
Effects of admixtures in diesel fuel on common-rail

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| Version | 3 |
| Design group | 07.10 Diesel injection system, general |
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| Validity | Sprinter 90#.6##, WD# ### |
| Reason for change | Range setting partially altered |

Complaint:

We regularly receive reports of engines and common rail systems which have been damaged by the use of an improper fuel.

Primary complaints: Engine dies, engine does not start or is difficult to start, as well as various complaints about engine running characteristics (jerks, shakes, emits smoke, etc.).

Cause:

Admixtures of gasoline, water, solvents or other fuel additives which have not been approved.

Continuation from the document "Remedy":

When investigating damaged parts it should be borne in mind that very often the fuel is the cause of damage in common rail systems.

All conceivable external causes must therefore be ruled out before there is a complaint about the product.

Even when the appearance and odor would be evidence enough, the guilty user will in many cases naturally demand further proof. In this case the necessary details can only be provided by a laboratory. Depending on type, this analysis can prove to be very expensive and logically it should be charged to the party who is responsible for the damage. It will be necessary to advise the customer about the costs incurred and about the risk that he (or his fuel supplier) may be liable for these costs.

| Attachments | |
|-------------------------------|----------------------|
| File | Designation |
| Schadensbilder Kraftstoff.pdf | Fuel damage patterns |

Remedy:

Of course many of these fuels are not obvious but there are numerous

cases where it is essential to be suspicious.

Then reservations must be expressed to the user until a thorough analysis is available.

The same procedure applies in all cases:

1. As much diesel fuel as possible must be removed from the fuel circuit and made airtight.
2. Always remove at least 500 ml from the base of the fuel tank (dirt, water and gasoline are heavier).
3. Open the fuel filter (in a vise using pliers). (The use of an angle grinder is forbidden).

A distinction is made between five groups of fuels which are not in accordance with the specifications and which have one or more of the following properties:

- A. Gasoline smell
- B. Solvent/thinners smell
- C. Sulfuric acid smell
- D. Orange tint
- E. Red tint with pronounced reddish deposits, particularly inside the filter.

A. Gasoline smell: (wrong fuel pump used when refueling)

If there is a gasoline smell, a fuel sample must be taken from the vehicle and analyzed in a laboratory. If gasoline is found, any warranty claim is voided.

B. Solvent or thinners smell: (added according to a certain mixture ratio in order to reduce the price per liter)

This is a characteristic odor which strongly resembles the smell of an open paint pot. In these cases contamination of the fuel can only be proven with the aid of laboratory analysis. The damage manifests itself inside the high pressure pump in the form of a dry seizure of the eccentric shaft.

C. Sulfuric acid smell: (acid added to fuel oil in order to bleach out the color so that it looks like diesel)

An incorrect mixture ratio reduces the lubricity of the fuel, which leads to various seizures both in the high pressure pump as well as in the injectors and other components of the system. To verify the existence of acid residues, mix the fuel sample with water in the ratio 1:1 and check with:

1. Litmus paper (red tint if acid is present)

2. pH paper (the intensity of the blue tint reflects the acid content)

3. An analysis by a laboratory is necessary for confirmation

D. Orange tint:

This involves the same admixture as described under Section "C", but with even more serious mixture ratio errors.

Procedure as in Section "C" for acid.

E. Red tint with pronounced reddish deposits, particularly inside the filter (base of filter bowl). RME or FAME mixed at 5% is permissible

This is a fuel with a high sediment content. The small suspended particles and the deposits produced by this diesel fuel often mean that the particles accumulate very easily and are difficult to shift. The eccentric shaft of the high pressure pump is discolored brown. Here too a laboratory analysis is necessary in order to determine the mixture proportions.

Continuation of the document under the heading "Cause"

| Symptoms |
|---|
| Power generation / Engine management / Engine running / Stalls/goes out |
| Power generation / Engine management / Engine running / Cuts out intermittently |
| Power generation / Engine management / Engine running / Runs rough/shakes |
| Power generation / Engine management / Engine management indicator lamp / Electronic diesel control / Lights up |
| Power generation / Engine noise / Combustion noise |
| Power generation / Fuel system / Fuel system odor / Odor |
| Power generation / Engine management / Engine start / Long starting time |
| Power generation / Engine management / Engine start / Does not start |
| Power generation / Engine management / Engine performance / Goes into limp-home mode |
| Power generation / Engine management / Engine performance / No/poor output |
| Power generation / Engine management / Engine performance / Poor acceleration |
| Power generation / Exhaust system / Exhaust system function / Fumes/blue smoke |
| Power generation / Exhaust system / Exhaust system function / fumes/black smoke |