GM	WORLDWIDE ENGINEERING STANDARDS	General Specification	GMW16117

Coolant System Coolant Reservoir Assembly

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

Requirements and specifications contained in this document describe the quality, reliability, durability, and performance for the Coolant System Overflow Reservoir Assembly.

1.1 Purpose. This specification establishes the requirements for a Coolant System Overflow Reservoir Assembly. The functions, performance, design constraints, and validation required of the component are defined in this document. All requirements of this specification must be met in order to demonstrate design and production validation.

1.2 Applicability. Bill of Material (BOM) Row 344 – Surge Tank.

1.3 Remarks. The Coolant System Overflow Reservoir Assembly provides an unpressurized reservoir for coolant expansion and contraction. It also helps to control coolant after-boil, and serves as the customer coolant service level check and fill point. The engineering test schedule contained within this specification defines the minimum performance and durability criteria necessary for Design and Production Validation. In addition, the minimum requirements for Production Audit testing of ongoing production are outlined. The schedule is intended as a supplement to normal material inspections, dimensional checking and in-process controls, and should in no way adversely influence adherence to other inspection operations.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

SAE J1344

2.2 GM Standards/Specifications.

GMW3059	GMW3420	GMW15758	GMW16594
GMW3116	GMW14156 (ID)	GMW15760	
GMW3172	GMW14157 (ID)	GMW15862	

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2.3 Additional References.

- CG2991 Surge Tank SOR Appendix G3 VCRI (ID)
- GM Best Practice HVACPTC-230: Coolant Reservoir Volume Determination and Design (ID)
- GM Released Drawing 10322539 (coolant reservoir cap)
- Statement of Requirements (SOR) Appendix B, C, G3

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3 Requirements

3.1 System/Subsystem/Component/Part Definition.

3.1.1 Appearance. The tank shall not have any noticeable dents, scratches, twists or warpages. The tank surface color and finish (as grain or gloss) shall be shown on the SOR Appendix C or the GM authorized drawing. The material used should be translucent.

3.1.2 Content. See SOR Appendix C.

3.1.2.1 Physical Content. See SOR Appendix C.

3.1.2.2 Functional Content. See SOR Appendix C.

3.1.3 Ambient Environment. The following is the ambient environment in which the Coolant Reservoir must operate.

- Normal Operating Range: -40 °C to +125 °C.
- Maximum Under-Hood Temperature Excursions: -50 °C to +150 °C.
- Humidity Range: 0% to 100%.
- Altitude: -150 m to +4600 m.

Engine Compartment: Coolant Reservoir and all components may be exposed and shall be resistant to all typical, in car used fluids and substances listed as follows:

- Coolant to GMW3420.
- De-ionized water.
- Fuels: Gasoline, Ethanol, Diesel, Bio-Diesel B5, B20.
- Oils/Fluids available on market: for engine, transmission, power steering, brakes.
- Engine degreasers and cleaners available on market.
- Salt Water Solution 5% by mass.

3.1.4 Interfaces. Filler neck matched to closure GM Drawing 10322539 mandatory.

3.1.5 Usage Definition. Overflow reservoirs are unpressurized and used with coolant systems having a pressure cap on either the radiator, engine or radiator inlet hose.

3.1.6 Failure Mode and Effects Analysis (FMEA). Detailed design and process FMEAs shall be submitted to the GM Release Engineer and Validation Engineer upon request and shall be maintained as part of the vendor records of the Design and Product Validation. The FMEAs shall be updated each time a design change occurs.

3.1.7 Finish. The Coolant Reservoir shall be free of burrs or any sharp edges that may be detrimental to satisfactory assembly or safe handling.

3.1.8 Identification and Marking. The Coolant Reservoir shall have the following markings to GMW15862 clearly displayed on the outside/underside of the part and not on a surface that is noticeable to the customer. Additionally followed information are required:

a. Manufacturing date, as follows:
   1. **DDD Y** (**DDD** = Day of Year (001 to 365), **Y** = Last Digit of Year (0 to 9)).
   2. Example: 1235 Represents 03 May 2005.

b. Tool/Cavity Number.

c. Material Content (required for all parts).

d. Recycling Symbol per SAE J1344.

3.1.9 Internal/External Dryness/Cleanliness. All assemblies shall be thoroughly dry, prior to shipment. Parts shall not include any debris and not be exposed contaminations or durable lubes. Oil, grease or any contaminants may interfere with proper handling, cause plugging or have a detrimental effect on the material and function properties.

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3.2 Product Characteristics.

3.2.1 Performance Requirements.

- Validation of coolant reservoirs will be through vendor laboratory tests and vehicle durability and performance testing at GM Laboratory and Proving Ground facilities (see Appendix A for the Sequence Test Chart). Specific validation tests include, but are not limited to, the following tests defined in this specification.
- The tank shall be filled during the bench tests with coolant to the cold fill level comprised by 50% volume agent to GMW3420 and 50% volume water.
- Temperature tolerances for all bench test values: ± 2 °C.
- Pressure tolerances for all bench test values: ± 2 kPa.

3.2.1.1 Pre-test and Post-test. The following tests shall be performed on all samples before and after each test series.

3.2.1.1.1 Leak Test.

a. Plug the fill cap opening and overflow port. Assemble overflow hose to inlet port.
b. Using an air source, pressurize reservoir through the overflow hose to 50 kPa and hold.
c. Check reservoir for leakage underwater for five (5) minutes. There shall be no evidence of leakage (air bubbles).

3.2.1.1.2 Cap Installation/Removal Force Test. (Snap-on Caps Only).

a. Using a force gauge, install, and remove the cap on the coolant reservoir at room temperature (23 °C) on ten (10) samples. Record the installation and removal force.
b. The installation and removal forces shall be between 4.0 N and 6.0 N.

3.2.1.2 Drop Test. Drop four (4) coolant reservoirs with coolant level sensor as follow:

a. Suspend the first tank by its front mounting hole, with the hole at 1 m above a concrete floor surface.
b. Rotate the second sample it 90 degrees from the previous sample, and immediately suspend it so that the face of the tank is parallel to the floor with that face at 1 m above the concrete floor surface.
c. Repeat the last procedure for the third sample by rotating the tank in further 90 degrees.

Acceptance Criteria: Coolant reservoir shall pass the pre-test and post-test according to 3.2.1.1., and there shall be no visible cracks or broken mounting features.

3.2.1.3 Vibration Test. The following test should be performed on two (2) samples (see the test chart in Appendix A, Figure A1).

a. Install coolant reservoir in a rigid frame, in vehicle position, using production representative mounting. This frame is attached to the vibration table.
b. Coolant overflow hose is installed and attached to a rigid external support in vehicle position.
c. The overflow reservoir must be filled with water to 25 mm above the cold fill line.
d. Follow vibration procedure in GMW3172 (5.4.1.2) Random Vibration for Sprung Masses.
e. **Optional Vibration Schedule.** If available, test for 200 h using vehicle road-load accelerometer data.
f. Coolant reservoir must pass the Leak Test, and there shall be no visible cracks or broken mounting features.

Acceptance Criteria: Coolant reservoir shall pass the pre-test and post-test according to 3.2.1.1., and there shall be no visible cracks or broken mounting features.

3.2.1.4 High Temperature Soak Test (6 samples).

a. Place the overflow reservoir in the test fixture in the test chamber.
b. Fill the reservoir with coolant by volume to within 10 mm of the top of the filler neck or overflow port, whichever is lower.
c. Raise the chamber temperature to 115 °C.
d. Hold the reservoir at this temperature for 240 h. Add coolant as necessary to maintain the level.
e. Perform the Low Temperature Soak Test (3.2.1.5) after completion.

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