

EVANS®

WATERLESS ENGINE COOLANTS





Heavy Duty

Waterless Engine Coolant

for diesel heavy duty trucks, heavy equipment and gen set



High Performance

Waterless Engine Coolant

for modern, classic, vintage, light duty diesel and CNG



Powersports

Waterless Engine Coolant

for motorcycle, ATV's, UTV's and snowmobiles



- ▶ **A proprietary blend, soluble additives, and no water.**
 - ▶ **Additives remain soluble at all times regardless of conditions**
- ▶ **Boiling point: 190°C, Pour point: <-40°C. (Atmospheric Pressure)**
- ▶ **Evans are lifetime coolants if they do not become contaminated with water.**
 - ▶ **Coolant can be re-used and transferred from old to new equipment**
- ▶ **Reduced toxicity**

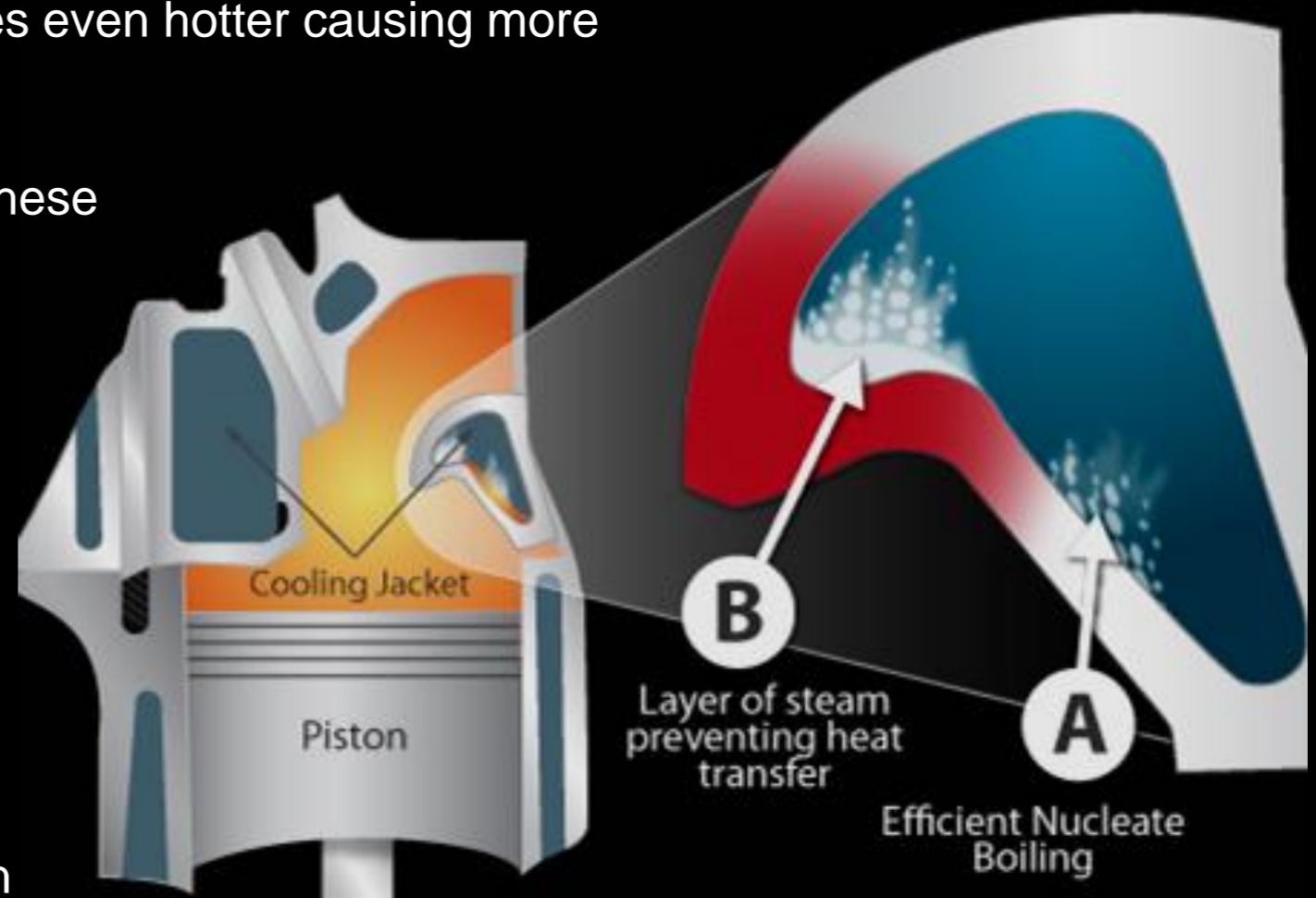
How it works

Water is an excellent fluid for cooling whilst in a liquid state, but when water turns to steam it has virtually no capacity for heat transfer. Evans is a superior fluid for transferring heat in engines because it remains in a liquid state until above 190°C.

Within an engine cooling system the hottest surfaces are those adjacent to the combustion chamber, specifically the cylinder liners and cylinder head. In these hot spots water is likely to vaporise preventing efficient cooling and causing loss of performance and unnecessary engine damage. When the coolant fails in this way the engine becomes even hotter causing more hot spots and more steam.

Evans waterless coolants will not boil around these Engine hotspots maintaining efficient cooling performance even when the engine is put under extreme conditions. When water turns to steam it pressurises the cooling system putting strain on hoses and other components. The significantly higher boiling point of Evans coolants means 75% less pressure than water resulting in a less stressed cooling system.

Water contains oxygen which causes corrosion and also allows electrolytic activity which further damages engine metals. Evans waterless coolants eliminate corrosion and electrolytic activity significantly increasing the life of the engine.



Why is “Waterless” so Important?

What is GOOD about water in coolant?

- Water has been the choice for cooling engines for over 100 years for very good reasons:
 - Water is cheap.
 - Water is available.
 - Water has **superior** thermal conductivity in its **liquid state**.

What is BAD about water in coolant?

- The low boiling point of water (**100°C to 104°C**) becomes the **failure temperature** of traditional cooling systems.
- Water is corrosive.
- Water quality is inconsistent
- Water retains just **4%** of it's thermal conductivity when it changes to vapor.
- Water promotes electrolysis

The energy that it takes to maintain coolant temperatures below the boiling point of water is a huge waste of fuel.



NO WATER NO CORROSION

Water is the root cause of corrosion in engines. Current antifreeze formulations regularly fail to prevent cavitation, oxidation and galvanic action, eating away pumps, radiators, liners etc. Corrosion build-up, inhibitor drop-out and lime-scale precipitation significantly reduces heat transfer efficiency and accelerates overheating.

Evans Waterless Coolants eliminate all causes of cooling system corrosion





NO WATER NO OVERHEATING

The operating temperature of an engine is very close to the boiling point of water.

Hotspots within the cooling system can lead to localised boiling, generating steam which increases system pressure and prevents effective cooling.

Evans Waterless Coolants have a boiling point of over 190°C, far above the operating temperature of the engine. The high boiling point ensures that the coolant remains liquid at all times enabling consistently effective cooling.





NO WATER NO PRESSURE

Hotspots within the engine cooling system cause localised boiling. The steam generated significantly increases the pressure within the system putting stress on hoses and other components.

Evans Waterless Coolants have a boiling point of above 190°C and will not vaporise within the cooling system.

Cooling system pressure is greatly reduced.





NO WATER NO LINER PITTING

As water flows through an engine cooling system it is subjected to many obstacles and constrictions. The resulting turbulence creates rapid changes in pressure forcing small pockets of water to vaporise.

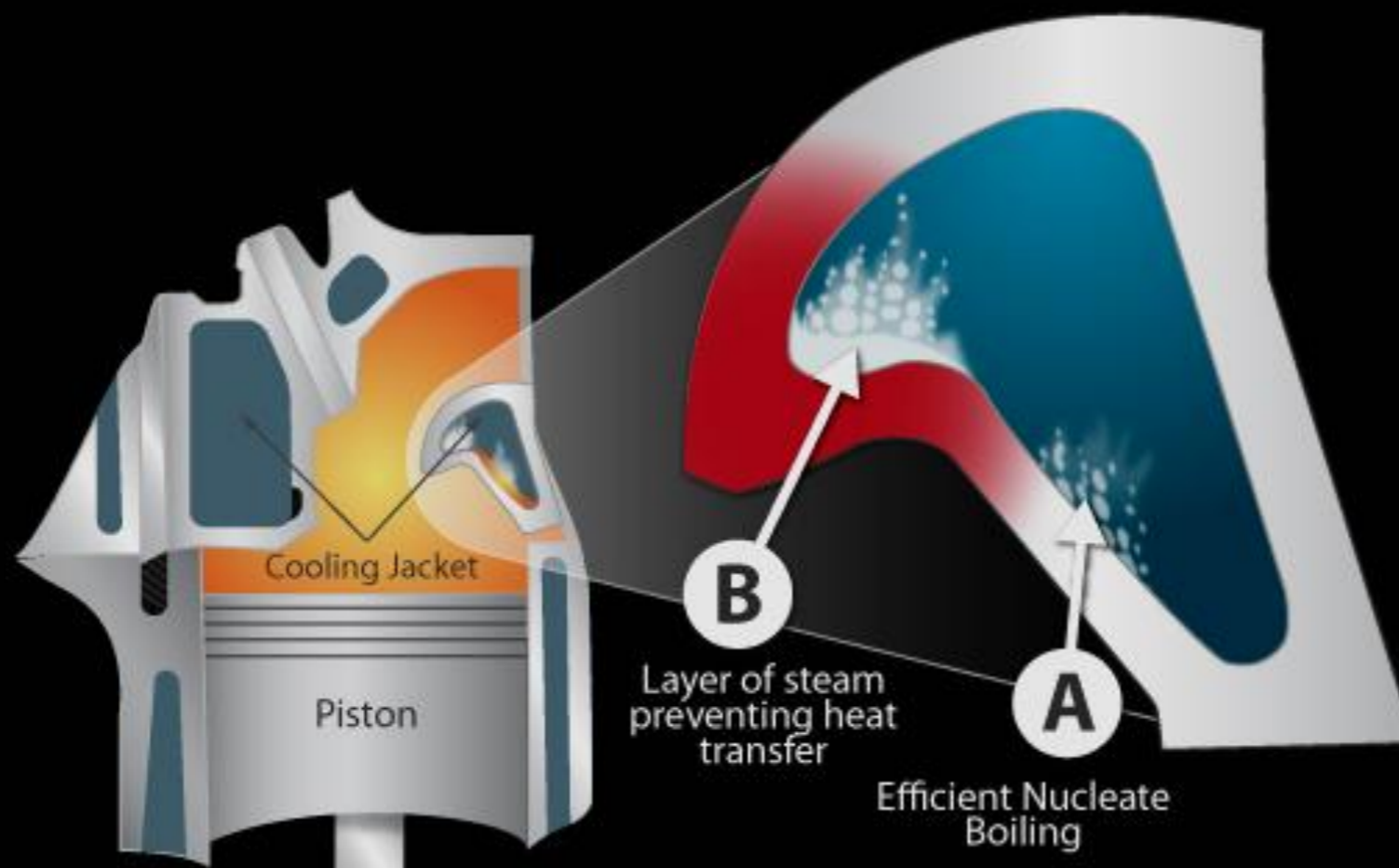
This process produces voids in the liquid known as "cavitation bubbles". As the pressure normalises the bubbles collapse generating forces great enough to punch holes in the surrounding metal. Evans Waterless Coolants are far less likely to vaporise when subjected to the turbulent pressure changes. Tests performed by the Southwest Research Institute conducted on behalf of John Deere concluded that Evans Waterless Coolants achieved results that can not be matched by any water based coolant.



Physical Limitations of Water

Within an engine cooling system the hottest surfaces are those adjacent to the combustion chamber, specifically the cylinder liners and cylinder head. Evans have proven that in these areas Glycol-Water mixtures regularly cross the thermal boundary that separates Efficient Nucleate Boiling (B in Fig.1) from Inefficient Critical Heat Flux (CHF).

CHF is synonymous with the condition Departure from Nucleate Boiling (DNB). When DNB occurs in an engine cooling system a film of steam bubbles form adjacent to the engine hot-spots (A in Fig.1). This is also referred to as Film Boiling. Because steam dissipates less than 1/30th of the heat that water does, local metal temperatures over-heat rapidly.



Chemical Limitations of Water

Water when heated drives off a significant proportion of dissolved oxygen, but as it cools reabsorbs fresh oxygen. This cycle leads to a perpetual cycle of corrosion, which is accentuated in classic vehicles with no expansion chamber.

Water also acts as an electrolyte if dissolved solids, such as hardness salts (lime scale) etc., are present. This promotes galvanic corrosion where metals of high nobility sacrifice themselves to metals of lower nobility – this is often manifested by pitting.

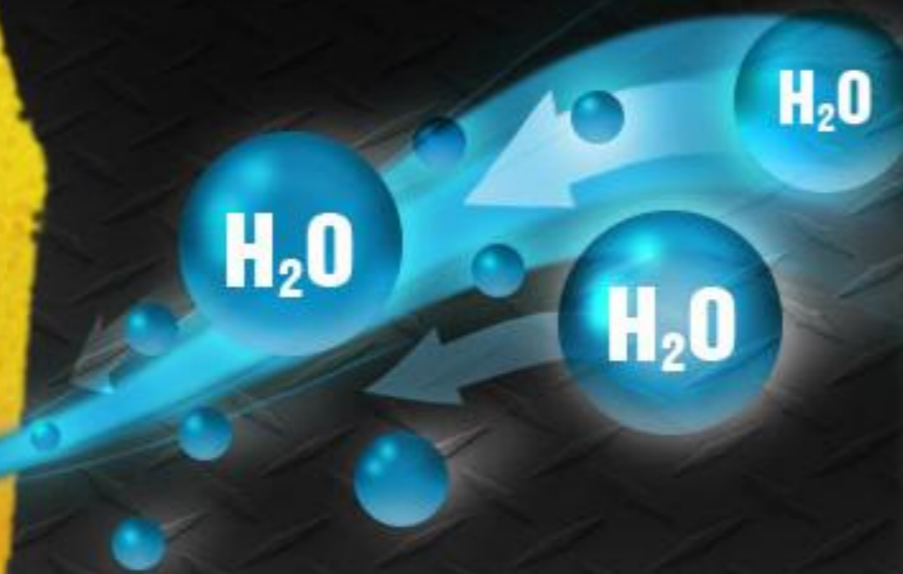
Corrosion inhibitor formulations have changed many times over the years, but not always for the better. Nitrite, silicate, borate and azole based products have been around for many years, with Organic Acid Technology (OAT) inhibitors appearing more recently. OAT formulations are often branded as ‘Long-Life’ based on their five year life-span, compared with 1-2 years for standard antifreeze formulations. Although OAT-EG-Water mixtures are now used in most new car engines, they have proven less successful in older vehicles and heavy duty diesel engines (HDDE). After several years of trying OAT based products many HDDE OEMs and fleet operators reverted to nitrite and/or Hybrid OAT (HOAT) formulations. One reason for this u-turn was that OAT formulations offer little protection against liner pitting.

To maintain effective inhibitor levels it is often necessary to retro-dose with Supplemental Coolant Additives or SCAs. It is common for SCA's to be under or over dosed leading to accelerated corrosion rates, cylinder liner pitting or blocking up of radiator channels with congealed inhibitor.

Evans Waterless Coolants contain little oxygen and are comparatively poor conductors in comparison to water based coolants. Subsequently metal corrosion and coolant degradation is eliminated. For these reasons Evans Waterless Engine Coolants can be considered 4LIFE!

Evans Prep Fluid

Waterless Engine Flush
for all engine types



Prep Fluid

Waterless Engine Flush

conversion fluid for all engine flush

Evans Prep Fluid is formulated to hygroscopically absorb water whilst flushing loose dirt and scale from the cooling system prior to filling with Evans Waterless Coolant.

Convert your engine



1. Draining the System

Whilst not essential we would recommend the engine is run until warm. This will help ensure any sediment is partially loosened and coolant viscosity lowered. Drain the existing coolant from the entire cooling system including the heater matrix and all hoses. Remember that antifreeze is toxic and should be collected and disposed of responsibly.

2. Using Evans Prep Fluid.

To further ensure that the cooling system is as free from water as possible we recommend Evans Prep Fluid. This hygroscopic fluid absorbs any residual water and removes any loose dirt and scale. Fill the system with Evans Prep Fluid and run the engine until normal operating temperature is reached. Allow to cool then drain.

3. Fill with Evans Waterless Coolant.

Fill the system with the appropriate Evans coolant. Run the engine until normal operating temperature is reached to displace any trapped air. After the initial fill check the coolant level and top up if necessary.

Provided the system is not left open to the atmosphere or accidentally contaminated with water it will last the life time of the engine. Forget long life, Evans is 4life!

Refractometer



All authorised Evans Installers **must** use a refractometer to ensure final fill of Evans Waterless Coolant does not contain greater than 3% water.



A 'Greener' way to cool your engine



TOXICITY: Evans waterless coolants contain an inhibitor that lowers the toxicity of ethylene glycol – safe for animals.

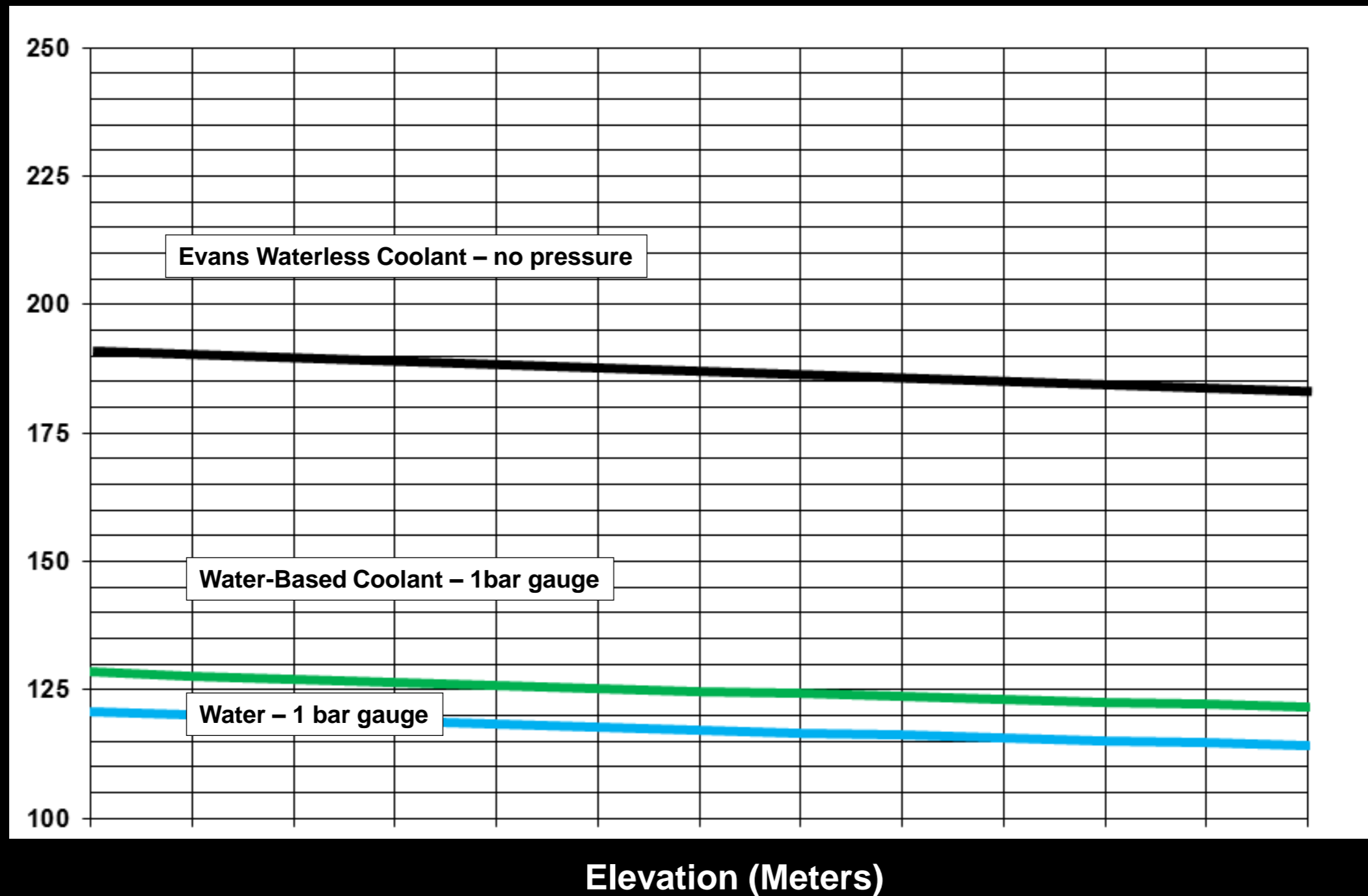
Considered essentially **non-toxic** by animal and in-vitro testing

Contains **Evans DETOX**, toxicity inhibitor technology

DISPOSAL: Eliminates future disposal of old coolant



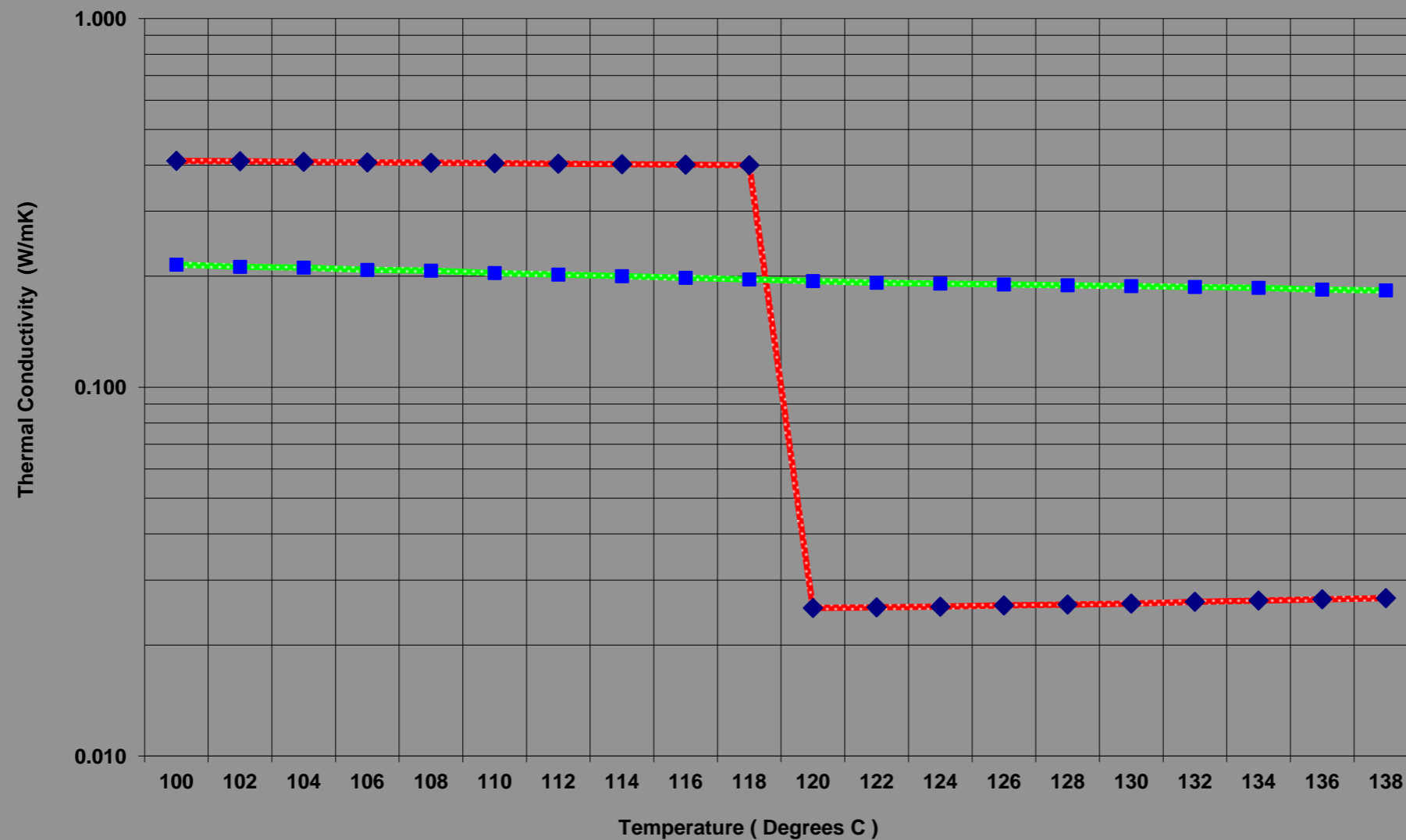
Boiling Point Comparison (Coolant Failure Temperature)



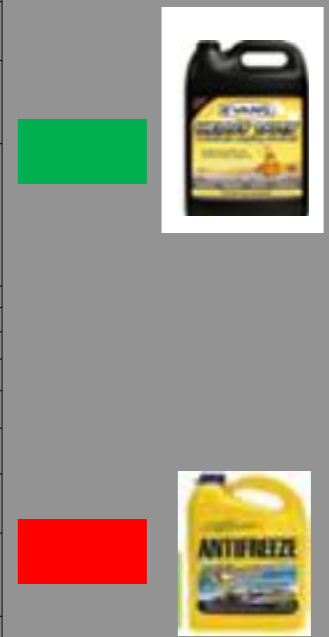
The coolant failure temperature is the boiling point of the coolant at the system pressure

Thermal Conductivity Comparison

Thermal Conductivity of the Liquid and Vapor Phases of
Water-Based Coolant vs Evans HDC
(The vapor phase of water-based coolant has almost no thermal conductivity.)



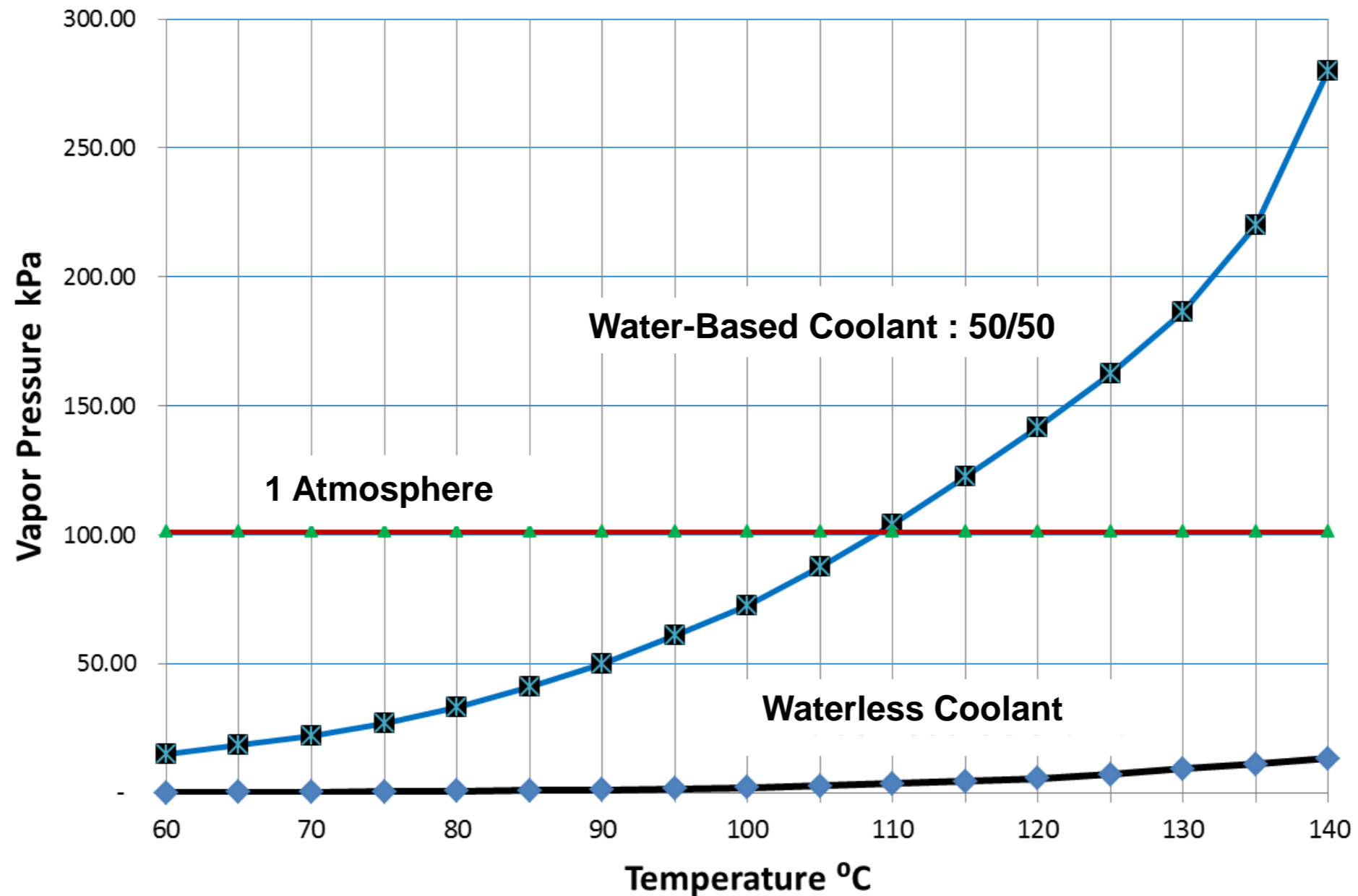
EGW 50%/50%, 100 kPa gauge Evans HDC, any pressure



System Pressure Comparison



Waterless Coolant vs. Water-Based Coolant



Rotax small aircraft engines.



- Rotax had a problem with take-offs in high ambient temperature regions.
- The coolant would boil over before reaching cooler temperatures aloft.
- Evans Waterless Coolant eliminated overheating
- Rotax recommends the use of Evans Coolants

Land, Sea, and Air

Hundreds of thousands of successful conversions worldwide in applications ranging from cars to aircraft to generators and heavy duty vehicles.

Most of these installations answer acute engine cooling problems that have defied solution by conventional coolant means.

Evans waterless coolants offer permanent solutions that save money *and* enhance performance.

Proven Economic, Environmental and Performance Advantages!!





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