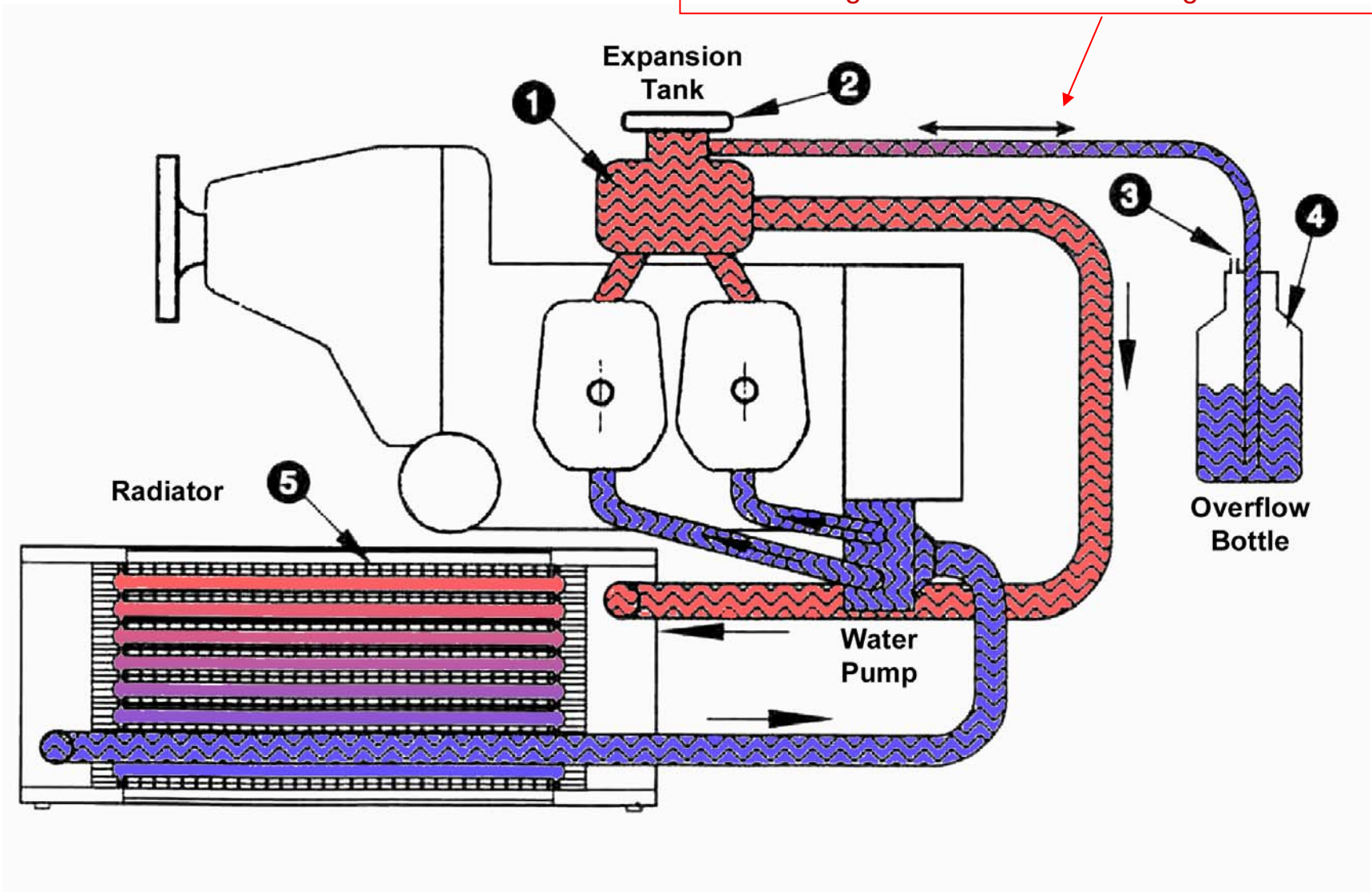
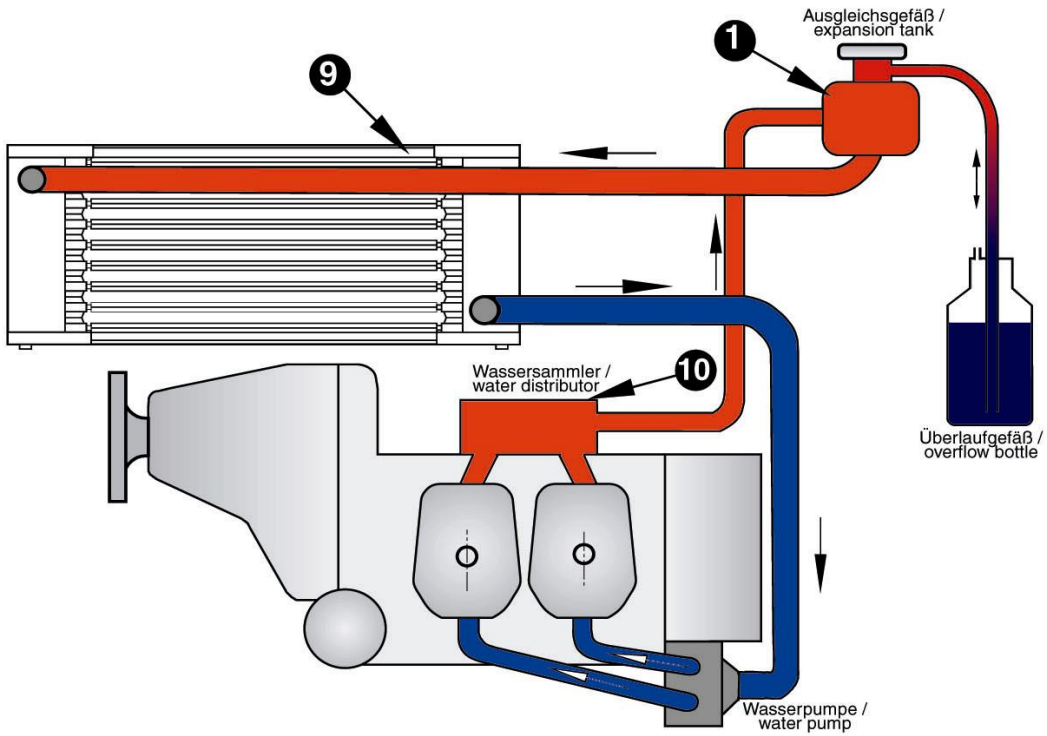
# ROTAX® 912/914 Cooling System

The Rotax 9 series engines use a simple, effective cooling system. Using liquid cooling allows a smaller engine package. This is mostly due to the fact that air cooling fins make the cylinder head larger, when the head is larger the crankshaft must be larger, this means the crankcase must be larger and so on…

Liquid cooling also allows tighter tolerances of the engine components by controlling the temperature extremes. This allows reduced weight and increased power.

Make sure you have a good quality hose for the overflow bottle, it must not collapse when the HOT fluid is being sucked back into the engine.






- Top mount radiators must have accumulator (10) and remotely mounted Expansion tank. (1)
- The Expansion tank must always be at the highest point in the system
- A “bleeding port” in the top of the rad will help purge air.
- Do not use a second cap on Rad!

# CHT probe

- The probe measures the metal temperature, there is no coolant in this cavity
- This is not a water temp probe

# Conventional Coolants

- Coolant should be mixed 50/50
- Use a Silicate free antifreeze such as DEX-COOL or Prestone long-life





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# EVANS



- **WATERLESS**
- **100% COOLANT - NO MIXING NEEDED**
- **CONTAINS NO SILICATES**
- **ELIMINATES SCALE & CORROSION**
- **COMPATIBLE WITH ALL METALS EVEN MAGNESIUM**
- **WILL NOT FREEZE**

  **remains liquid until -40º, when it contracts slightly and merely turns into a light viscous slurry. It will not freeze solid and expand.**
- **ESSENTIALLY NON-TOXIC**

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# Waterless coolant

- Waterless coolant virtually eliminates boil over in engines
- Waterless coolant allows engines to tolerate running hotter, without boiling over.
- Allows the cooling system to run at very low or no pressure.
- Because there is no water in the system engines operating with NPG+ will be free from corrosion and electrolysis

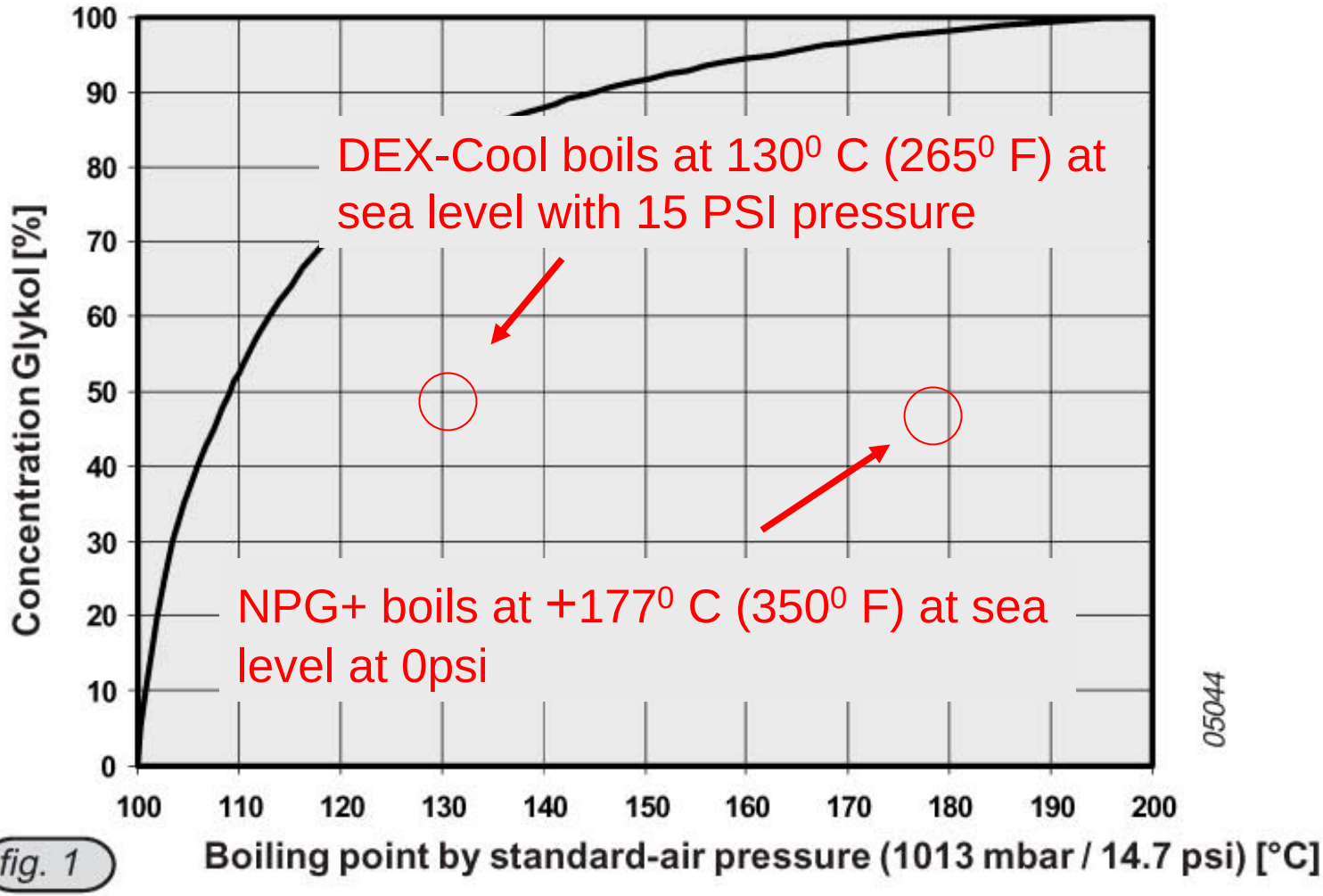
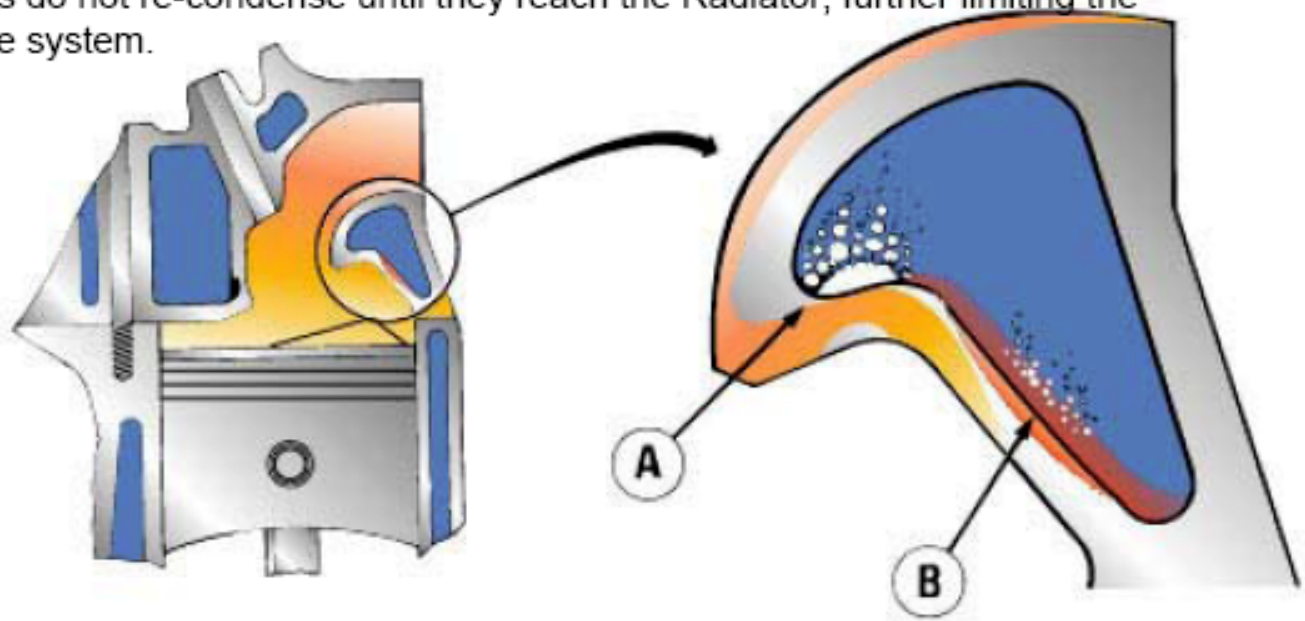

DEX-Cool boils at 130⁰ C (265⁰ F) at sea level with 15 PSI pressure
NPG+ boils at +177⁰ C (350⁰ F) at sea level at 0psi
Concentration Glykol [%]
100
90
80
70
60
50
40
30
20
10
0
100
110
120
130
140
150
160
170
180
190
200
Boiling point by standard-air pressure (1013 mbar / 14.7 psi) [°C]
05044

*fig. 1*

(**A**) Example of coolant boiling: the common problem with conventional water based coolants. As the conventional coolant flows over a hot spot it "boils off". In this "boiling off" area the heat is not being carried away as it is essentially being surrounded by air (bubbles). The hot spot remains hot possibly leading to detonation or pre-ignition. The coolant bubbles do not re-condense until they reach the Radiator, further limiting the effectives of the system.




(**B**) Demonstrates high engine load sustained "Nucleate Boiling", free of surface vapor blanketing, attainable only with Evans NPG. As the Evans coolant reaches its boiling point in a local hot spot it begins to boil in very small bubbles that actually carry the heat away more effectively than straight fluid. This "Nucleate Boiling" immediately re-condenses, before getting to the radiator, thereby increasing the effectiveness of the system. As the hot spot is fully saturated by fluid (not air as in conventional coolants) and the increased cooling action of "Nucleate Boiling" the hot spot is controlled.

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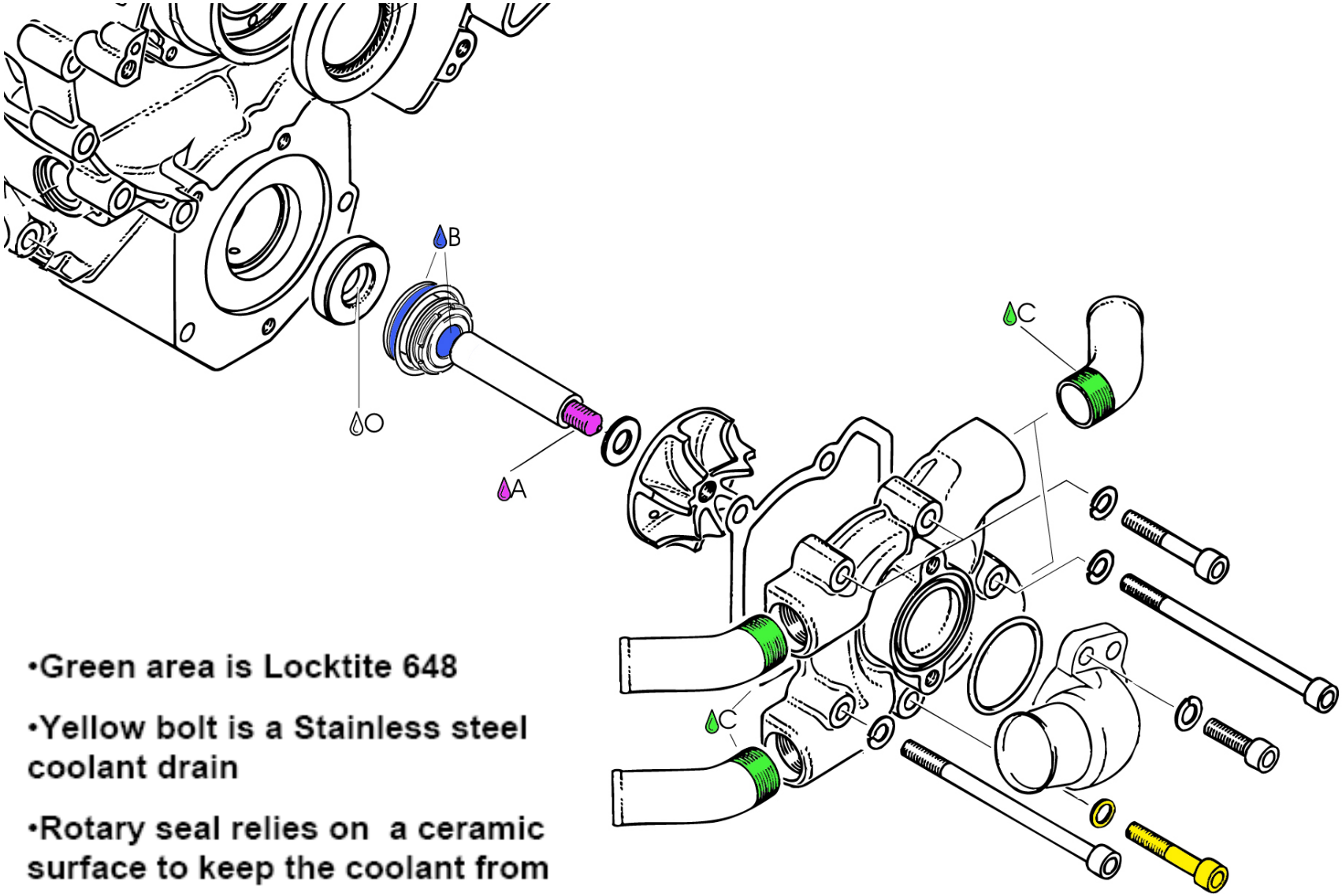


- Green area is Locktite 648
- Yellow bolt is a Stainless steel coolant drain
- Rotary seal relies on a ceramic surface to keep the coolant from leaking. Install carefully

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# Pump leakage tolerance

- Due to the design of the Rotary seal, the manufacture tolerates a certain amount of leakage
- Method:
  - Clean area around water pump and leakage bore.
  - Run engine for 5 minutes after all temperatures have stabilized.
  - Coolant must not drip through leakage bore for a period of 1 minute.