Safest Place To Sit**

If the sensitive person is not the driver, the most effective simple measure is often to move to where the radiation level is the lowest. This is usually somewhere on the back seat, though the precise location varies. One side may be better than the other, or it may be best in the middle. It may help to pull the feet up on the seat.

Use a gaussmeter to find the lowest radiation levels on the seat, in the foot-well and on the back rest.

While most sources of radiation are in the front of most cars, there may be some equipment in the back, such as a fuel pump. A few cars have their battery in the back, while some luxury cars have a spare battery there. These systems are connected to the front of the car through a cable that usually runs down one side of the car.

Cars with anti-lock brakes have magnetic sensors in each wheel well, which can be bothersome when the car moves if someone with EHS is sitting near the wheel.

If the sensitive person is the driver, there are not many options for where to sit. Some people have been helped by rolling the front seat back to get a little more distance from the many sources of EMF up front. Some then use the cruise control, while others have strapped wooden blocks onto the pedals. Please consider the safety implications of such an arrangement.

### **Simple Modifications**

It is rarely possible to create a dramatic improvement in a car that has a high level of EMF to start with. If a large improvement is needed, it is often best to look for a better model to work on. Improvements may be possible by disconnecting unneeded circuits, such as the clock and the cruise control. This can be done by removing their fuses in the fuse box, but be careful not to also disconnect important parts of the car.

Electrical windows and seats should not be a problem, as they should only generate EMF while being operated. Since they only run briefly, the exposure is very limited, and even extremely sensitive people seem to do fine with them. It is possible to install manual cranks in many cases, but it is labor intensive and thus costly.

Grounding straps that drag on the ground below the car are available, but do not seem to have a noticeable effect.

Shielding can produce a good deal of improvement; but as with air cleaners, it's only a help. It cannot make a bad situation good, just a good one better. If the radiation level in the car is 30 milliGauss, and the driver can only tolerate 0.3 milliGauss, there is no way to get there this way. Shielding is covered in part 2 of this article.

A few people are simply bothered when being close to metal, even if not touching it. That may be because of the slight disturbance metal imposes on electromagnetic fields, including the one our bodies naturally create. It may help to put pieces of wood or a thick ceramic tile under the feet, so they are lifted a bit off the metal floor in the car.

Running the headlights and other electrical devices cause the alternator and wiring to carry more electricity, thus producing more EMF. It may help to drive only in the daytime and during fair weather.

### **Rotating Cars**

People who have EHS tend to be more sensitive to certain frequencies than others. One vehicle may thus be more tolerable than another kind, even though their level of radiation is the same. Rigidly avoiding a lightly intolerable car for a year or so may make it tolerable again, just as may happen to foods we are allergic to.

Some people own multiple cars, which they alternate between, while some switch to a different car when they get sensitized to the one they own.

### **Choosing a Lower-EMF Vehicle**

The level of EMF radiation varies greatly with the brand, model and year. Use a gaussmeter to compare the vehicles that are considered. The typical new car will measure in the range of 30 to 80 milliGauss, with the engine revved up and the car not moving. It is not difficult to find one that measures below 10, while very few come in below 2 milliGauss.

Generally, trucks and SUV's tend to have lower levels than cars; large vehicles have less than small ones; older vehicles have less than newer ones; vehicles with fewer gadgets have less than loaded models.

It is best with a model where the battery and the alternator are located in the front—far from the driver.

Cars with side-mounted engines may put the alternator closer to the driver, and they may have a bothersome electric fan cooling the radiator, instead of a fan driven by the engine.

The fuse box is often in the driver-side foot-well. Look for models where it is located elsewhere.

The ignition coil is a large source of EMF and is best located in the front, far from the driver.

Electronic fuel injection generates some EMF as well, though less than the other parts mentioned. Carburetors do not generate EMF, but have not been installed in cars since the 1980's. A few older models use all-mechanical fuel injectors that do not generate EMF.

Features to look for:

- larger vehicle
- older vehicle
- no anti-lock brakes
- few electronic gadgets
- battery far from driver
- ignition coil far from driver
- alternator far from driver
- fuse box far from driver
- no side-mounted engine

The above list is only a general guide. It is not always accurate, and it may not be possible to find such a vehicle. The highest levels I have measured were in a 1987 Buick Century, a large older vehicle. It weighed in with a hefty 120 milliGauss. Make sure to measure with the engine revved up and test for tolerance before buying.

Some sensitive people do well with trucks from Dodge and Ford, though while the 2000 model of the F-150 has especially low levels of EMF, the 1993 F-150 is as high as the typical car. The body style changed between those two model years, and apparently, how the components and wires were placed also changed.

One would think that the old Volkswagen Beetle should work particularly well with its engine in the back. It is certainly better than most cars, but the battery is located under the rear seat, which is very close to the driver in this tiny vehicle. All the electricity also runs through the ignition key, right next to the driver.

The vintage Volkswagen van also has a “hot” ignition key, though everything else is located far to the back. These old vehicles have no catalytic converters and have an unpleasant exhaust.

Gasoline powered cars have the fundamental problem of having spark plugs that use a lot of electricity, which is sent to them from the alternator and the ignition coil. Both the ignition coil and the alternator are the main sources of EMF in any car, and they cannot be shielded effectively. The main measure is simply to have an adequate distance.

If the radiation level at the driver's seat needs to be lower than about 1 milliGauss, the only option is probably to use a diesel car. Some highly sensitive people use diesel cars without further modification.

### **Diesel Cars**

Diesel cars have no spark plugs and no ignition coil. Older diesel engines can even run completely without electricity, once they are started.

A drawback to driving a diesel vehicle is the smoke from the tailpipe. The driver has to be careful, but it is manageable, even for very sensitive people. Strategies for avoiding the fumes can include keeping the windows closed and waiting inside for a minute before stepping outside. When stopping, the windows should be closed or a respirator worn, at least if there is a chance that a breeze will bring fumes forward from the rear.

There should not be a problem driving with the window open on a country road, but it is always a good idea to have a respirator within easy reach.

Using biodiesel should help on the exhaust problem, though it is only available in some areas.

Diesel engines are found in both cars and trucks. In the mid-1980's, the manufacturers started putting electronic fuel injectors in the cars, and later in the trucks. Most of the diesel cars and light trucks produced in the 1980's were rushed to market following the oil crisis and had poorly designed engines with lots of maintenance problems.

Mercedes is the only brand of car from that era that is worth considering today. They were built to last, with many of them running well past 300,000 miles—some as far as 500,000 miles. Mercedes put their first diesel model out in 1960, and has had time to perfect the design, and many of them are still on the road today and listed for sale. There are several companies which specialize in selling and refurbishing parts for these cars.

Mercedes upgraded their line in 1986, so models before that year are best. Five models were produced: 300D, 300SD, 300CD, 240D and the 300TD wagon. The wagon has a complicated hydraulic suspension that is expensive to maintain. The 240D has an engine some people feel is undersized for the automatic transmission. The 300CD is the sport version of the 300D.

The 300D and 300SD are the most commonly available, and both are used by people with EHS. The 300SD is the largest model and the only one with an electronic speedometer, which may be bothersome and need to be disconnected. The other models have their cruise-control operated by a spinning magnet, which also may need to be disconnected.

Mercedes also produced the 190D from 1984, but it has electronic fuel injection.

If further reductions in the EMF levels are needed, it may be possible to reduce them to as little as 0.02 milliGauss in these models. This will take some effort and impose limitations on the use of the car. These modifications are covered in detail in the following article, which is intended for technical readers. That article will also comment on other brands of diesel vehicles and provide more technical information regarding automotive EMF issues.

When using cars this old, do expect more repairs than on newer models, even on these well-designed cars.