



## Technical Bulletin 4 DIESEL IN WINTER

### **Fuel Filter Problems due to low ambient temperatures**

#### **Engine Power Loss**

Diesel engine power loss during winter operation is a common occurrence and source of complaint. Unless there is a component failure within the engine, the problem can usually be traced back to paraffin crystal formation in the fuel which restricts flow through fuel filters. Freezing temperatures can also cause any emulsified water to form a fuel/ice slush, further restricting filters. Frequently, fuel filters are blamed for the problem when, in fact, the problem is caused by the effect of cold weather.

The Cloud Point is the temperature at which paraffin, which is naturally present in diesel fuel, begins to form cloudy wax crystals. When the fuel temperature reaches the cloud point, these wax crystals flowing with the fuel coat the filter element and quickly reduce the fuel flow, starving the engine. Typical cloud point temperatures range from:  $-18^{\circ}\text{F}$  ( $-28^{\circ}\text{C}$ ) to  $+20^{\circ}\text{F}$  ( $-7^{\circ}\text{C}$ ), but may occasionally be as high as  $+40^{\circ}\text{F}$  ( $4.4^{\circ}\text{C}$ ).

The Pour Point is the temperature at which the paraffin in the fuel has crystallized to the point where the fuel gels and becomes resistant to flow. Pour points also vary but they usually occur from  $10^{\circ}\text{F}$  ( $5.6^{\circ}\text{C}$ ) to  $20^{\circ}\text{F}$  ( $11.1^{\circ}\text{C}$ ) below the cloud point.

#### **Solving the Problem**

As long as diesel or a winterized diesel blend is used during winter conditions, most fuel related winter problems can be avoided. However, encountering poor quality or unconditioned fuel is inevitable, so some precautions should be made when operating in cold weather. Depending on the severity of winter operating conditions, many operators may choose to protect their equipment through the use of fuel additives, fuel heaters, and fuel water separators.

**A Word of Caution:** Never add gasoline or alcohol to diesel fuel to help with cold weather operation. The practice creates an explosion danger and will damage the fuel injection system.