



RV Maintenance and Operation

B5.9 and C8.3 Engines

Quick Reference Guide

Cooling

Routine Maintenance Recommendations

Drain and flush system every 2 years and refill with heavy duty coolant - 50/50 mix of water and antifreeze
 Always use antifreeze. In addition to freeze protection, antifreeze is essential for overheat and corrosion protection
Supplemental Coolant Additive(Fleetguard DCA4) required with C8.3
 Change coolant service filter at **EVERY** oil drain interval
 Use correctly sized Fleetguard DCA4 service filter
 or
 Add correct number of units of liquid SCA and use plain filter

# of SCA Units	Fleetguard Service Filter
2	WF-2070

If an SCA other than Fleetguard is used, follow mfr. recs.
 Topoffs should be done with heavy duty coolant - 50/50 mix of water and antifreeze and 1.5 units of SCA/gal of coolant (SCA for C8.3)
 While not required, DCA4 can be used with the B5.9, though any incremental benefit will be small

Definition of Heavy Duty Coolant

A combination of 50/50 water and low silicate antifreeze (ethylene glycol and propylene glycol are acceptable)
 1.5 units of SCA per gallon of coolant (C8.3 only)
 Protects to -34F. Freeze protection decreases above 68% antifreeze
 Antifreeze must meet ASTM D4985 (GM6038M) specs

Why Are SCAs Needed? (C8.3 and "wet liner" engines in general)

Normal piston slap causes cylinder liner to vibrate at high frequency
 Vapor bubbles are created in coolant as liner moves away from coolant (a phenomenon known as cavitation...localized boiling)
 Bubbles collapse as liner moves back into coolant
 Implosion of bubble removes material from liner surface leading to pitting
 Proper amount of SCA forms an oxide film on liner surface
 Vapor bubbles still form, but remove oxide film rather than liner
 This is why SCA level depletes and must be continually replenished

SCA Concentration Min/Max Limits (C8.3 only)

Must be maintained between 1.2 and 3.0 units/gallon of coolant
 Levels below 1.2 don't adequately protect against liner pitting
 Levels above 3.0 can lead to premature failure of water pump seals due to deposits being formed on seal faces

When To Test SCA level

Test twice a year under "normal" conditions. Test more frequently only when a reason exists to think chemical balance may be incorrect, i.e. partial drain of cooling system, large leak, etc.
 Regular testing should NOT be used to determine when to replace coolant service filter. Replace coolant filter at every oil change
 If SCA between 1.2-3.0 Continue replacing coolant filter at every oil change

SCA < 1.2	Add liquid SCA to raise level to 1.5 and replace service filter
SCA > 3.0	Do not replace service filter and test at each oil change until level is below 3.0. Then start changing service filter at oil changes

How To Test

Antifreeze - Refractometer Fleetguard #CC2800 is recommended vs. floating ball because it is more accurate
 SCA - Fleetguard DCA4 test kit #CC2602. Dip ONE STRIP in coolant for 1 sec, shake off drips, wait 45 sec. and compare three patches. Follow these directions EXACTLY. Take coolant sample from radiator drain cock. DO NOT take coolant sample from overflow bottle or top tank

Cooling Cont'd

Water Quality Requirements

Calcium/Magnesium	Max. 170ppm as CaCO ₃ + MgCO ₃
Chloride	Max. 40ppm as Cl
Sulfur	Max. 100ppm as SO ₄

A conservative approach to cooling system maintenance would include an analysis of your home-base tap water supply. Samples can be sent to Monitor, Inc (800/437-3333) for analysis. Your local Cummins distributor can provide this service as well as sample bottles and other coolant test devices. Consider using pre-formulated antifreeze when on the road or when water quality is unknown

Pre-formulated Antifreeze and SCA

Pre-formulated antifreeze, such as Fleetguard Compleat, offers a vehicle owner the convenience of a pre-mixed antifreeze solution containing high quality water and the correct chemical balance of antifreeze and SCA. Compleat may be used with the B5.9

Lube Oil

Routine Maintenance Recommendations

Oil Drain Interval	Fleetguard Filter
B5.9 - 6,000mi/250hr/6mos	LF3349
C8.3 - 6,000mi/250hr/6mos	LF3000

(which ever comes first)

Replace oil filter at **EVERY** oil drain interval

Multigrade vs. Straight Weight

Recommendation	High quality 15W40 oil API CE/SG
Why Multigrade?	Reduced deposit formation Improved cranking in low ambient temperatures Shortens time-to-block pressure in low ambients Improved lubrication during high temperature operation SG rating required for lubrication of sliding tappets

Synthetic Oils

May be used in B5.9 and C8.3 engines provided they meet performance and chemical requirements outlined in bulletin #3810340-01 (listed on back)
 Recommended for use in ambient temperatures consistently below -13F(-25C) for improved engine cranking and flowability
 Should NOT BE USED to extend oil drain intervals

Engine Break-in Oils

Special break-in oils should not be used. If synthetic or synthetic blend oil has been used prior to an engine rebuild, petroleum based oil should be used for the first oil change interval, after which use of synthetic oil can be resumed

Supplemental Oil Additives

Supplemental oil additives such as friction-reducers and graphitizers should not be used unless the oil supplier can provide evidence of satisfactory performance. If there is any doubt about the suitability of an oil, consult the oil manufacturer for a definitive recommendation, or data to establish that the oil has performed satisfactorily in Cummins engines

Oil Analysis

Oil analysis, as a method to extend drain intervals, is NOT recommended. Different methods of measuring soot, lack of correlation among testing labs, and differing driving patterns and idle time are the basis of the recommendation



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Fuel

Routine Maintenance Recommendation

Fuel filter should be changed at **EVERY OTHER** oil change

	B5.9	C8.3
Fleetguard fuel filters	FF5052	FF5052
without water separator	FF5052	FF5052
with water separator	FS1251	FS1251

Low Sulfur Fuel and Fuel Lubricity

Based on nationwide testing for lubricity, use of additives to improve fuel lubricity is NOT recommended for any Cummins engine when operated on commercially available low-sulfur #2 diesel fuel or #1/#2 winter blend diesel fuel. The fuel recommendation remains as it was prior to the introduction of low-sulfur fuel...a high quality diesel fuel available at truck stops and filling stations across North America

Biocide Treatment

A biocide or fungicide can help when fuels are prone to contamination with bacteria or fungus (black "slime")

Other Fuel Additives

Cummins engines are designed to operate satisfactorily on a wide range of diesel fuels, including commercially available #2 diesel fuel. Any fuel additive product should be accompanied with performance data supporting its performance and benefit. Engine failures caused by incorrect fuel are not covered under warranty. It is not the policy of Cummins Engine Company to test, approve, or endorse any product not manufactured or sold by Cummins Engine Company

Ether

Ether

A mechanical or electrical ether metering device is required whenever ether is used. Manual application of ether is PROHIBITED. Metering devices can be supplied by OEMs or through upfit with Fleetguard equipment. DO NOT USE ETHER on engines with intake air preheaters

Idle/Warmup/Cooldown

Excessive Idle

Excessive idling should be avoided when possible, resulting in reduced fuel consumption and engine wear. Engine idling encountered during normal traffic jams is not considered excessive

Engine Warmup

Cold Start Do not operate at full speed/load until coolant temperature reaches normal operating temperature. Do not operate above low idle until oil pressure is indicated on oil pressure gauge

Engine Cooldown

Recommendation: Prior to shut down, an engine should be idled 3-5 minutes after full throttle or high power operation such as climbing a steep grade or high vehicle speeds. However, under normal driving conditions, such as exiting a highway to enter a fuel or rest stop, enough time is generally taken at light load getting the vehicle positioned and stopped, that a 3-5 minute cooldown is not necessary

Component Maintenance

Valve Adjustment Interval

	Initially	Thereafter
B5.9	24,000mi/1,000hr/1yr	48,000mi/2,000hr/2yrs
C8.3	24,000mi/1,000hr/1yr	48,000mi/2,000hr/2yrs

Air Filter and Intake System

Follow RV manufacturer's recommended filter change interval. Visually inspect intake air components at each oil change for cracks or loose connections

Air Compressor (if equipped)

Inspection required at 48,000mi/2000hrs/2yrs which includes clean/inspect of cylinder head, valve assembly, discharge line, air dryers, splitter valves, pressure relief valves, and alcohol injectors (refer to Section 7 of O&M Manuals)

Charge Air Cooler

Inspection required at 24,000mi/1,000hrs/1yr which includes checking tubes, fins, and welds for cracks, holes, or other damage (refer to Section 6 of O&M Manuals)

Vibration Damper

Inspection required at 48,000mi/2,000hrs/2yrs which includes visual inspection for deformation (refer to Section 7 of O&M Manuals)

Fan Idler Pulley, Fan Hub, Belt Tension

Inspection required at 24,000mi/1,000hrs/1yr which includes visual inspection of all components (refer to Section 6 of O&M Manuals)

Extended Shutdown Start Procedure

When starting an engine that has been sitting for more than 30 days:

- 1) Engine oil pressure must be indicated on gauge within 15 secs. after starting. If oil pressure does NOT register within 15 secs., shut off engine immediately. Confirm that oil level in oil pan is correct. If OK, disconnect the fuel solenoid wire and crank the engine until oil pressure registers on gauge. If oil pressure is not registered after 30 seconds of cranking, follow the Troubleshooting Guidelines listed in the O&M manual for low oil pressure
- 2) Idle engine three to five minutes before operating under load

Bulletin #'s

Cummins Customer Service	800-DIESELS
Fleetguard Customer Service	800-521-4005
"The Power In RVs" brochure	3605857
TripTips: Preventive Maintenance - B5.9 Video	3605883
TripTips: Preventive Maintenance - C8.3 Video	3605884
B & C Series Sales & Service Directory	3605835-01
Cummins Recreational Vehicle Warranty	3381661
B5.9 O&M Manual	3810205-11
B5.9 Troubleshooting and Repair Manual	3666087
B5.9 Shop Manual	3666017
C8.3 O&M Manual	3810248-09
C8.3 Troubleshooting and Repair Manual	3666003-01
C8.3 Shop Manual	3666008-01
Cummins Engine Oil Recommendations	3810340-01
Cummins Engine Fuel Recommendations	3379001-05
Fleetguard Cooling System Maintenance	3387910