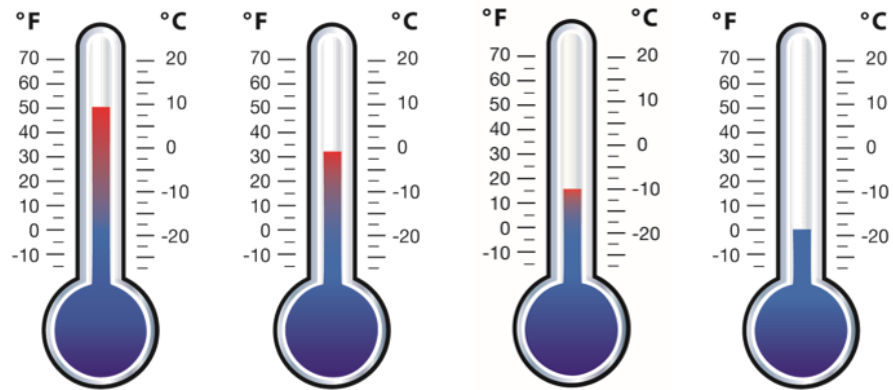


# Diesel Engine Operation in Cold Climates



## What's affected?



|           | <50°F<br>(<10°C) | <32°F<br>(<0°C) | <15°F<br>(<-9°C) | <0°F<br>(<-18°C) |
|-----------|------------------|-----------------|------------------|------------------|
| Coolant   | ●                | ●               | ●                | ●                |
| Fuel      |                  |                 | ●                | ●                |
| DEF       |                  |                 | ●                | ●                |
| Air       |                  |                 | ●                | ●                |
| Batteries |                  |                 |                  | ●                |
| Oil       |                  |                 |                  | ●                |

## General Tips

- For cab climate control, prolonged idling may be necessary. Idle the engine at an RPM adequate to heat coolant above 140°F (60°C), around 800-1000 RPM. In 0°F (-18°C) ambient temperature, this is 1200 RPM.
- There are a number of technologies that can reduce idle time, save fuel, and deliver comfort while minimizing the impact to the environment, such as:
  - Auxiliary Power Unit (APU): engine or battery powered
  - Fuel based heaters
- Insulate exposed lines, filters, pumps, and reservoirs.
- Check electrical systems daily and cold weather support systems weekly.
- For more detailed information, reference Service Bulletin # 3379009 on QuickServe Online, the operation and maintenance manual, or contact your local Cummins distributor.

Note: This document is not intended to replace the information found in the Operation and Maintenance Manual or Service Bulletins.

# Specific Tips and Accessories

| Fluid/Component             | Information and Tips   | Recommended Accessories   |
|-----------------------------|--|---|
| <b>Coolant</b>              | <p>In cold climates, coolant helps warm the engine and components, it is the first line of defense.</p> <ul style="list-style-type: none"> <li>• <i>It is beneficial to use starting aids such as a coolant heater or an intake manifold heater in temperatures below 50°F (10°C)</i></li> <li>• <i>It is recommended to use a combination of starting aids in temperatures below -10°F (-23°C)</i></li> </ul>   | <p><b>Engine:</b></p> <ul style="list-style-type: none"> <li>• Intake Manifold Heater</li> <li>• Coolant heater               <ul style="list-style-type: none"> <li>– Immersion</li> <li>– External</li> </ul> </li> </ul> |
| <b>Fuel</b>                 | <p>It is important to ensure fuel fluidity. Fuel begins to cloud below freezing and will start to wax or gel around 15°F (-9°C).</p> <ul style="list-style-type: none"> <li>• <i>Keep fuel tank full, drain fuel filter condensate daily</i></li> <li>• <i>You can blend No. 1 and No. 2 fuels to lower the cloud point or use winterized diesel, but note both may result in lower lubricity which can reduce the life of fuel system components. It can also lead to decreased fuel economy due to lower BTU content.</i></li> </ul> | <p><b>Engine:</b></p> <ul style="list-style-type: none"> <li>• Fuel/water separator filters</li> <li>• Fuel warmer</li> </ul>   |
| <b>Diesel Exhaust Fluid</b> | <p>DEF systems are designed to freeze and thaw. The DEF tank is heated by engine coolant and the dosing unit is electrically heated. Heating and thawing is controlled automatically through a combination of OEM hardware and engine ECM software logic.</p>  |   |
| <b>Air</b>                  | <p>Lower air temperatures also mean lower combustion temperatures.</p> <ul style="list-style-type: none"> <li>• <i>Under 32°F (0°C), pull air from within the engine enclosure</i></li> <li>• <i>If consistently operating in conditions under -25°F (-32°C), consider pulling air from a compartment around the exhaust stack</i></li> </ul>  | <p><b>Chassis:</b></p> <ul style="list-style-type: none"> <li>• Intake air heater</li> <li>• Thematic controlled fan</li> <li>• Winter front</li> </ul>   |
| <b>Batteries</b>            | <p>Manufacturers generally recommend battery and system capacity to provide adequate start at 0°F (-18°C). As temperatures drop, the battery's cranking capacity may decrease. Compounding the issue, the system load increases at lower temperatures.</p> <ul style="list-style-type: none"> <li>• <i>Make sure your batteries have good cranking capacity and hold charge before trips</i></li> </ul>  | <p><b>Chassis:</b></p> <ul style="list-style-type: none"> <li>• Battery warmer</li> <li>• Battery sleeve</li> <li>• Arctic battery</li> </ul>   |
| <b>Oil</b>                  | <p>As the temperature drops, the viscosity of oil increases. This causes more friction and can lead to increased parasitics and premature engine wear.</p> <ul style="list-style-type: none"> <li>• <i>Certain oil weights are recommended for different temperature ranges</i></li> <li>• <i>Oil can also be heated to lower the viscosity using oil heaters</i></li> <li>• <i>It is important to check your oil level more frequently at colder temperatures</i></li> </ul>  | <p><b>Engine:</b></p> <ul style="list-style-type: none"> <li>• Oil heater</li> <li>• Oil pan cover</li> </ul>   |

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