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| ISTA system version | 4.10.20.15602 | Data version | R4.10.20 | Programming data | - |
| VIN | XXXXXXX | Vehicle | 5/E60/SEDAN/535d/M57/AUTO/ECE/RL/2005/07 | | |
| Int.lev.works | - | Int.lev.(cur.) | - | Int.lev.(tar.) | - |
| Mileage | - | | | | |

Enclosure 1 to SI 17 01 96 (140), edition 12/2006

1.0 Requirements made of engine coolant

Pure water is unsuitable as a coolant not just because of the lack of protection against freezing. Good functioning of the cooling system is only guaranteed once a suitable anti-freezing and anti-corrosive agent, or antifreeze for short, has been added.

The cooling system of BMW vehicles must only be filled with the anti-freezing and anti-corrosive agents approved for this purpose. The filling and maintenance instructions to be found in the Repair Instructions and operating instructions must be observed.

Antifreeze agents must meet the following requirements:

- They must guarantee operability of the cooling system in winter (anti-freezing protection by lowering the freezing point) and in summer (prevent boiling and boiling over of the coolant).
- They must protect metal components that come into contact with the coolant (grey cast iron, steel, aluminium alloy, brass, copper and solder) against corrosion and cavitation.
- They must be neutral with respect to rubber and plastic parts in the coolant circuit.
- They must guarantee the consistency of the above-mentioned quality criteria.

To create these coolant properties, the anti-freezing and anti-corrosive agents must be mixed to the correct ratio with water.

Prescribed mixture for coolant:

50 % antifreeze for anti-freezing protection down to -38 °C

The original coolant mixture poured into the cooling system at the factory has this antifreeze-to-water ratio. If the proportion of antifreeze is less than 40 % to -29 °C (i.e. the water content is higher than 60 %), not only the degree of protection against freezing, but also protection against corrosion is reduced. When the water content is too high, this can lead to premature overheating in very hot weather or hot climates and as a consequence lead to coolant being ejected out of the system and damage to the engine through overheating.

This means that it is essential that an anti-freezing and anti-corrosive agent is added even in the tropics. Too high a concentration, more than 55 % down to -47°C, leads to deterioration of the cooling properties (heat transfer) and protection against freezing-up is modified in the opposite direction, i.e. it also deteriorates.

The amounts of antifreeze required for providing protection against freezing-up are stated as percentage figures on the containers.

Minimum requirements concerning water quality:

- Appearance: colourless, clear
- Sediment, without suspended matter
- pH value: 6.5-8.0

- Total hardness, max.: 20° dH (German hardness grade) or in new measuring unit:
- Total hardness, max.: 3.6 mmol Ca²⁺/ltr.
- Chloride content: max. 100 mg/ltr.
- Sulphate content: max. 100 mg/ltr.

Potable tap water usually fulfils these requirements. Local water utilities can provide information about the quality of the water they supply. If necessary, the water must be treated (e.g. softened) or distilled water must be used.

The quality of regenerated sea water (as found in the Gulf states) is inadequate!

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