## 5.1.8 Specifications for Natural Gas Engine

Listed in Table 5-4 are the natural gas specifications for Detroit Diesel engines.

<table>
<thead>
<tr>
<th>Property</th>
<th>Limit</th>
<th>ASTM Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hydrocarbon</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MethaneEthane-PropaneC4 and Higher</td>
<td>mole percent88% Minimum6% max.1.7% max.0.3% max.</td>
<td>D 1945</td>
</tr>
<tr>
<td><strong>Other Gaseous Species</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HydrogenCarbon dioxide + Nitrogen + OxygenOxygenCarbon MonoxideOther Species MethanolSulfur, Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Performance Related Properties</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor Octane NumberWobbe Number</td>
<td>115 Minimum1290-1380 BTU/SCF</td>
<td>*D 2623D 3588</td>
</tr>
<tr>
<td><strong>Contaminates</strong></td>
<td>†</td>
<td></td>
</tr>
<tr>
<td><strong>Pressure Water Dew PointTemperature, max.</strong></td>
<td>‡</td>
<td>D 1142</td>
</tr>
<tr>
<td><strong>Pressure Hydrocarbon Dew PointTemperature, max.</strong></td>
<td>‡ Below which will form1% condensate</td>
<td>D 1142</td>
</tr>
<tr>
<td><strong>Odorant</strong></td>
<td>§</td>
<td></td>
</tr>
</tbody>
</table>

* Test Method D 2623 was obsoleted by ASTM in 1991. Wobbe Index (WI), also known as Wobbe Number, is a measure of fuel energy flow rate through a fixed orifice under given inlet conditions. Numerically, WI= (dry, higher heating value)/(Specific gravity).
† The compressed natural gas shall not contain dust, sand, dirt, gums, oils, or other substances in an amount sufficient to be injurious to the fuel station equipment or the vehicle being fueled.
‡ The water and hydrocarbon dew point at fuel pressure shall be at least 10°F below the 99.0% winter design temperature listed in Chapter 24, Table 1, Climatic Conditions for the United States, in American Society of Heating, Refrigerating and Air Conditioning Engineer’s (ASHRAE) Handbook, 1989 fundamentals volume. Testing for water and hydrocarbon vapor shall be in accordance with ASTM D 1142, utilizing the Bureau of Mines apparatus.
§ The natural gas at ambient conditions must have a distinctive odor potent enough for its presence to be detected down to a concentration in air of 1% by volume.
|| For Genset applications, when using fuel containing sulfur in excess of 16 ppm, the oil change interval must be reduced. Refer to Item 1 in the Lubrication and Preventive Maintenance Intervals sections.

### Table 5-4 Natural Gas Specifications for Detroit Diesel Natural Gas Engines
5.2 LUBRICATING OIL (DIESEL)

The selection of the proper lubricating oil is important for achieving the long and trouble-free service Detroit Diesel Series 60 engines are designed to provide. Only oils displaying the American Petroleum Institute (API) Symbol shown below are recommended. This symbol assures that the lubricant meets the minimum performance levels necessary for proper engine performance and durability.

5.2.1 Lubricant Requirement — All Diesel, Except Pleasure Craft Marine

Lubricants meeting these criteria have provided maximum engine life when used in conjunction with recommended oil drain and filter maintenance schedules. For the API symbol for this, see Figure 5-1.

![API Symbol]

Figure 5-1 API Symbol
Lubricants meeting these criteria have provided maximum engine life when used in conjunction with specified oil drain and filter maintenance schedules. Only oils licensed by API may be used in Detroit Diesel engines. Lubricants meeting API Service category CH-4 are intended for use primarily with low (0.05%) sulfur fuel and may be used in all Detroit Diesel Series 60 engines.

API CG-4 and CF-4 oils may be used when CH-4 oils are not available; however, their use may require a reduction in oil drain interval depending upon the application and the fuel sulfur level.

At ambient temperatures below \(-20^\circ C\) \((-4^\circ F)\) when sufficient starter speed cannot be achieved with SAE 15W-40 oils, the use of 5W-XX and 10W-XX oils, where XX is 30 or 40, may be used to improve startability provided they are API CH-4 and have demonstrated field performance in DDC engines. These oils must possess a HT/HS of 3.7 minimum.

When the use of high sulfur fuel (greater than 0.5% mass sulfur) is unavoidable, higher alkalinity lubricants are recommended. High sulfur fuels require modification to oil drain intervals. For further information refer to the section titled "The Use of High Sulfur Fuels."
5.2.2 Lubricant Requirement — Heat Exchanger-Cooled Pleasure Craft Marine

Lubricants meeting these criteria have provided maximum engine life when used in conjunction with recommended oil drain and filter maintenance schedules. For the API symbol for this, see Figure 5-2.

<table>
<thead>
<tr>
<th>NOTICE:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use only 15W-40 lubricating oil in Series 60 pleasure craft marine engines.</td>
</tr>
</tbody>
</table>

**Figure 5-2** API Symbol—Heat Exchanger-Cooled Pleasure Craft Marine

Lubricants meeting these criteria have provided maximum engine life when used in conjunction with specified oil drain and filter maintenance schedules. Only oils licensed by API may be used in Detroit Diesel engines. Lubricants meeting API Service category CH-4 are intended for use primarily with low (0.05%) sulfur fuel and should be used in Detroit Diesel Series 60 pleasure craft marine engines.