

## Compressor oil: all you need to know



All DENSO A/C Compressors are delivered as complete assemblies, pre-filled with the correct type of compressor oil.

The purpose of compressor oil is to lubricate and cool the moving parts of the compressor. The oil film also protects the rubber seals in refrigerant lines and connections reducing the amount of refrigerant leaking out. However, there are huge differences in compressor oil types and quality. To guarantee proper oil circulation in the refrigerant cycle, the compressor oil has to be pressure and temperature resistant in all operating conditions. Garages should only fill the compressor with refrigerator oil approved by either the car or compressor manufacturer, and should also avoid using universal or multi-grade oils.



### **Beware of Universal Oil!**

**Insufficient lubrication due to universal oil is the second most common reason for A/C compressor failure**

Analysis of DENSO A/C Compressor warranty claims show that in a quarter of all cases garages did not use the correct PAG-oil that is needed for DENSO Compressors. The use of incorrect oils, such as universal oils or oil mixtures, inevitably leads to seizure and damage. This is because universal oils, often preferred by garages, are PAO-oils or mineral oils with a different viscosity to that of synthetic PAG-oils. PAO-oils do not mix well with PAG-oils and with refrigerant R134a or R1234yf, leading to poor lubrication and increased wear. Furthermore,

the different viscosities cause a thinner oil film to form between the cylinder and piston, leading to seizure or the reduction in the life expectancy of the compressor. To identify the correct oil type always refer to the compressor identification label, either attached to the rear or side of the compressor. The new label will also display the amount of oil inside the new compressor. In some cases this can be differ from the vehicle specifications! Therefore always check car manufacturer data.

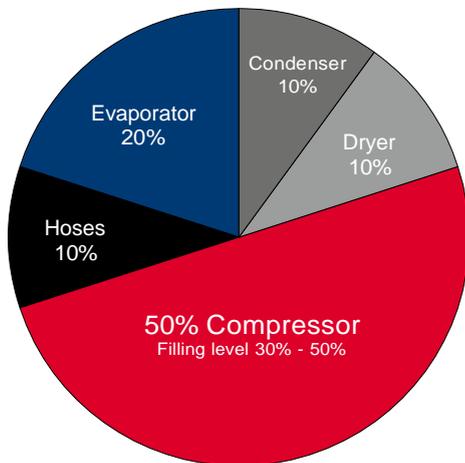
## Ensure the correct amount of oil is used

### Essential action when removing a compressor:

- 1. After recovery of refrigerant:** When removing refrigerant, some compressor oil will be mixed with the refrigerant and will be removed from the refrigerant circuit together with the refrigerant. It is essential that this oil is drained off at the A/C service station and its volume measured precisely. The volume drained need to be charged to the refrigerant cycle when refilling with refrigerant.
- 2. After removal of the old compressor:** Drain the oil from the compressor and measure the amount. Check the compressor installation guide for the appropriate oil drain procedure.

**Caution!** Between 30-50% of the total oil quantity should be drained. Otherwise, the system could be overcharged from refilling with too much compressor oil or UV leak dye during A/C service. 3 to 5cc of UV leak dye is tolerated for systems up to 1000 gram of refrigerant!

Oil distribution within the A/C system (reference values, varying depending on outside temperature and engine load)



For more information: [www.denso-am.co.uk](http://www.denso-am.co.uk)

### Compressor installation tips:

**All DENSO A/C Compressors are complete assemblies, pre-filled with the right type of compressor oil.**

- 1. If the system has been flushed:** Original DENSO Compressors which are delivered with the correct amount of oil can be installed directly. Turn the compressor systematically by hand to distribute oil evenly. This will avoid damage when the compressor starts moving or during start-up.
- 2. If flushing of the system is NOT required:** Use the following calculation to confirm the correct amount of oil to remove from the new DENSO A/C Compressor.

**Calculation to confirm the correct amount of oil:  $A - B = C$**

A = Total oil amount in new DENSO compressor

B = Amount of oil drained from the old compressor

C = Amount of oil to remove from new compressor

### Calculation example:

The total amount of oil in the new compressor (A) is 120 cm<sup>3</sup>. The oil amount drained from the old compressor (B) is 50 cm<sup>3</sup>. The amount of oil to remove (C) from the new compressor is A-B, 120-50= 70 cm<sup>3</sup>.

A 120 cm<sup>3</sup> (Oil level in new compressor)

- B 50 cm<sup>3</sup> (Amount of oil drained from the old compressor)

= C 70 cm<sup>3</sup> (Amount of oil to remove from new compressor)

- 3. For some applications it is necessary to add oil.** For example, where there is one and the same part number for Single and Dual evaporator cycles or when the oil quantity of the new compressor differs from the vehicle specifications. If this is the case, always check the car manufacturer data to confirm the correct oil amount. Never add oil directly into the compressor, always add it to the condenser, receiver dryer or second evaporator cycle.

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