DETROIT®

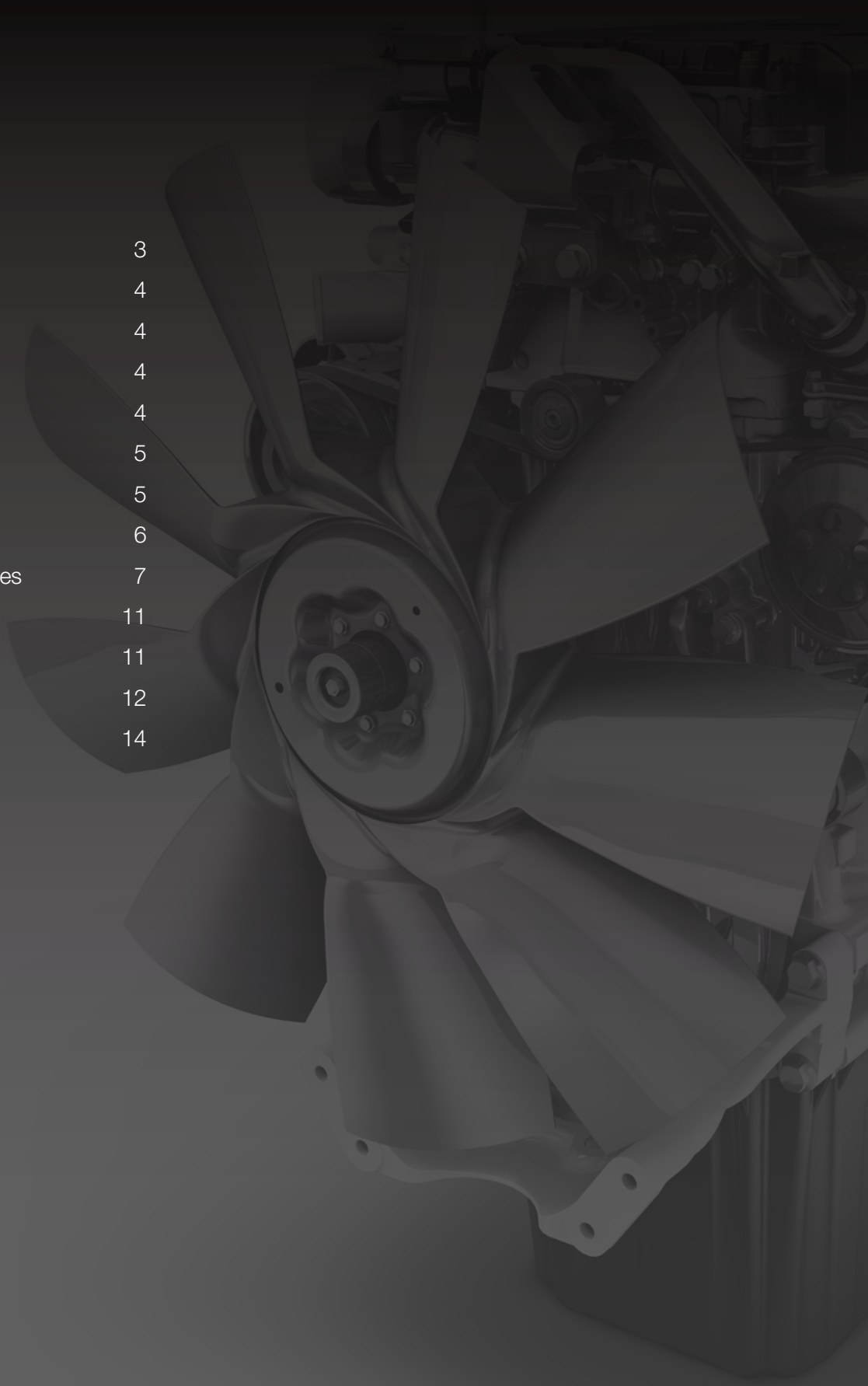
POWER COOL®

ON HIGHWAY COOLANT CATALOGUE 2023

PENSKE

Australia

CONTENTS

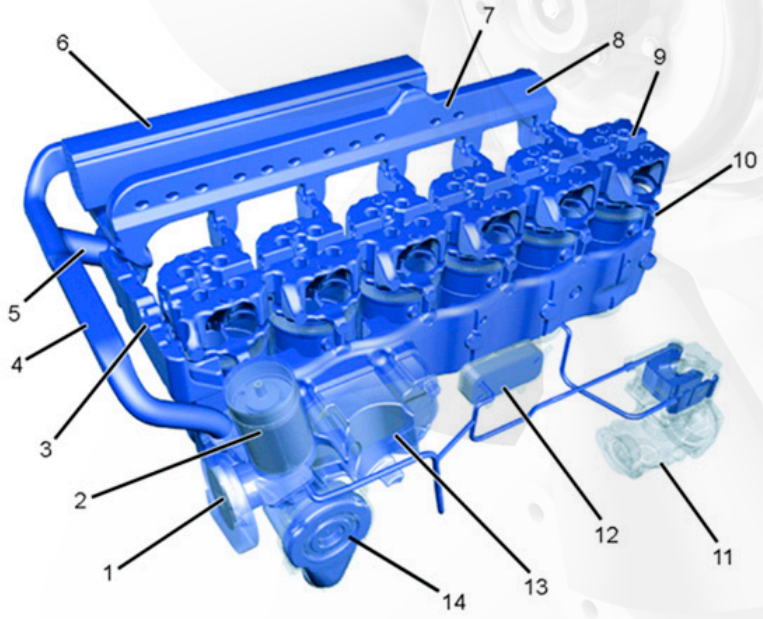


With as much as 30% of an engine's energy being released as heat, it is important that the OEM cooling system performs at peak efficiency. Paramount to this performance is the right coolant to meet the demands of the latest technology engines.

A coolant needs to:

- Provide an adequate heat transfer medium.
- Protect against cavitation damage to both cylinder liners and water pumps.
- Provide a corrosion/erosion-resistant environment.
- Prevent formation of scale or sludge deposits.
- Be compatible with cooling system hose and seal materials.
- Provide adequate freeze protection.

Having a coolant that can perform relentlessly over arduous kilometres without losing functional integrity is critical to protecting essential engine components and the longevity of your engine.



1. **Water Pump**
2. **Coolant Filter**
3. **Short Circuit Line**
4. **Coolant Return Flow**
5. **Coolant Outlet to Cooler Circuit**
6. **Exhaust Gas Recirculation Cooler**
7. **Coolant Return Flow**
8. **Water Manifold**
9. **Cylinder Head**
10. **Cylinder Block**
11. **Air Compressor**
12. **Fuel Cooler**
13. **Oil/Water Heat Exchanger**
14. **Thermostat**

In recent years the industry has expanded the range of coolants available to the heavy duty market. These coolants are split in to two main categories:

- Standard Life Coolant (SLC)
- Extended Life Coolant (ELC)

PRODUCT PORTFOLIO

PRODUCT	DESCRIPTION	COLOUR	PACK SIZES	PRODUCT SERVICE LIFE
PowerCool DDC Premix	Conventional coolant Containing Nitrite and Ethylene Glycol PREMIX 50%	**Fuschia Pink**	5L 20L 205L 1000L	2 Years 320,000 km 3,000 hours
Powercool Plus Extended Life	Organic Additive Technology Contains Ethylene Glycol Premix	**Red**	5L 20L 205L 1000L	4 Years 1,000,000 km 12,000 hours
PowerCool HB800	Hybrid coolant Containing Nitrite and Ethylene Glycol PREMIX 50%	**Luminescent Yellow**	20L 205L 1000L Bulk	4 Years 12,000 hours (3 Years/9,000 hours MTU)

POWERCOOL DDC PREMIX

FEATURES

- Conventional coolant
- Detroit approved 93K217
- Ethylene Glycol based
- Superior protection against:
  - Cavitation erosion
  - Corrosion
  - Scale build up

BENEFITS

- Premixed coolant 50% – no need for further dilution
- Low silicate
- Phosphate and amines free
- Aluminium compatible
- No Supplement Coolant Additive (SCA) required at initial fill
- Compatible with other conventional fully formulated engine coolants
- Compatible with Supplemental Coolant Additives (SCA)
- Service life: 2 years, 320,000km, 4,000 hours

APPLICATIONS

- On-highway engines (all brands)
- Complete mixed fleets

COMPATIBLE PRODUCTS

- Conventional ethylene glycol based coolant

PACK SIZES

- 5L, 20L, 205L, 1000L

POWERCOOL PLUS PREMIX

FEATURES

- Detroit approved 93K217
- Organic Acid Technology
- Nitrite, 2-EHA and Silicate free
- Ethylene Glycol based
- Free of borate, nitrite, amine and phosphate

BENEFITS

- Extended life: 4 years, 1,000,000 km, 12,000 hours
- Complete Mixed Fleet use; automotive, light and heavy duty diesel (North American, Asian and European OEM's)
- Universal compatibility. Can be added as top-up to any OAT coolant and colour antifreeze
- Protects against wet sleeve liner cavitation
- Enhanced water pump performance
- Fully compatible with OAT coolant technologies only
- Premixed, ready to use

APPLICATIONS

- On-highway engines (all brands)

COMPATIBLE PRODUCTS

Powercool Plus premix coolant utilises coolant specification formula that has approvals from OEMs listed below:

- Mercedes Benz 325.3 & 326.6
- Detroit DFS93K17
- Cummins CES14603
- *mtu* MTL 5048
- MAN 324 Typ SNF
- DEUTZ DQC CB-14
- Navistar CEMS B-1 Type III-A
- TMC RP 364
- ASTM D3306-20, D6210-17,
- D7583-16 D7820-19

PACK SIZES

- 5L, 20L, 205L, 1000L

POWERCOOL HB800 PREMIX

FEATURES

- Fully formulated hybrid technology (HOAT)
- MTU Approved A001061
- Contains Nitrite
- More robust than conventional engine coolants
- Low silicate, ethylene glycol based coolant
- Free of phosphates and amines
- Exceptional protection for cast iron surfaces
- Does not have Detroit 93K217 approval

BENEFITS

- Extended life: 4 years, 12,000 hours
- MTU approval : 3 Years/9,000 hours
  - Compatible with OAT and conventional coolants
  - Can be used as top up, until original drain interval is reached
- NO Supplemental Coolant Additive required
- Universal use: meets and exceeds industry standards
- Excellent wet sleeve liner protection against cavitation
- Premixed, controlled quality delivered ready for use

APPLICATIONS

- Off-highway – Not to be used in marine engines where sea water is warmer than 25ºC
- Mixed transport fleets (except Detroit On Highway)
- Mixed industrial fleets mining equipment

COMPATIBLE PRODUCTS

- CAT: Extended Life Coolant (ELC)

PACK SIZES

- 20L, 205L, 1000L, Bulk

FREQUENTLY ASKED QUESTIONS

WHAT DOES ENGINE COOLANT DO?

1. The primary function of a coolant is to remove heat from the engine
2. The secondary function is to provide anti-corrosion protection, anti-freeze and anti-boil.

ARE ALL COOLANTS THE SAME? IF NOT, WHAT IS THE DIFFERENCE?

No. High quality coolants such as the Powercool coolant range meet specific engine coolant performance standards for automotive and heavy duty diesel applications. Additionally, the glycol content, corrosion inhibitor package performance, anti-foaming, scale inhibitors, and heat transfer levels can differ.

The Powercool range meets industry and engine manufacturer coolant performance requirements, including Australian Standard AS 2108-2004 for Type A Coolants.

HOW DO I CHANGE THE ENGINE COOLANT?

See Changeover Procedure (page 11).

WHEN DO I CHANGE MY ENGINE COOLANT?

1. After any repairs or replacement to any engine cooling system component
2. When the coolant has been contaminated or topped up with water
3. When the warranty period of the coolant has expired
4. When the inhibitor and glycol level has depleted

WHY CAN'T I USE TAP WATER?

Water does not contain any corrosion inhibitors and will lead to metal corrosion. Additionally, it does not provide the boil over and freeze up protection that an ethylene glycol coolant provides. Water top ups to cooling systems have a negative effect on coolants. The water dilutes the corrosion inhibitor level, which lowers the cooling systems protection. Always top up with a compatible premixed coolant.

HOW SHOULD I DISPOSE OF MY OLD COOLANT?

Contact local authorities for the correct and responsible disposal regulations.

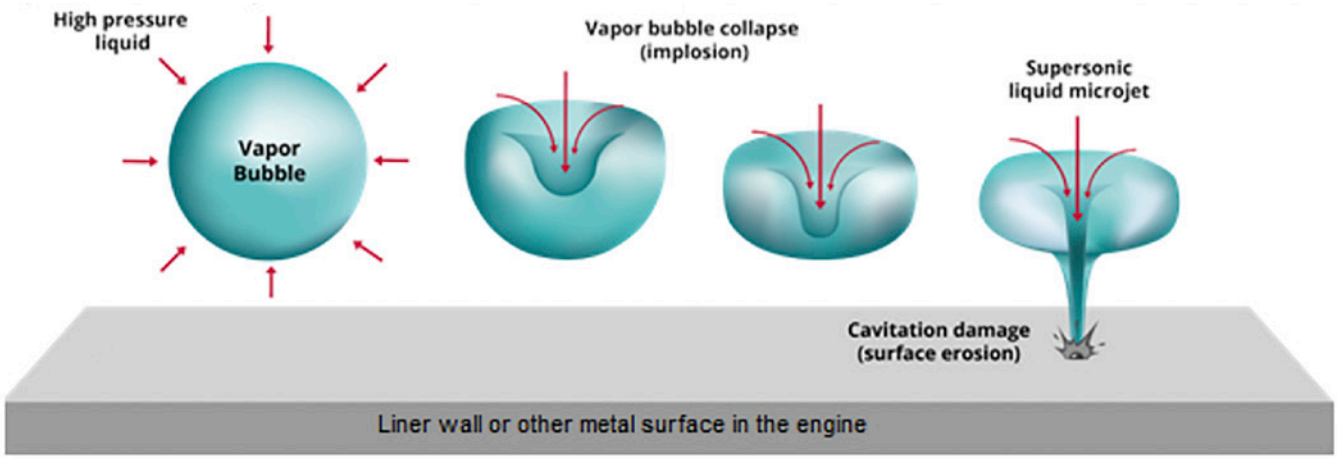
CAN I MIX COOLANTS?

If coolants are mixed the corrosion inhibitor stability and performance may be affected. All engine coolant manufacturers should recommend NO MIXING of different coolants.

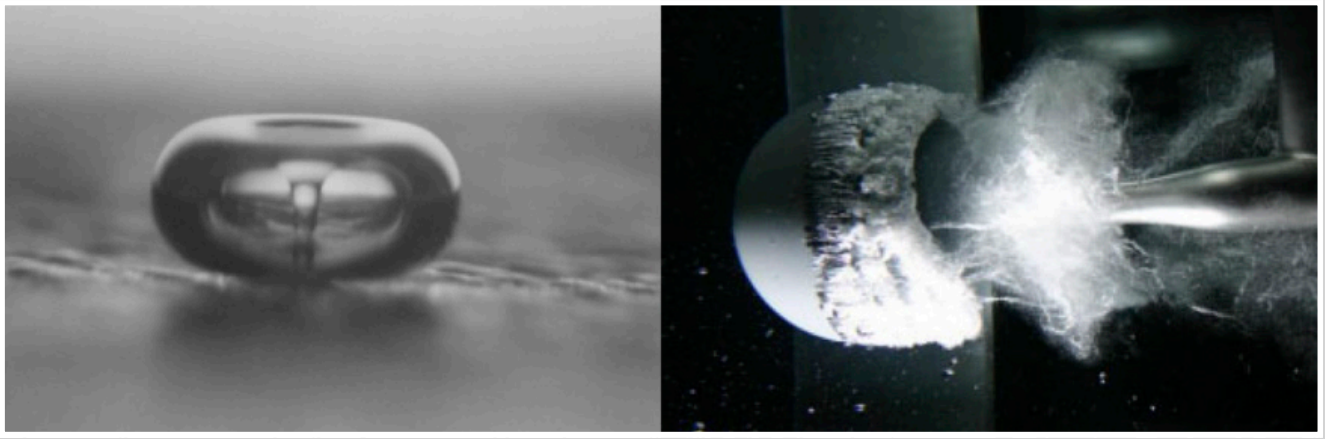
WHY WE NEED COOLANT

CAVITATION

VAPOROUS CAVITATION is an ebullition (boiling) process that takes place if a bubble grows explosively in an unbounded manner as liquid rapidly changes into vapor. This situation occurs when the pressure level goes below the vapor pressure of the liquid. Vaporous cavitation causes cavitation wear (or pitting) that can erode un-protected metal components due to the shockwaves and micro jets that act on the surfaces directly in contact with Vapor Cavities (Bubbles). The below illustration is a characterization of the Vaporous Cavitation wear process on an unprotected metal surface:



Below are a couple of magnified vapor bubbles, on the left is a vapor cavity showing the high pressure 'funneling' directly into the surface below. This pinpoint jet of high pressure is the beginning of surface degradation leading to Cavitation wear, (pitting). The picture on the right is the burst of a vapor bubble on the edge of a metal vane, (as found in a fluid pump).



HOW DOES CAVITATION WEAR (EROSION) OCCUR IN A HEAVY DUTY DIESEL ENGINE?

When the engine is running, the pistons move inside their liners they cause the cylinder liner to vibrate, similar to the effect of ringing a bell. As the cylinder wall moves back during a vibration cycle, a vacuum forms for a brief instance, resulting in vapor bubbles in the coolant. When the coolant column vibrates back, the vapor bubbles implode and the jet of water funneling back onto the cylinder liner causes material erosion.

Left unchecked, these cavities can keeping growing and eventually penetrate the liner, allowing oil and coolant to mix. Once that happens, it's only a matter of time before the engine fails.

AERATION

- Air leaks into the cooling system will promote foam generation in the coolant
- This in turn promotes pitting which is most noticeable around water pump impellers
- Inhibitor packages contain anti-foaming additives

RUST AND CORROSION

- Cast iron surfaces in a corrosive coolant will form iron oxide or rust on the iron surface. Other metals, likewise, form oxide layers but corrode at different rates depending on the condition of the coolant. The colour of these various corrosion products vary from red, green or black depending on the oxide that is formed.
- A major factor that has direct impact on the rate of corrosion on any of the metals is the coolant's pH level. If a coolant's pH drops below 7.5, it will become aggressive to ferrous metals (cast iron and steel), copper and brass. If it increases above 11, it will become aggressive to aluminium and solder in a cooling system.
- Corrosion rates are directly related to the coolant temperature. As coolant temperature increases, so does the corrosion. Corrosion rates can double with every (13°C - 28°C) rise in temperature up to 71°C, where further increases in temperature have little effect.
- Other causes of corrosion are dissolved solids, Chlorides and Sulphates and combustion leakage.

SCALE

Cooling system deposits, such as hard water scale can form on cooling system surfaces. These deposits prevent heat from transferring to the coolant. Scale 3mm thick can reduce cooling system heat transfer by 40%. The deposits generated accelerate wear and reduce heat transfer

The reduced heat transfer to the coolant causes overheating of the engine and may result in warping of components. It is not uncommon to have cracked heads or blocks, deterioration of hose, loss of power, oil contamination and exhaust system failures when an overheated condition exists.

The formation of scale on hot metal cooling system surfaces is affected by many conditions that occur in a cooling system:

- Water hardness – The harder the water being used in the coolant, the greater the amount of scale formation.
- Temperature – As coolant temperature increase, hardness salts (calcium and magnesium) in solution become less soluble and increase scale on hot metal cooling system surfaces.
- High phosphate – The use of high phosphate levels in anti freeze and supplement coolant additives will react with hard water to form scale.
- Corrosion due to scale deposits – Scale deposits in a cooling system lead to localised corrosion underneath the outlying boundaries of the scale deposit.

Problems that result from Scale formation

- Leaky water pump seals
- Cracked and warped heads
- Piston ring scuffing and breaking
- High oil temperature and oil breakdown
- Thermostat failures
- Restriction of coolant in return lines

For more information on rust corrosion and scale refer to ddc-svc-bro-0077

SILCATE GELATION

Sodium silicate is added to coolant to protect aluminium surfaces from corrosion and pitting. Silicate gelation is the tendency for the added silicate to drop out of the solution and from a jelly like substance that will plug radiators, heater, aftercoolers and other parts of the cooling system.

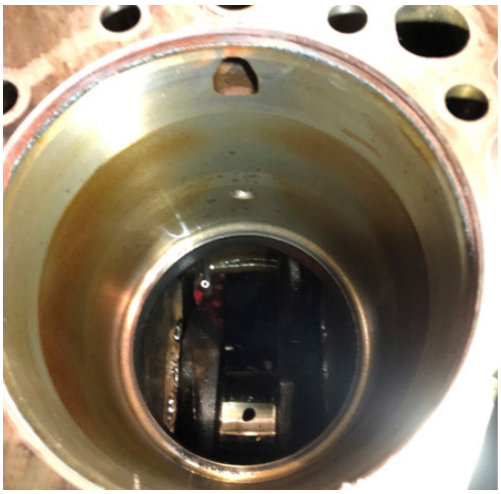
This drop out of silicate can be attributed to a combination of factors and cooling system interactions such as:

- Higher amounts of silicate and phosphate in coolant
- Hotter engines
- Aftercoolers
- Additive packages
- Mixing coolants

When coolant is overconcentrated, the excess silicate will drop out of the coolant and form a silicate gel on heat transfer surfaces. This result is reduced coolant flow and engine overheating.

PROPER MAINTENANCE

This pictures below show an engine that has had its coolant properly maintained for over 1,200,000 kms.



CHANGEOVER PROCEDURE

DRAIN, FLUSH, FILL

DRAIN

Drain all existing coolant fluid from the cooling system and dispose of it in accordance with standard coolant disposal processes (bearing in mind that used coolant fluid may be considered hazardous waste).

FLUSH

Flushing can be conducted with water (rather than flushing with new PowerCool coolant). Therefore, thoroughly flush the cooling system with good quality water (demineralised or deionised).

Refer to PPS bulletins LSB14-05 and TSD13-04 for more details.

COOLANT TESTING

Penske Australia has developed a coolant test kit to for a number of different coolant properties and a test sheet to match the test kit.

This kit contains a Refractometer, pH Meter, OAT test strips & Nitrite drop test kit.

The below items can be purchased as a complete set or as individual pieces from any Penske Australia branch.

- Refractometers can be used to determine level of EG and PG
- Test strips can be used to measure inhibitor content level (calibrated to specific coolant types)
- pH determination by test strip or handheld pH meter
- Coolant sampling and laboratory analysis is recommended as best practice (using Penske sample kit)
- Refer to Penske bulletin LSB 21-11 for more details
- Conventional coolant should be tested with test kit at every service. OAT coolant only requires PH testing every service and requires a lab test every 12 months or 160,000 km.

Sample kit allows for detailed laboratory analysis

BEST PRACTICE

Coolant is an important functional fluid in an engine. Therefore the following should be put in practice:

- When in doubt about the cooling fluid currently in use: drain, flush, and replace with new coolant
- When topping up, make sure that the cooling fluid in use is in good, and clean condition
- When topping up, always use the same coolant
- When mixing two different coolants together, the service life is compromised
- If in doubt seek advice. Technical support is available (nationally) in a timely manner

SIMPLE REFRACTOMETER

TEST KIT

COOLANT SAMPLE KIT POWERKIT

MANUFACTURER WARRANTY

RECOCHEM AUSTRALIA MANUFACTURER WARRANTY FOR THE POWERCOOL RANGE OF PRODUCTS (GLYCOL AND WATER BASED COOLANTS)

On the understanding that there is not a coolant in the global market that is approved by all OEM's, Recochem Inc. recommends the POWERCOOL coolant range, for use in all heavy duty diesel applications and engines including but not limited to Cummins, Caterpillar, Komatsu and MTU.

1. POWERCOOL coolant range has a limited warranty of up to 1,000,000 km or 12,000 hours or 4 years, which ever comes first in heavy-duty diesel applications as outlined in the Recochem product data sheet for this product.
2. POWERCOOL coolant range must be used and maintained in accordance with the engine manufacturer coolant maintenance schedule and recommendations for water based OAT engine coolant.
3. Premixing of any POWERCOOL concentrates to the required dilution must be carried out with de-ionised water. In accordance with the instructions stated in the manufacturer product data sheet.
4. If a coolant system component that comes into direct contact with the coolant is found to fail as a direct result of the failure of the engine coolant to fulfil its job within the stated warranty period, Recochem Inc. will have the failed part fixed or replaced at its discretion.
    - 4.1. In the event of a coolant related failure where rectification work is required to return the engine to service, all such repairs on MTU, Detroit and Mercedes Benz diesel engines will be performed at a Penske Power Systems facility or nominated authorised dealership.
    - 4.2. The rectification work referred to in 4.1 will be performed at factory warranty labour rates, times and parts pricing, with fair and reasonable remove, replace, and travel time.
5. This limited warranty does not cover normal wear and tear and applies if all the following conditions are met:
    - 5.1. The coolant system was in good shape at the time it was drained and flushed (cleaned if necessary) prior to the addition of the Recochem product as defined in Section 1 of this document.
    - 5.2. Only coolant properly made from Recochem POWERCOOL is present in the coolant system.
    - 5.3. All top up of the finished product made from Recochem POWERCOOL coolant is done using Recochem POWERCOOL coolant.
    - 5.4. The dilution water used, must meet OEM requirements for the quality of water used to make a water based coolant.
    - 5.5. The customer follows all the recommendations of Recochem Technical Service Department and the OEM with regards to installation, top-up and in-field monitoring of the product.
6. Recochem Inc. is not liable for failures or damage resulting from abuse, incorrect storage, modification (incorrect dilution and/or use of poor quality water), neglect or misuse of POWERCOOL CONCENTRATE and the finished coolant made from it.
7. This warranty is conditional upon the customer providing written notice of any claim pursuant to this warranty, and Recochem Inc. being satisfied that:
    - 7.1. POWERCOOL coolant was defective as received in its original unopened container.
    - 7.2. OR that POWERCOOL coolant was received used and maintained properly but did not perform to stated claims.
8. The written notice of claim must include, at a minimum, a description of the issue, the failed part, a sample of the coolant in the system at time of failure and the maintenance records for the failed unit.
9. Recochem Inc.'s warranty is limited to the claims of product meeting stated specifications.

10. LIMITATION OF LIABILITY

Notwithstanding any other provision herein, the products are provided by Recochem to the customer with no other conditions, representations and warranties whatsoever. In no event shall Recochem and its affiliated entities be liable in contract, tort or otherwise to any person or entity for any direct, indirect, incidental, punitive, special or consequential damages, including, without limitation, any damages resulting from loss of use, business interruption, loss of profits and/or revenue, loss of savings, the cost of procurement of substituted goods.

POWERCOOL WARRANTY CLAIM PROCEDURE

1. If a coolant issue arises in the field, the customer representative is to contact the Recochem Account Manager or Recochem Technical Team immediately with the details regarding the failure.
2. Details should include:
    - The equipment make and model
    - How the coolant was added, i.e. was the coolant added to a product already in the system or was the system was drained, flushed and filled and the fill used was the Recochem product?
    - The condition of the coolant system prior to the addition of the Recochem water based OAT engine coolant?
    - All maintenance records before and during the use of the Recochem water based coolant
    - What has been used for cooling system top-ups
    - Number of km's/hours since last coolant change
    - Any data on the operation of the coolant system prior to and during the in-field use of the Recochem water based coolant an example may be does the cooling system tend to overheat?
    - A description of cooling system failure
3. The customer must retain the failed component (until needed by Recochem) and provide a 1000 ml sample to Recochem Inc. for evaluation.

The coolant sample is to be labelled and sent to this address:

Recochem Inc.
Att: Recochem Laboratory
PO Box 478
Wynnum QLD 4178

Recochem Inc. will initiate an evaluation of the coolant sample to determine the "root cause" of the cooling system failure. Recochem Inc. will provide a report outlining the likely cause of the failure, and future preventative actions.

PENSKE AUSTRALIA BRANCH NETWORK

Contact your local Penske Australia branch for engine parts and service support.

VICTORIA

Melbourne
488 Blackshaws Road
Altona North
Victoria 3025
Ph: 03 9243 9292

NEW SOUTH WALES

Sydney
78-82 Riverside Road
Chipping Norton
New South Wales 2170
Ph: 02 9794 2600

Hunter Valley
42-44 Enterprise Crescent
McDougalls Hill
New South Wales 2330
Ph: 02 6572 1012

NORTHERN TERRITORY

Darwin
18 Mendis Road
East Arm
Northern Territory 0822
Ph: 08 8998 9700

SOUTH AUSTRALIA

Adelaide
103-107 West Avenue
Edinburgh
South Australia 5111
Ph: 08 8209 0000

TASMANIA

Launceston
225 Georgetown Road
Rocherlea
Tasmania 7248
Ph: 03 6325 0000

QUEENSLAND

Brisbane
196 Viking Drive
Wacol
Queensland 4076
Ph: 07 3877 6060

Cairns
60 Buchan Street
Portsmith
Queensland 4870
Ph: 07 4042 9200

Lytton
Unit 2/52 Trade Street
Lytton
Queensland 4178
Ph: 0721007600

Mackay
17 Commercial Avenue
Paget
Queensland 4740
Ph: 07 4952 8500

Townsville
Cnr Ingham Road
& Ronald Court
Mount Louisa
Queensland 4814
Ph: 07 4412 0300

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22 Stockyards Lane
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