PRODUCT INFORMATION SHEET

WYNN'S HEAVY DUTY ENGINE COOLANT (PRE-MIX)

Product Number: 51805 205 litre 51820 20 litre 51850 3 x 5 litre

WYNN'S HEAVY DUTY ENGINE COOLANT (PRE-MIX) is a low silicate ethylene glycol based coolant pre-mix, developed to protect all petrol and diesel engines from damage caused by heat, cold and corrosion.

Wynn's Heavy Duty Engine Coolant (Pre-Mix) is a universal engine coolant that is suitable for all passenger cars and light commercial vehicles. It is also suitable for all light duty and heavy duty diesel engines, in all industries including Transport, Marine, Earthmoving and Mining.

Advantages

Wynn's Heavy Duty Engine Coolant (Pre-Mix) has been specifically formulated to perform to the International Standard ASTM D 4656 Specification, the International Standard ASTM D5345 Specification and the International Standard ASTM D 6210, and meets The Maintenance Council (TMC) Recommended Practice (RP) 329.

Wynn's Heavy Duty Engine Coolant (Pre-Mix) is formulated to meet all the requirements of ASTM D4656 "Standard Specification for a Prediluted Aqueous Ethylene Glycol Base Engine Coolant (50 Volume % Minimum) for Automobiles and Light-Duty Service," as specified as the basic performance of TM RP 329.

Wynn's Heavy Duty Engine Coolant (Pre-Mix) has been formulated to overcome the problem of diesel engine liner pitting that still troubles the engine industry. Modern heavy-duty diesel engines contain replaceable cylinder liners that are subject to accelerated corrosion, due to coolant vapour bubble formation and the subsequent bubble implosion. To overcome the increased vapour bubble formation, various diesel engine manufacturers have specified ethylene glycol based coolants that conform to the ASTM D 5345 Specification.

Wynn's Heavy Duty Engine Coolant (Pre-Mix) meets the ASTM D 6210 "Standard Specification for Fully-Formulated Ethylene-Glycol-Base Engine Coolant for Heavy-Duty Engines," which does not require any addition of Supplemental Coolant Additive (SCA) until the first maintenance interval.

Wynn's Heavy Duty Engine Coolant (Pre-Mix) meets the ASTM D 5345 "Standard Specification for Prediluted Aqueous Ethylene Glycol Base Low-Silicate Engine Coolant (50 Volume Percent Minimum) for Heavy Duty Engines requiring and Initial Charge of Supplemental Coolant Additive (SCA)".

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Coolant concentrates meeting this specification require an initial charge of a supplemental coolant additive (SCA) and require regular maintenance doses of a SCA to continue the protection in certain operating heavy-duty engine cooling systems, particularly those of the wet cylinder liner-in-block design.

The SCA additions are defined by and are the primary responsibility of the engine manufacturer or vehicle manufacturer. If they provide no instructions, the ASTM D 5345 Specification requires that the recommended instructions of Wynn's Supplemental Coolant Additive be followed as detailed in the applications.

Supplemental Coolant Additives (SCA's) are used to provide additional protection against deposits, corrosion and pitting which may not be provided by the additives in the coolant pre-mix. Wynn's Heavy Duty Engine Coolant (Pre-Mix) is formulated to meet the requirement in the ASTM D 5345 Specification for an initial charge of a supplemental coolant additive (SCA).

SCA's also extend the life of the coolant by adding to and replenishing the additives that deplete during normal operations. With the use of simple dip and read corrosion inhibitor test kits, the level of SCA can be measured and monitored. This allows for the simple addition of Wynn's Supplemental Coolant Additive during the service interval of the coolant, which meets the requirement in the ASTM D 5345 Specification for the regular maintenance doses of an SCA.

Wynn's Heavy Duty Engine Coolant (Pre-Mix) is formulated to comply with the 125 ppm maximum silicon content specified in the Standard Specification ASTM D 5345.

For heavy-duty diesel engines and V6 Holden Commodores, use Wynn's Heavy Duty Engine Coolant (Pre-Mix), as it is already pre-mixed at the minimum concentration requirement of 50% by volume. For petrol or light duty diesel engines, Wynn's Heavy Duty Engine Coolant (Pre-Mix) can be further diluted (down to 30% of coolant concentrate – refer applications chart), unless otherwise recommended by the vehicle manufacturer. This concentration will provide protection for 3 years or 100,000km.

Wynn's Heavy Duty Engine Coolant (Pre-Mix) is suitable for all passenger cars and 4WD's including the following makes of vehicles; Chrysler, Daewoo, Daihatsu, Ford, Holden, Hyundai, Nissan, Mazda, Mitsubishi, Toyota, Subaru and Suzuki.

<u>Benefits</u>

Wynn's Heavy Duty Engine Coolant (Pre-Mix) has been specially formulated to provide the following benefits:-

- CONFORMS TO SPECIFICATION ASTM D 5345

  Wynn's Heavy Duty Engine Coolant (Pre-Mix) meets the requirement of the ASTM D 5345 "Standard Specification for Prediluted Aqueous Ethylene Glycol Base Low-Silicate Engine Coolant (50 Volume Percent Minimum) for Heavy Duty Engines Requiring an Initial Charge of Supplemental Coolant Additive (SCA)"

- CONFORMS TO SPECIFICATION ASTM D 6210

  Wynn's Heavy Duty Engine Coolant (Pre-Mix) meets the ASTM D 6210 "Standard Specification for Fully-Formulated Ethylene-Glycol-Base Engine Coolant for Heavy-Duty Engines."

- CONFORMS TO SPECIFICATION TMC RP 329

  Wynn's Heavy Duty Engine Coolant (Pre-Mix) meets the requirement of The Maintenance Council (TMC) Recommended Practice (RP) 329.

- CONFORMS TO SPECIFICATION ASTM D 4656

  Wynn's Heavy Duty Engine Coolant (Pre-Mix) meets the requirement of the ASTM D 4656 "Standard Specification for a Prediluted Aqueous Ethylene Glycol Base Engine Coolant (50 Volume % Minimum) for Automobiles and Light-Duty Service".

- LOW-SILICATE AND ZERO-PHOSPHATE FORMULA

  The low silicate formulation allows Wynn's Heavy Duty Engine Coolant (Pre-Mix) to meet the 125 ppm maximum silicon specification in ASTM D 5345. The use of high silicate corrosion inhibitors cause "hydro-gel or silica-gel" to form a "green goo or green sludge" that block coolant passages. The symptoms are usually an overheated engine or a cabin air heater that fails to heat. Also Wynn's Heavy Duty Engine Coolant (Pre-Mix) contains no phosphates which are noted as being environmentally unfriendly nutrients in waterways.

- NITRITE FORMULA

  Wynn's Heavy Duty Engine Coolant (Pre-Mix) also uses a nitrite base technology that is used by the major engine manufacturers of on-highway heavy-duty engines. The use of nitrite technology allows Wynn's Heavy Duty Engine Coolant (Pre-Mix) to be measured and monitored on approved corrosion inhibitor test kits, as recommended. This nitrite technology provides cavitation corrosion (liner pitting) protection in heavy-duty engines.

  Wynn's Heavy Duty Engine Coolant (Pre-Mix) meets The Maintenance Council (TMC) Recommended Practice (RP) 329, "Fleet Purchasing Specification for Nitrite-Containing Ethylene Glycol Base Coolant".

  Previous high silicate formulations tend to cause problems in heavy-duty engines such as silica-gel, solder bloom and water pump weepage.

- REDUCES CORROSION

  The action of highly effective corrosion inhibitors in this product significantly reduce the rust and corrosion of metals used in cooling systems.

Wynn’s Heavy Duty Engine Coolant (Pre-Mix) is designed to provide anti-corrosion protection to cooling systems of the bi-metal type which contain various components composed of copper, solder, brass, steel, cast iron and aluminium.

Wynn’s Heavy Duty Engine Coolant (Pre-Mix) meets and exceeds the ASTM D 1384 Standard Specification "Glassware Corrosion Test", the ASTM D 4340 Standard Specification "Heat Rejection Aluminium Corrosion Test", the ASTM D 2570 Standard Specification "Simulated Service Corrosion Test", and the ASTM D 2809 Standard Specification "Aluminium Water Pump Cavitation/Erosion Corrosion Test".

- PREVENTS FOAMING

The strong action of the anti-foaming agents present In Wynn’s Heavy Duty Engine Coolant (Pre-Mix), reduce or eliminate foam in systems filled with water or ethylene glycol/water mixture, increasing the overall efficiency of the cooling system by preventing air entrainment and water pump cavitation. Wynn’s Heavy Duty Engine Coolant (Pre-Mix) meets and exceeds the ASTM D 1881 Standard Specification "Glassware Foaming Test".

- PREVENTS SCALE DEPOSITS

Wynn’s Heavy Duty Engine Coolant (Pre-Mix) prevents scale deposits from forming and clogging radiators and other vital components of heavy-duty engine cooling systems.

Scale acts as an insulator and reduces the amount of heat that has to be transferred away into the cooling system.

Wynn’s Heavy Duty Engine Coolant (Pre-Mix) conditions water in the cooling system to keep mineral scale, sludge and deposits from building up on heat transfer surfaces thus promoting maximum efficiency.

- EXTENDS LIFE OF COOLING SYSTEM

Wynn’s Heavy Duty Engine Coolant (Pre-Mix) maintains heavy-duty engine cooling systems by applying a very fine protective coating to all cooling system surfaces, thus preventing cavitation erosion that leads to pitted cylinder liners, and preventing chemical corrosion attack on other metals.

- RESERVE ALKALINITY

Wynn’s Heavy Duty Engine Coolant (Pre-Mix) contains buffers that keep the coolant slightly alkaline so that metal electrolysis is eliminated, and any acidic blow-by-gases are neutralised, thus reducing corrosion of metal components.

Wynn’s Heavy Duty Engine Coolant (Pre-Mix) meets and exceeds the ASTM D 1121 Standard Specification "Reserve Alkalinity" and the ASTM D 1287 Standard Specification "pH" as required in the ASTM D 5345 Standard Specification.

- WATER QUALITY

  Wynn's Heavy Duty Engine Coolant (Pre-Mix) has been formulated by the specific water quality recommendations of the engine and vehicle manufacturers, and outlined in the Standard Specification ASTM D 5345, as follows:

PROPERTY	SPECIFICATION	ASTM TEST METHOD
Total Solids (ppm)	340 MAX	D188
Total Hardness (ppm)	170 MAX	D1126
Chloride (ppm)	40 MAX	D512, D4327
Sulphate (ppm)	100 MAX	D516, D4327
pH	5.5 - 9.0	D1293

Wynn's Heavy Duty Engine Coolant (Pre-Mix) is a 50% volume pre-mixed solution of Wynn's HD Engine Coolant Concentrate and de-ionised water to the ASTM D 5345 Standard Specification.

Applications

Wynn's Heavy Duty Engine Coolant (Pre-Mix), in an engine cooling system, has three main functions:

- to protect the system against frost damage.
- to cool the high temperature areas and prevent over boiling.
- to protect the cooling system from corrosion and deposits.

Wynn's Heavy Duty Engine Coolant (Pre-Mix) has been formulated to a coolant concentration of 50% by volume, to ensure maximum protection against the three above mentioned risks - frost, boiling, and corrosion.

Many diesel engine manufacturers recommend this concentration level. Wynn's Heavy Duty Engine Coolant (Pre-Mix) can be diluted further (down to 30% by volume of coolant concentrate) as recommended by the relevant engine manufacturer.

COOLANT CONCENTRATION		**COOLANT DILUTION**		**PROPERTIES**		
% VOL. ANTIFREEZE	% VOL. WATER	51820 LITRES	WATER LITRES	% VOL. ETHYLENE GLYCOL	FREEZING POINT °C	BOILING POINT °C
50	50	20	0	47.5	-33	108
45	55	20	3	43.0	-28	106
40	60	20	6	38.0	-23	105
35	65	20	9	33.5	-19	104
30	70	20	14	28.5	-15	103

Corrosion protection is the most important function of a coolant and is achieved by the use of Wynn's Heavy Duty Engine Coolant (Pre-Mix), by the inclusion of a well balanced corrosion inhibitor package. In modern engines, with the greater use of aluminium alloys and thinner section castings, corrosion problems are critical. The products of corrosion in engine cooling systems can circulate with the coolant, causing blockage in the system and consequently overheating problems.

The choice of the inhibitor package in Wynn's Heavy Duty Engine Coolant (Pre-Mix) is the result of very extensive testing which includes laboratory tests, simulated service tests, cavitation tests, static engine tests and field service trials.

Coolant Maintenance Recommendations in the ASTM D 5345 Standard Specification are to be followed when using Wynn's Supplemental Coolant Additive and Wynn's Heavy Duty Engine Coolant (Pre-Mix).

If any of the following recommendations differ, follow the engine or vehicle manufacturer's recommendations.

- Maintain coolant concentration between 40% (freeze protection to -24°C) and 60% (freeze protection to -52°C) depending on operating environment. Wynn's Heavy Duty Engine Coolant (Pre-Mix) has a coolant concentration of 50% (freeze protection to -33°C).

- Drain and flush the cooling system every two years, 386,200 kilometres, or 6,000 hours.

- Follow the engine or vehicle manufacturer's recommendations for precharging of the cooling system after draining and flushing. Use Wynn's Heavy Duty Engine Coolant (Pre-Mix) at 60 - 100% vol concentrations with quality water.

- Use water that does not contain excessive solids, hardness, chloride, or sulphate.

- Use accurate, reliable equipment such as a refractometer to measure coolant concentration levels for freeze protection.

- Use the recommended test kit when testing the coolant for corrosion inhibitor concentration. Test kits indicate the degree of liner pitting protection present in the coolant.

- Do not precharge the cooling system with Wynn's Supplemental Coolant Additive if the coolant is drained and reused.

- Use coolant mixed at the desired proportions for make-up. Wynn's Heavy Duty Engine Coolant (Pre-Mix) is pre-mixed for initial-fill and top-up.

- Use Wynn's Supplemental Coolant Additive at recommended dosage to control deposits, corrosion and pitting.

- Do not add plain water as make-up coolant.

- Do not substitute precharge coolant filters for service filters, as this will result in over-treatment. Precharge filters contain more SCA than maintenance filters.

- Do not exceed 60% coolant concentrate. More than 68% coolant concentrate actually reduces freeze protection. The maximum recommended coolant concentrate level is 60%.

- Do not exceed the recommended dosage of Wynn's Supplemental Coolant Additive or the recommended concentration of coolant concentrate. Over concentration can result in plugged radiators, heater cores, and charge air coolers. Over concentration can also cause water pump seal leaks.

- Do not reuse coolant that has been drained from a vehicle where over concentration of coolant concentrate or over concentration of supplemental coolant additives has occurred, where the coolant is over one year old, or where the container is dirty.

- Do not use soluble oil additives.

- Do not use methyl alcohol or methoxy propanol base coolant concentrates.

- Do not use antileak additives if engine cooling system is equipped with a coolant filter, as this may plug the filter element.

- For all other cooling systems, follow the recommendations of the engine or vehicle manufacture.

Specifications

Wynn's Heavy Duty Engine Coolant (Pre-Mix) meets the performance requirements of the following standards:-

NATIONAL STANDARDS

AS/NZS 2108.1:1997 Engine Coolant Type A

INTERNATIONAL STANDARDS

ASTM D 4656
ASTM D 5345
ASTM D 6210
SAE J 1034
SAE J 1941
TMC RP 329
BSI 6580
JIS 2234

VEHICLE/ENGINE MANUFACTURER STANDARDS

General Motors GM 1825M
General Motors GM 1899M
Ford ESE-M 97B18-C
Ford ESE-M97B44-A
Caterpillar 1 EO 535
Cummins Bulletin 3666132
Detroit Diesel Bulletin 7SE298

Typical Characteristics

Appearance	Clear Thin Liquid
Colour	Green
Density @ 15°C	1.060 (ASTM D 4052)
Boiling Point (°C)	108 (ASTM D 1120)
Freezing Point (°C)	-33 (ASTM D 1177)
Flash Point (°C)	None
pH	10.5 (ASTM D 1287)
Phosphate Content (ppm)	Nil
Nitrite Content (ppm)	1340
Reserve Alkalinity (ml)	5.2 (0.1N HCl)
Boil Protection (67% vol in water) °C	127 (120 kPa)
Boil Protection (°C)	132 (120 kPa)

Features

Wynn's Heavy Duty Engine Coolant (Pre-Mix) meets or exceeds the following tests:-

- ASTM D 1121 - Reserve Alkalinity Test
- ASTM D 1287 - pH Test
- ASTM D 1384 - Glassware Corrosion Test
- ASTM D 1881 - Glassware Foaming Test
- ASTM D 2570 - Simulated Service Corrosion Test
- ASTM D 2809 - Aluminium Water Pump Cavitation/Erosion Corrosion Test
- ASTM D 4340 - Heat Rejection Aluminum Corrosion Test

Test Data

ASTM D 1384

CORROSION TEST FOR ENGINE COOLANT IN GLASSWARE

This is a beaker type procedure used for evaluating the corrosive affects of engine coolants on six standard metal test specimens under controlled laboratory conditions.

Wynn's Heavy Duty Engine Coolant (Concentrate) was added to the standard ASTM Corrosive Water (anhydrous sodium salts and distilled water).

ASTM D 1384 CORROSION TEST
ASTM CORROSIVE WATER AND WYNN'S HEAVY DUTY ENGINE COOLANT (CONCENTRATE)
CORRECTED COUPON WEIGHT CHANGE (mg)
AVERAGE OF THREE SETS

	Typical ASTM Corrosive Water Only	With Wynn's HD Engine Coolant	ASTM D 4656 Specification
Copper	-3.0	-1.3	10 Max
Solder	-61.0	-15.0	30 Max
Brass	-3.0	-1.6	10 Max
Steel	-125.0	-0.1	10 Max
Cast Iron	-216.0	+0.5	10 Max
Aluminium	-40.0	+2.1	30 Max

INDUSTRY MAXIMUM ALLOWABLE SPECIFICATIONS

	General Motors GM 1899-M	Ford ESE-M97B44-A	Ford ESE-M97B18-C	Australian/ New Zealand AS/NZS 2108.1:1997
Copper	10	10	9	10
Solder	20	20	16	15
Brass	10	10	9	10
Steel	10	10	9	10
Cast Iron	10	10	10	10
Aluminium	20	20	31	15

ASTM D 1881

FOAMING TENDENCIES OF ENGINE COOLANTS IN GLASSWARE

This is a beaker test used to evaluate the tendency of engine coolants to foam under laboratory controlled conditions of aeration and temperature. The volume of foam and the time for the foam to break, are measured to determine if a coolant passes or fails.

If a coolant foams and becomes aerated as it circulates through the cooling system of a vehicle, the air trapped within the coolant will not allow the coolant to dissipate heat from the cooling system as readily as a coolant that controls the rate of foaming. In addition, air entrapment in the coolant rapidly depletes the corrosion inhibitors in the system due to the presence of free oxygen which results in premature corrosion of metallic components.

The following tests were conducted to show the foam control provided by Wynn's Heavy Duty Engine Coolant (Pre-Mix).

	Foam Volume (ml) 5 minutes	Break Time Seconds
Wynn's Heavy Duty Engine Coolant (Pre-Mix)	27	2.1
Specification ASTM D 4656	50 Max	5.0 Max

ASTM D 2570

SIMULATED SERVICE CORROSION TESTING OF ENGINE COOLANTS

This test procedure developed jointly by the ASTM and SAE to evaluate the affects of circulating engine coolants on metal test specimens and automotive cooling system components under controlled, laboratory conditions.

Duration of this test is 1064 hours at a controlled temperature of 88°C and a 114 to 132 litres per minute circulating flow.

The ASTM corrosive water used in the test is made from three anhydrous sodium salts: 1) sodium sulphate, 2) sodium chloride and 3) sodium bicarbonate, and is very corrosive to the six standard metal test specimens and automotive components used in the test.

The test with Wynn's Heavy Duty Engine Coolant (Concentrate) was conducted using ASTM corrosive water to increase test severity and using a copper/brass radiator.

ASTM D 2570 CORROSION TEST
CORRECTED WEIGHT CHANGE (mg)
AVERAGE OF THREE SETS
ASTM CORROSIVE WATER AND WYNN'S HEAVY DUTY ENGINE COOLANT (CONCENTRATE)

	With Wynn's HD Engine Coolant	ASTM D 4656 Specification	Australian/ New Zealand AS/NZS 2108.1:1997
Copper	-0.4	20 Max	20 Max
Solder	-24.1	60 Max	60 Max
Brass	-0.8	20 Max	20 Max
Steel	+0.4	20 Max	20 Max
Cast Iron	+1.8	20 Max	20 Max
Aluminium	-0.4	60 Max	60 Max

ASTM D 2809

ALUMINIUM WATER PUMP CAVITATION - EROSION CORROSION TESTING OF ENGINE COOLANTS

The performance of engine coolants has been assessed using ASTM D 2809. This test procedure consists of pumping an aqueous coolant solution at 113°C through a pressurised 103kPa simulated automotive coolant system. An aluminium automotive water pump, driven at 4,600rpm by an electric motor, is used to pump the solution as well as to serve as the object specimen in evaluating the cavitation erosion-corrosion effect of the coolant under test. The pump is examined to determine the extent of cavitation erosion-corrosion damage and rated according to ASTM D 4656.

Wynn's Heavy Duty Engine Coolant (Pre-Mix) was tested and rated to this water pump cavitation erosion-corrosion assessment.

ASTM D 2809 CORROSION TEST
RATING FROM 1 TO 10

Wynn's Heavy Duty Engine Coolant	Specification ASTM D 4656
10	8 Minimum

ASTM D 4340

TEST FOR ALUMINIUM CYLINDER HEAD HEAT TRANSFER CORROSION

This test is to help achieve a better understanding of heat transfer corrosion that takes place on aluminium cylinder heads and to better understand what effect anti-freeze corrosion inhibitor type packages have in retarding heat transfer corrosion of aluminium.

Wynn's Heavy Duty Engine Coolant (Concentrate) was tested with ASTM Corrosive Water.

ASTM D 4340 CORROSION TEST
MAXIMUM WEIGHT LOSS (-1.0mg/cm^2/week)

Typical ASTM Corrosive Water	50/50 Wynn's Heavy Duty Engine Coolant (Concentrate) and ASTM Corrosive Water
-1.30	-0.02