

Abrasive Solids

Corrosion inhibitors and hard water components that have come out of the coolant solutions and may lead to premature water pump failure and to plugging of cooling system components such as radiator and heat exchangers

Additive Package

Inorganic or organic chemicals in all coolants that provide corrosion protection for cooling system components. The additive package may also contain anti foam and anti scaling agents as well as dyes for identification purposes

Antifreeze

A glycol (usually ethylene glycol or sometimes propylene glycol) mixed with water and an additive package used as a heat transfer fluid in engines. By using an appropriate ratio of glycol to water, effective protection is provided against cold weather freezing as well as boil over under hot conditions.

ASTM

The American Society for Testing and Materials, develops and provides laboratory and performance specifications for automotive (ASTM D3306) and heavy duty (ASTM D 4985 and 6210) coolants.

Automotive Coolant

A coolant intended for automotive and light duty applications. Automotive coolants are not fully formulated and will require a pre-charge of supplemental coolant additives when used in a heavy duty application.

Blank Filter

For engine cooling systems so equipped, a filter that contains a porous filter media but no additional additive components. A blank filter can be used to remove abrasive solids from a coolant.

Bitterant

A chemical component, often denatonium benzoate, added to render coolant unpalatable to animals and small children. Used to reduce the risk of inadvertent poisoning due to accidental ingestion.

Borate

An inorganic corrosion inhibitor often present as a key component in the additive package of traditional coolants. Borate salts provide protection for cast iron components as well as provide a buffering capacity to the coolant

Buffers

A coolant additive, such as borate, used to retard coolant pH drops. With age and high temperature use, the glycol component of coolants may tend to oxidize, forming acidic components and a drop in pH which in turn will accelerate corrosion (rusting) of metal cooling system parts. A buffer helps to prevent this pH drop and extend the life of the coolant.

Carboxylate

An organic corrosion inhibitor present as a key component in the additive package of Organic Additive Technology coolants (OAT, carboxylate coolant, extended life coolant.) Carboxylates may also be present in hybrid coolants in combination with inorganic inhibitors. Carboxylate inhibitors provide protection against corrosion for cooling system components are often distinguished from inorganic inhibitors in that they deplete or are used up at a very slow rate, thus providing extended life coolant properties

Cavitation

A physical process of vacuum bubble formation occurring in liquids due to the mechanical vibrations (as at cylinder liner walls) or due to high speed flow changes (as with water pump impellers.) Cavitation can cause damage to the metal surfaces unless proper protection is provided by the coolants additive package

Chemical Filter

For engine cooling systems so equipped, a filter that contains a porous filter media as well as an additive package. The additive package, sometimes referred to as a Supplemental Coolant Additive, will dissolve from the chemical filter and enter the coolant stream to reconstitute corrosion inhibitors that have depleted as the coolant ages. Chemical filters may be added as often as every 15,000 miles depending on the type of coolant used and the coolant manufacturer's recommendations.

Chloride

An aggressive or corrosive component to be minimized in coolants. Chloride is present in all tap water and can find its way into an engine's cooling system by top-off. When chloride levels become high (greater than 100 ppm) the coolant can become corrosive to metal components. Most prediluted coolants are made with distilled water that contains no chloride.

Class 8 Trucks

A on-road truck with a total gross vehicle weight (GVW) of 33,001+ lbs.

Color

A coolant is often colored by the addition of small quantities of dye. The coolant color can be used to help identify the intended application of a new, unused (as specified by TMC's recommended practice 351). With use a coolant's color can change, due to contamination, and has limited value in identifying the coolant type or quality.

Coolant Compatibility

The ability of a coolant of one type to be mixed with another coolant of a different type and to still maintain desired coolant properties; the ability to maintain corrosion protection upon mixing with another coolant product. Compatibility can also refer to the ability to be mixed with supplemental coolant additive without the formation of deposits and precipitates.

Coolant Filters (See Chemical filters)

Coolant filters are mechanical, canister devices that are placed in the line of coolant flow on engines so equipped by the OEM. A coolant filter can be used to remove debris and abrasive solids from the coolant (blank filter). A coolant filter can be used to add supplemental coolant additive to the coolant to reconstitute depleted corrosion inhibitors (chemical filter). All filters must be replaced periodically in order to remain effective. Chemical filters may need to be replaced as often as every 15,000 miles to assure adequate corrosion inhibition when using traditional coolants.

Concentrate

A form of coolant commercially available that does not contain significant amounts of water but is largely glycol and additive package. A concentrate must be mixed with good quality water before it can be used to fill a cooling system. Concentrates are typically mixed 40/60 to 60/40 with water and are most often used as a 50/50 mixture. Concentrates can also be used to adjust the freeze point of a coolant already in use. Addition of concentrate, up to 60% overall will increase a coolant's freeze protection. Levels above 60% are not recommended as freeze protection at very high concentration is actually lost.

Contamination

The inadvertent addition or presence of a component in a coolant that may reduce the effectiveness of the coolant to provide corrosion protection or freeze/boil protection. Contamination can result from a fuel or oil leak to the cooling system.

Corrosion

Damage to cooling system metal components due to improper coolant protection. Corrosion can lead to component failure, leaks and system plugs and occurs when a coolant is not properly maintained. With traditional coolants, failure to add supplemental coolant additives and chemical filters at the appropriate time may lead to corrosion. Failure to replace a coolant after the manufacturers recommended life may lead to corrosion.

Corrosion Metals

Active corrosion will result in the formation of corrosion metals in the coolant as metallic components pit and degrade when an improperly maintained coolant is used. Laboratory analysis for corrosion metals can be used to indicate that corrosion is occurring and that corrective action is needed. Typical corrosion metals include: iron, aluminum, copper and lead.

Cylinder Liner

In heavy duty diesel applications, the cylinder walls that make up the combustion chamber are very often removable to expedite inspection and repair if needed. Cylinder liners on some engines are prone to cavitation corrosion and require proper corrosion inhibition. Nitrite is a corrosion inhibitor that is often present in supplemental coolant additive and chemical filters and must be continually replenished in traditional coolant to maintain cylinder liner corrosion protection.

Depletion

The normal loss of corrosion inhibitors through routine use in an engine's cooling system. Inhibitor depletion in traditional coolant technology requires the use of supplemental coolant additives to maintain a minimum concentration for corrosion protection.

Deposits

Deposits refer to the formation of solid layers coating the walls of the cooling system or blocking narrow coolant passages as in the radiator and heat core. Deposits, called scale will form on the hotter zones in the cooling system due to the use of hard water containing magnesium and calcium. Deposits can also form when traditional corrosion inhibitor such as silicates, fall out of the coolant and are carried to narrow sections of the system where plugging may occur. Finally, deposits can be formed from corrosion products and lead to plugging. Solder bloom is one such deposit.

Dilution

The unintentional mixing of a coolant with either water or with another type of coolant that results in a reduction in corrosion inhibitor concentration or a reduction in freeze protection.

EG

Ethylene glycol, a major component in most coolants that is added to provide freeze protection as well as boil protection. EG must be properly mixed with water in order to provide correct freeze protection.

EGR

Exhaust Gas Recirculation - an engine configuration in which 15% or more of the exhaust is recycled back to the intake in a strategy to reduce emissions by reducing the maximum combustion temperatures. Because recycled exhaust gas must be cooled before it is mixed with fresh air and fuel, EGR equipped engines have a special exhaust gas cooler which can increase the amount of heat to the cooling system by as much as 30%; This may cause an increased coolant temperatures up to 230oF.

Elastomers

Elastomers are present throughout the engines cooling system and are present in seals and gaskets used to contain coolant as it passes from one section of the cooling system to another. The inadvertent presence of fuel and oils in the coolant can lead to premature elastomer (seal) failure. Elastomers should be carefully chosen for the conditions to which they will be applied. Use of an elastomer at a higher temperature than it was designed for can lead to premature failure

Extended Life Coolant

A name often applied to carboxylate or organic acid technology coolants because of the demonstrated ability of certain carboxylates to provide protection to 300,000 miles and beyond without refortification or the need for supplemental coolant additive. Not all Extended Life Coolants are the same. Many recently available may lack the real world demonstrate ability to protect to high mileages.

Extended Service Interval Coolant

Traditional coolant technology using inorganic corrosion inhibitors and requiring refortification by means of an Extended Service Filter.

Extender

A very concentrated solution of corrosion inhibitors to be added to used coolant to refortify some of those inhibitors that deplete. An extender does not contain a full complement of inhibitors but only those that are known to deplete. Unlike SCA's and chemical filters, extenders are typically used only once in the life of the coolant, typically after 300,000 miles of service.

Extended Service Interval Filter

An extended service interval filter is a special form of a chemical filter in which supplemental coolant additive are released gradually, over the life time of the filter to refortify inhibitors that are depleting from a traditional coolant technology. ESI filters by using timed-release technology are changed less frequently than traditional chemical filters. An ESI filter may last to 125,000 miles before change out is required. An ESI filter is usually larger and more expensive than a traditional chemical filter because it contains several doses of refortification in one canister.

FleetFix™

A system of Extended Life Coolant products from ChevronTexaco that includes a FleetFix™ test strip to detect over dilution with traditional coolants and a FleetFix™ liquid to restore an cooling system on Extended Life Coolant that has become overdiluted with traditional coolant.

Flush and Fill

A preferred method when converting a cooling system from traditional coolant technology to Extended Life Coolants; the procedure entails draining the used coolant and then flushing the system with water to remove any collected debris including abrasive solids and spent, traditional corrosion inhibitors, followed by filling with 50/50 Prediluted Extended Life Coolant.

Foaming

A potential problem, occurring during rapid coolant filling operations as at the OEM factory. Foaming can lead to underfill situations and air entrainment. All good coolants will contain anti-foam agents as part of their add pack to eliminate foaming tendencies

Freeze Point

From a cooling system perspective, the freeze point is the temperature to which a coolant can be cooled without causing freeze damage. All coolant containing water expand upon freezing and will rupture/crack a cooling system if allowed to go below their freeze point. In glycol based coolants, freeze point is controlled by controlling the glycol to water ratio. A 50/50 ratio is considered optimum for most application

Fully Formulated Coolants

A heavy-duty diesel engine coolant that does not require additional fortification before use. Fully formulated coolants, as specified by ASTM D6210 will contain sufficient inhibition, at least initially, for full cylinder liner cavitation protection.

Gasket Seals

An elastomeric seal, typically mounted to a support structure or gasket that forms a water tight connection between the coolant passages of facing components. Gasket seals will be found on the head gasket and used to connect coolant passages from the head to the block. Multiple seals are often formed by a single gasket.

Gelation

A problem with conventional coolant technology where inorganic inhibitors unintentionally separate from the coolant upon storage or under certain conditions in the cooling system. Gellation is undesirable because it can lead to cooling system plugging and abrasive damage. It indicates that the coolant has been depleted of certain needed inhibitors. Extended Life coolant do not suffer from this gellation problem.

Gen Set

A gen set is a stationary power plant that consists of an engine, typically a heavy duty diesel engine as well as a dynamo or generator to produce electricity.

Glycol

A key coolant component present in most commercially available products. Glycol is present to provide both freeze protection as well as boiling protection as it lowers freeze point and raises boiling point when properly mixed with water. The glycol most commonly used in coolant is ethylene glycol. Propylene glycol is also used for those applications where accidental release to the environment is a special concern. Both forms of glycol are toxic however.

Green Goo

Upon improper or extended storage, a traditional coolant (often dyed green) will undergo a gellation process where some of its inhibitors will separate from the coolant and form a gel or goo which can lead to a plugged cooling system. Extended Life coolant do not suffer from this gellation problem.

Hard Water

Refers to water that contains excessive dissolved minerals such as calcium and magnesium. The use of hard water in cooling systems is to be avoided, especially with traditional coolants because these dissolved minerals can plate out on hot spots in the engine as scale and impede heat transfer. With scale formation, the hot spots get even hotter.

Heat transfer

Heat transfer is the coolant's number one job. A heavy duty diesel engine produces enough heat to warm 5 single family homes. About one third of that heat is removed by the engine's cooling system which transfers heat from the engine block to the radiator where it is dissipated.

Heat transfer fluids

The liquid used to transfer heat from a heat producer to a radiator. The coolant. Water is the most efficient heat transfer fluid. Because of water's freeze, boil and corrosive properties it can not be used alone and is used in combination with glycol and an additive package.

Heavy Duty (HD)

In internal combustion engine operation, characterized by average speeds, power output and internal temperatures that are generally close to the potential maximums that the engine was designed for. Heavy duty engines will often require a fully formulated coolant or Extended Life Coolant to meet corrosion protection needs.

High Silicate

Refers to the level of silicate corrosion inhibitors present in traditional and hybrid coolant technology. TMC RP 329 as well as ASTM D 4985 and D 6210 specify a maximum silicate level recommended for use in a cooling system, typically 125 ppm as elemental Si. Higher levels can lead to gellation, abrasive solids formation, reduced water pump life and impaired heat transfer capabilities.

Hot spots

A localized area, usually at the engine block but also present in charge air and exhaust coolers where temperatures can become excessive leading to part failure if adequate cooling is not provided. A location typically prone to scale formation, especially with traditional coolant technology.

Hybrid Coolant

A coolant that contains both traditional, inorganic corrosion inhibitors as well as organic acid technology. Performance is between that of either parent technology.

Hydrometer

A device used to measure a coolant's freeze protection by measuring density changes with varying glycol levels. Because hydrometers are notoriously prone to error, their use is not recommended for cooling system maintenance. Rather, freeze point should be determined using an appropriate refractometer.

Implosion

In reference to a cooling system, implosion refers to the collapse of vacuum bubbles in the coolant usually in the vicinity of the cylinder liner or at the water pump impeller blade. Without proper inhibition from the coolant, implosion can lead to liner and pump damage and expensive part failure.

Inhibitor Blanket

The additive package in a traditional coolant will protect against corrosion by forming an inhibitor blanket on all cooling system components. This blanket, typically silicate, will stop corrosion but will also impede heat transfer. As the blanket erodes, abrasive solids are generated which can lead to premature water pump seal failure.

Inhibitors

Chemical compounds, part of the coolant's additive package that are provided to prevent corrosion of the cooling system's metal components. Inhibitors can be either inorganic compounds as in traditional technology or they can be organic compounds such as carboxylates as found in Extended Life Coolant (OAT coolant.)

Light Duty

In internal combustion engine operation, characterized by average speeds, power output and internal temperatures that are generally much lower than potential maximums.

Low silicate coolant

Both TMC RP 329 and ASTM D4985 and D6210 specify maximum silicate content to be used in heavy duty coolants of 125 ppm as Si. Higher levels may lead to gellation, silicate drop out and premature water pump failure due to abrasive solids. Thus low silicate coolants are preferred in heavy duty applications for improved cooling system performance. In automotive applications which contain aluminum parts, higher silicate levels may be tolerated for improved aluminum protection.

Metals, Cooling System

Metals commonly used in automotive and heavy duty diesel engines are iron (engine block, water pump impeller) aluminum (radiators, thermostat housing, etc.) copper (radiators) and sometimes lead (copper radiator joints.) The presence of dissolved metals in the coolant can be indicative of cooling system corrosion and the failure of the coolant to give adequate protection.

Mid Liner Support

This refers to the practice of some engine manufacturers to provide physical support to their cylinder liners at their mid section. Mid liner support will dampen vibrations caused by internal combustion and reduce the risk of cavitation corrosion due to uncontrolled vibrations.

Molybdate

A corrosion inhibitor often used with nitrite to provide protection against cavitation corrosion of cylinder liners in heavy duty diesel applications.

Nitrate

A corrosion inhibitor often found in traditional coolants. Nitrate imparts corrosion protection for aluminum components. Nitrate is also a decomposition product formed in the routine aging of coolants that contain nitrite inhibitors.

Nitrite

A corrosion inhibitor used to protect cast iron cylinder liners from cavitation corrosion. With traditional coolants in engines where cavitation is occurring, nitrite can deplete in as little as 15,000 miles. When this occurs, refortification with supplemental coolant additive is required to restore nitrite to effective levels and provide cavitation protection.

OAT Coolant

Refers to Organic Acid Technology coolants. These coolants rely on carboxylate or organic acid corrosion inhibitors to provide a broad array of protections for all cooling system metals. OAT inhibitors deplete very slowly and so OAT coolants are also referred to as Extended Life coolants.

PG

Propylene glycol; a form of glycol used in some coolants. Like ethylene glycol, PG will provide freeze and boil protection but is less toxic than EG and is sometimes used where accidental release to the environment is a concern. Note both EG and PG are toxic.

pH

pH is a measure of coolant acidity. Traditional coolants will have a fresh pH of about 9-11; carboxylate coolants will have an initial pH of about 8-8.5. Coolant pH declines with the coolant's age in use due to the breakdown of glycol and the formation of acidic glycol breakdown products. When a coolant's pH drops too low (below 8 for traditional coolants and below 7 for carboxylate coolants), the coolant's corrosion inhibitors become ineffective in providing corrosion protection and at this point a coolant should be drained and the system flushed and refilled with new coolant.

Phosphate

A traditional corrosion inhibitor, providing broad protection for cast iron as well as for aluminum. Phosphate has a tendency when used with hardwater to form hard water scale which can damage an engine's cooling system. Always use good quality water.

Pitting

A localized corrosion process, that can be caused by several factors including cavitation or by high temperature boiling. If pitting is left unchecked by proper corrosion inhibition, part failure will result.

Precharge

A Precharge is an initial dose of corrosion inhibitors, typically used to assure protection against liner pitting. Fully formulated coolants will contain a Precharge of supplemental corrosion inhibitors. The Precharge permits the immediate use of a fully formulated coolant in heavy duty applications where liner cavitation protection is required.

Preventative Maintenance (PM)

All cooling systems will require periodic maintenance to assure that proper freeze/boil protection is in effect and that adequate inhibitors are present to provide corrosion protection. Thus routine or preventative maintenance will include a freeze point check using a refractometer with freeze point adjustment if required. A check of coolant inhibition will also be included using the appropriate coolant test methods - typically but not always involving a test strip.

Prediluted

A coolant that has the appropriate amount of high quality (distilled) water already added by the coolant manufacturer. Typically, a prediluted coolant will contain about 50% water; however, other ratios are sometimes available if desired.

Premixed

See pre-diluted

RA

The coolant property of reserve alkalinity. RA is a measure of the coolants buffering capacity. In the past traditional coolants protected against corrosion in part by providing a buffer agent to resist corrosion process. With the introduction of carboxylate technology, buffering action of the coolant is of less importance and has been removed as a requirement from popular coolant specifications. The RA of carboxylate technologies can be around 5 whereas a traditional coolant may have an RA exceeding 10. RA by definition is the volume of 0.1N HCl solution required to lower a coolant pH to 5.5.

Radiator

High surface area heat exchanger where as much as 40% of the engines heat , carried by the coolant is exchanged with cooling air and thus dissipated. Typically manufactured from copper/brass in heavy duty application with a current tendency toward aluminum for reduced weight.

Refractometer

A hand-held optical device used to measure a coolant's freeze point. The refractometer is the preferred method for accuracy and ease of use compared to hydrometer or to test strips.

RP

RP is a recommended practice issued by the Technology and Maintenance Council, an organization dedicated to the service of truck fleets and fleet maintenance. TMC issues a broad array of RP's covering cooling system maintenance as only one of several areas of involvement.

Rust

Rust is a cast iron corrosion product and can lead to the formation of brown coolant. In the cooling system, the formation of rust indicates poor maintenance. It is caused by ineffective or low level of corrosion inhibitors. It is very often caused by an underfill situation in which air is entrained and trapped in the system. Those areas devoid of coolant will rapidly corrode in the high humidity and temperature conditions present.

SCA

Supplemental Coolant Additive; used with traditional coolant technologies, SCA's are additive packages that must routinely be added to the traditional coolant to reconstitute inhibitors that become depleted in normal use. SCA's can be added as a liquid supplement or by means of a spin-on filter containing inhibitor solids that will rapidly dissolve in the coolant. SCA addition may be required as often as every 15,000 miles.

Scale

An insoluble coating formed from hard water components containing calcium and magnesium. Scale will typically form at hot spots in the engines cooling system. Because of scales insulating ability, it can make a hot spot even hotter ultimately leading to high temperature damage. Many heavy duty coolants will contain scale inhibitors to reduce scaling tendencies.

Seals

Elastomeric cooling system components chosen to restrain coolant flow to within the system, usually used at the juncture of hardware components. Elastomers are chosen to be compatible with the fluid and temperature conditions anticipated in use.

Shelf Life

Coolant shelf life is limited in traditional coolants by the tendency of some inhibitors to drop out of the coolant and form gel. Silicate is a typical component in traditional technology that causes gel formation and usually limits shelf life to about two years. Carboxylate technology, containing no silicates has a greatly extended shelf life and can be stored to beyond seven year with out a gellation problem, provided that the seal on the container has not been broken

Silicate

An inorganic corrosion inhibitor often present as a key component in the additive package of traditional coolants. Silicates are often added to provide aluminum protection. Silicates deplete rapidly and are a common component of supplemental coolant additives used to reformat used coolant. Excess silicate additive (as in SCA overuse) can lead to silicate drop out and contribute to abrasive solids formation plugging and premature water pump failure. Silicates are not present in Extended Life Coolants

Silicate fluid

ChevronTexaco provides a Silicate Fluid to be used with select Cummins engines only. With Cummins ChevronTexaco has agreed to provide a silicate additive to be used with Extended Life coolant when factory filling Cummins N-14, M-11 and ISX series of engines to enhance Cummins seal life in these engines. In all other Cummins engines or in Cummins engines that are converted by flush and fill procedures, the silicate fluid is not required.

Slow Release

Referring to Extended Service Interval filters, slow release of the filter's inhibitors is accomplished by encapsulating those inhibitors in a membrane that either slowly disintegrates or that permits the slow diffusion of inhibitors over the life of the filter. By using Slow Release, an Extended Service Filter can reduce much of the maintenance associated with the use of Traditional SCA's. However, Slow Release filters will be more costly in proportion to the number of SCA's they replace. If the slow release mechanism fails, a system could be either severely overdosed or underdosed with additives resulting in possible failure.

Specifications

ASTM, TMC as well as a number of OEM's have issued specifications that delineate physical, chemical and performance properties an acceptable coolant should possess. Pertinent industry wide specifications include: ASTM D3306, D4985 and D6210, TMC RP 302,303, 329, 330 and 351. OEM specifications include GM's 6277M and Caterpillar EC-1.

Spin on filters (See also Chemical and Coolant Filters)

Spin on filters are used for two reasons. First, OEM's may require a coolant filter to remove debris, often left during the engine manufacture or from the deposition of corrosion inhibitors when using traditional coolants. In addition, spin-on filters may be used as a method of providing supplemental coolant additives. In this case, filters will contain a reformatting dose of corrosion inhibitors to be dissolved into the coolant as it passes through the filter. With traditional coolants requiring supplemental coolant additive, spin-on filters may need to be replaced as frequently as every 15,000 miles. With an extended service system, the extended service filter may be replaced after 100,000 to 125,000 miles. Extended Life coolants do not require reformatting until 300,000 miles and do not employ spin on filters for SCA addition.

Stationary Engine

Stationary engines are typically used in power generation but can also be used for gas compression and for pipeline transport. If stationary engines are equipped with large coolant reservoirs, coolant life is extended beyond that typically experienced in over-the-road applications. With Extended Life Coolant, it is possible to achieve 32,000 hours of use without reformatting, provided that coolant is tested at least once per year.

Surge Tank

An overflow tank with cap, connected to an engine's cooling system. Surge tank holds extra or reserve coolant to assure that the engine's cooling system is completely filled at all times. A surge tank may or may not have a constant flow of coolant through it depending on design. Liquid coolant additives should be added only to those surge tanks that have a continuous through-put to assure proper mixing with mainstream coolant. Top-off with a 50/50 prediluted coolant via the surge tank is acceptable.

Test strip

Test strips are available to provide quick indication of coolant quality. Test strips can be used to indicate freeze point, nitrite and molybdate levels, carboxylate levels and coolant pH. All test strip methods can under certain circumstances lead to erroneous readings and should be back by laboratory analysis when in doubt. The carboxylate and pH strips are usually quite accurate, the nitrite and molybdate strips are a bit less accurate and freeze point test strips are not accurate, especially with red or orange dyed coolants. For freeze point use a refractometer designed for coolant testing.

Thermostat

A valve/flow device used to control coolant flow to the cooling system's radiator and thus to control coolant temperature. Typically thermostats have been designed to keep the coolant at 190°F in automotive and heavy duty application. When the engine is cooled the thermostat is closed, preventing flow to the radiator. As the engine warms, the thermostat opens and allows heated coolant to flow to the radiator for cooling.

TMC

The Technology and Maintenance Council. An organization run for and by fleet owners and operators that develops recommended truck maintenance practices (RP's). The TMC has developed several important coolant maintenance RP's including RP 329 and RP351

Top off/Make up coolant

An engine's coolant system will typically lose a fraction of its coolant continually due to evaporation and/or leaks. The cooling system must be kept filled in order to avoid air entrainment and accompanying corrosion. When replacing lost coolant, it is recommended that a 50/50 prediluted coolant be used to assure that good quality water is used and proper freeze/boil protection are maintained.

Total dissolve solids

TDS: A measure of the amount of dissolved additives contained in the coolant, typically measured by electrochemical means - conductivity. Continued overdosing of SCA's can lead to high TDS. High TDS can lead to premature water pump seal failure.

Toxicity

All glycol based coolants are toxic; ethylene glycol coolant is more toxic than propylene glycol coolant. In addition used coolants can contain dissolved metals from corrosion of cooling system components which increase toxicity.

Underfill

An underfilled cooling system will suffer from air entrainment and will experience rapid corrosion and rusting of metal components as coolant will not protect those areas with which it has no contact. A cooling system should be routinely examined to maintain the proper fill level.

Vapor Space

A area in an underfilled cooling system that lacks coolant and is prone to rapid corrosion and rusting. Vapor space can be due to a design flaw that prevents complete filling with coolant but more often is due to poor maintenance practices and inattention to the cooling system.

Water Filters

See spin-on filter, chemical filter, blank filter.

Water Pump

Provides circulation of coolant throughout the cooling system. The life of the water pump can be affected by the quality of coolant in use. High dissolved solids from SCA overuse as well as hard water components can hasten water pump seal failure.

Wet Sleeve Cylinder liners

See cylinder liner, mid-liner support.