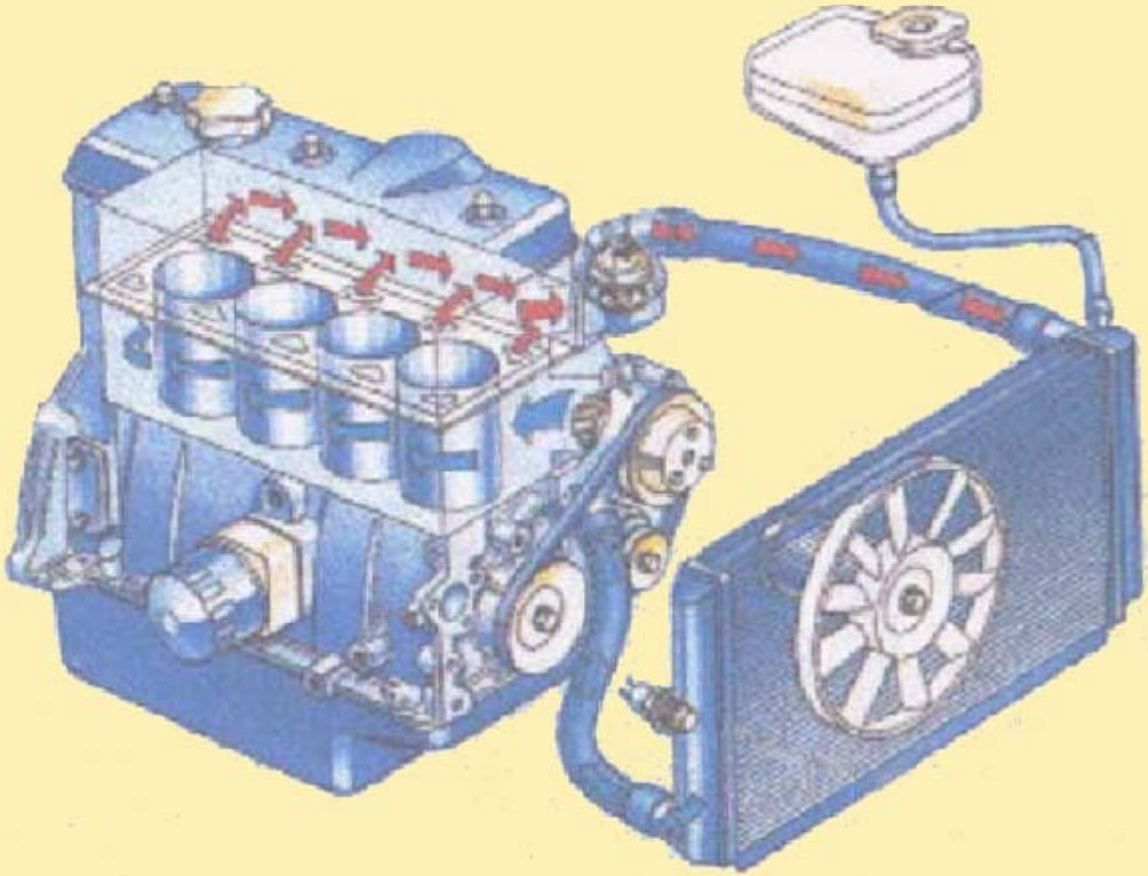
Its not just Antifreeze!



Why not just use water to cool your engine?

Water is the best heat transfer medium BUT:

- water freezes at 0 °C
- water boils at 100 °C
- water is very corrosive

Clearly you cannot use water alone to cool your engine ……

So what is the solution?

The solution is to use an Antifreeze/Coolant

By mixing your Antifreeze/Coolant concentrate at the correct ratio with water you will provide your engine with:

- **Good heat transfer properties**
- **Freeze point protection**
- **Boiling point protection**
- **Corrosion protection**

Did You Know?

- **Engine Cooling System facts:**

- A survey found that 70% of vehicles contain rust and scale.

- Over 60% of water pump failures can be attributed to poor coolant maintenance.

- Up to 60% of engine failures can be attributed to cooling system failure.

- Just 0.6mm of deposits in the cooling system can reduce the heat transfer efficiency by 40%

Did You Know ?

- Your **antifreeze/coolant is a vital component** of any diesel or petrol engine.
- Your **antifreeze/coolant contains corrosion inhibitors and therefore needs to be maintained all year round** and not just during the Winter months.
- Your **antifreeze/coolant needs to provide freeze protection to stop ice forming.** If it freezes the associated expansion can crack the engine block and related components.
- Your **antifreeze/coolant needs to provide boiling protection** (if the coolant boils, this can lead to overheating which will also cause additional corrosion)
- **The main function of an antifreeze/coolant is to remove excessive heat from the engine.** This is achieved by transferring the heat away from the engine with the antifreeze/coolant.

What can go wrong in the cooling system?

- If not cooled efficiently the engine will overheat and the lubricant will not work effectively, potentially leading to premature engine failure.
- Insufficient freeze protection may lead to the coolant freezing, expanding and causing the engine to crack.
- Low levels of corrosion inhibitors can cause pitting of metal surfaces and deposits in the radiator, leading to reduced performance and potential engine failure.

What can go wrong in the cooling system?

- Incompatibility of the antifreeze/coolant with seals, gaskets and hoses will lead to leaks developing and subsequent loss of fluid.
- Poor maintenance of the cooling system causes depletion of the corrosion inhibitors resulting in cavitation in the cylinder head, water pump, cylinder liners etc. and eventual failure of these engine components.
- Inefficient cooling of the engine leads to poor combustion control and high NOx content in the exhaust gases.

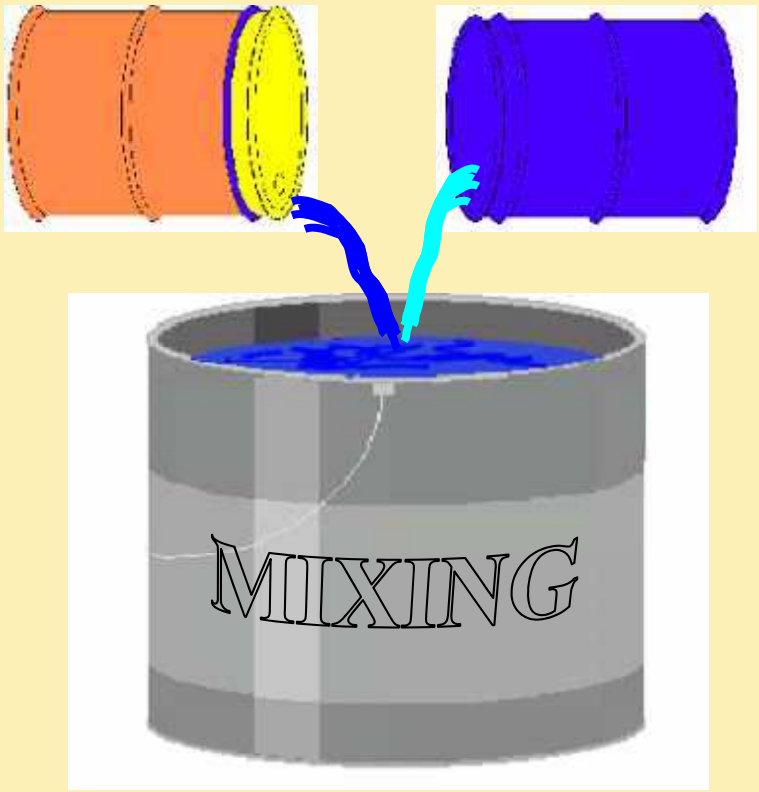
Antifreeze/Coolant "Good Practice Guidelines"

- Always use the coolant standard recommended by your vehicle manufacturer, when either topping up or refilling your coolant system
- In the absence of a recommendation – Use an antifreeze/coolant meeting a minimum of BS 6580 (1992) and/or ASTM D3306.
- **DO NOT** neglect the antifreeze/coolant in your vehicle: follow your Vehicle Manufacturers maintenance guidelines for dilution ratio and change interval.
- For optimum performance, use a 50% mix of antifreeze/coolant with water.
- Mixing antifreeze/coolant with water at the correct concentration is **crucial for corrosion protection** and not just for freeze point protection.
- **DO NOT** use the colour of your antifreeze/coolant as a quality indicator, and always check you are using an antifreeze/coolant to the recommended specification.

Typical Antifreeze/Coolant Dilution Method.

50/50 (By Volume) MIXTURE: Antifreeze Water

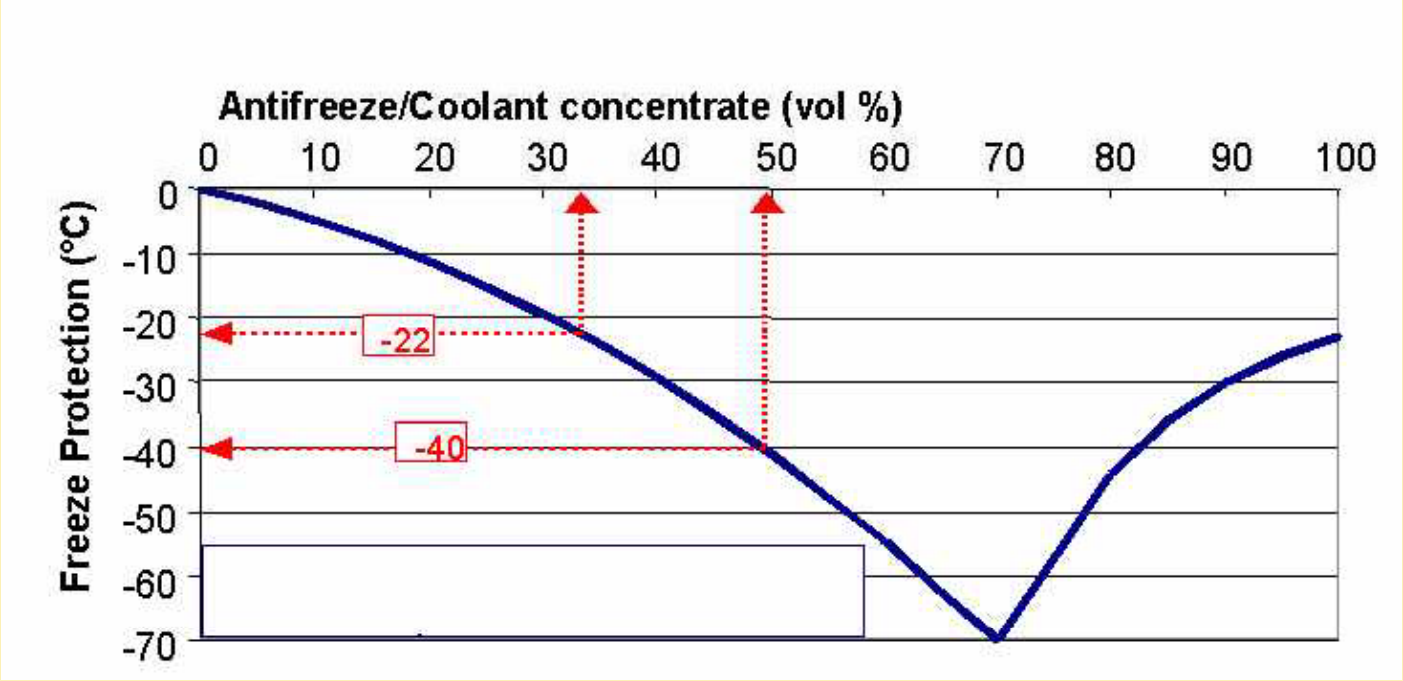
ANTIFREEZE CONCENTRATE CONTAINING MONO ETHYLENE GLYCOL(MEG) PLUS CORROSION INHIBITORS



WATER

Mixing Table for MEG based Antifreeze/Coolant Concentrate in water

- For optimum protection mix at 50% antifreeze with 50% water.
- Min. protection is achieved at 33% antifreeze with 67% water.



- NEVER MIX BELOW 33% AS YOU WILL NOT HAVE SUFFICIENT INHIBITORS TO PROTECT AGAINST CORROSION!!

- NEVER USE MORE THAN 65% ANTIFREEZE/COOLANT CONCENTRATE IN YOUR ENGINE!!

Antifreeze/Coolant "Good Practice Guidelines"

- When Checking the dilution of your Coolant mixture - Use either a Hydrometer or Refractometer:
- Wait until the engine coolant is at ambient temperature. Use a fresh prepared mixture of 50% coolant to check if your instrument is accurate and calibrated correctly.
- **Caution :** these instruments will **ONLY** indicate freezing point protection or the coolant dilution depending on the design of the instrument. They will **NOT** indicate the level of corrosion protection remaining in the coolant.
- Refractometers are more expensive than Hydrometers but are consistently accurate when measuring freeze points

Hydrometer

Refractometer

Antifreeze/Coolant "Good Practice Guidelines"

Health & Safety:

- Before handling the antifreeze/coolant always read any warning labels on the suppliers package. If in doubt refer to your coolant suppliers Material Safety Data Sheet.

Disposal of Used Coolant:

- Segregate hazardous workshop waste streams.
- Use dedicated waste containers only for their designated material.
- Current restrictions on mixing waste are set out in The Special* Waste Regulations 1996 SI 972 - reg 17 - Restrictions on Mixing Special Waste.

By following the above guidelines You can:

- comply with the law
- help the environment
- promote recycling

* for Special read Hazardous - these regulations are being replaced in 2005 by the "Hazardous Waste Regulations" and will specifically forbid the mixing of different classes of waste.

Do you want more information on Antifreeze/Coolant?

For further information look on the BTC Web Site at **www.btctag.org**

Or contact the BTC Secretariat at

btc@interlynk.co.uk