# Fuels, Diesel and Alternative (CI)

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## DIESEL FUEL SPECIFICATIONS

John Deere compression ignition (diesel) engines are designed to operate on #2 Diesel Fuels which meet U.S. Military Specification VV-F-800E, ASTM D975 or EN 590 Standard Specifications for Diesel Fuel Oils. Fuel specifications recommended for use in John Deere Diesel Engines follow:

- Fuel Specific Gravity @ 15 °C..... 0.850 (API 35)
- Kinematic Viscosity @ 40 °C..... 2.50 cSt
- Fuel Lower Heating Value ..... 42,765 kJ/kg (18,385 Btu/lb)
- Fuel Temperature at Pump Inlet..... 40 °C (104 °F)
- Cetane Number ..... 45
  Cetane number greater than 50 is preferred for temperatures below -4°F (-20°C) or elevations above 5000 feet (1500 m).
- Cloud Point below the expected low temperature or Cold Filter Plugging Point (CFFP) at least 9°F (5°C) below the expected low temperature.
- Sulfur Content.....Refer to “Fuel Capabilities by Product” Sections

## DIESEL EXHAUST FLUID (DEF)

The Selective Catalytic Reduction (SCR) system is used on some John Deere engines. This system utilizes DEF to activate the catalyst in the SCR system. Information pertaining to this system is available in Application Guideline, “Selective Catalytic Reduction System (AG34).”

## DIESEL FUEL RECOMENDATIONS

### Diesel Fuel Sulfur Content

Fuel quality and sulfur content must comply with government regulations for the region in which the engine operates. Fuel sulfur is measured on mass content. The term ppm represents mg/kg and these terms are used interchangeably in this document. For the recommended sulfur level, refer to the “Fuel Capabilities by Products” sections in this document, or the Operator's Manual for the specific engine model.

### Ultra Low Sulfur Diesel (ULSD) Fuel Hazard

**AVOID STATIC ELECTRICITY RISK WHEN REFUELING**

The removal of sulfur and other compounds in Ultra Low Sulfur Diesel (ULSD) fuel decreases its conductivity and increases its ability to store static charge. Refineries may have treated the fuel with a static dissipating additive. However, there are many factors that can reduce the effectiveness of the additive over time.

Static charges can build up in ULSD fuel while it is flowing through fuel delivery systems. Static electricity discharge when combustible vapors are present could result in a fire or explosion. Therefore, it is important to ensure that the entire system used to refuel your machine (fuel supply tank, transfer pump, transfer hose, nozzle, and others) is properly grounded and bonded. To ensure the delivery system is in compliance with fueling standards for proper grounding and bonding practices consult with your fuel or fuel system supplier.

### Diesel Fuel Lubricity

Most diesel fuels, including low- and ultra low-sulfur fuels manufactured in North America and Western Europe, have adequate lubricity to ensure proper engine operation and durability. However, some diesel fuel may lack the necessary lubricity. Fuel lubricity should pass a maximum scar diameter of 0.45 mm as measured by ASTM D6079 or ISO12156-1. If fuel of low or unknown lubricity is used, add John Deere PREMIUM DIESEL FUEL CONDITIONER™ (or equivalent) at the specified concentration. Do not mix engine oil or any type of lubricating oil with diesel fuel.

### Cold Weather Diesel Fuel Additives

When outside temperatures drop below 32°F (0°C), use John Deere PREMIUM DIESEL FUEL CONDITIONER™ (winter formula) or equivalent, at the specified concentrations. Cloud Point to be below the lowest expected ambient temperature or Cold Filter Plug Point 5°C below the lowest expected ambient temperature. DO NOT mix gasoline or ethanol based fuels with diesel fuel. Improper fuel additive usage may result in engine damage. When running with BIODIESEL blends, wax formation can occur at warmer temperatures than with straight petroleum diesel. Begin to use John Deere approved fuel conditioners (check with your local John Deere dealer) at 40°F (5°C) to treat biodiesel fuels during the cold weather season. Below 32°F (0°C ) John Deere requires the use of B5 or lower blends. Below 14°F (-10°C) John Deere requires the use of winter blend diesel fuel. John Deere additives meet ULSD requirements and are compatible with Diesel Oxidation Catalyst.

## Diesel Fuel Analysis

To monitor the properties and quality of diesel fuel, DIESELSCAN™ is a John Deere testing program that is recommended. Check with your John Deere dealer for availability of DIESELSCAN™ kits.

## Machine Refueling Static Control Information

Original Equipment Manufacturers (OEM's) and Distributors who incorporate John Deere engines in their product(s) should conduct a review of fuel system and related components to provide appropriate protection for the safety of personnel involved in the operation or maintenance of products using John Deere engines. This may include review, certification, or compliance with relevant industry recommendations, standards or regulations.

A non-exhaustive list of recommendations, regulations or standards that may be applicable is below:

- SAE J1645 Fuel Systems and Components - Electrostatic Charge Mitigation
- ISO 14121-1 and 2 Safety of machinery - Risk assessment
- ISO 12100-1 and 2 Safety of machinery - Basic concepts, general principles for design

Depending on the application, other recommendations, regulations, or standards may apply.

## Long-term Fuel Storage

To minimize condensation, keep tanks as full as practical. Fuel tanks must be properly vented and sealed from contamination. When fuel is stored for an extended period of time, add a fuel conditioner to stabilize the fuel and prevent water absorption.

**Important**: DO NOT USE BIODIESEL DURING MACHINE STORAGE. When using biodiesel blends, switch to petroleum diesel for long-term storage. The allowable storage interval will vary depending on biodiesel concentration and the "produced on date." For specific recommendations, contact Application Engineering.

Before storage, operate engine on at least one complete tank of petroleum diesel fuel to purge the fuel system. Ensure that the fuel tank is full during storage to prevent water build up due to condensation.

Biodiesel fuel is not recommended for stand-by equipment that can have minimal fuel consumption (such as standby generators, fire protection, etc.). For standby applications, use only petroleum based diesel fuel with John Deere approved fuel conditioners/additives. For fuel conditioners/additives, check with your local John Deere dealer.

# FUEL VISCOSITY

## Low Viscosity Fuels and Jet Fuels

John Deere engines will operate on lower viscosity fuels. As fuel viscosity and lower heating value decrease, engine power will be reduced. Engine response, load recovery, and starting time may also be adversely affected. Additionally, low viscosity fuels may affect engine combustion, causing the engine to misfire or engine white smoke issues during some operating conditions.

The reduced lubricating properties of lower viscosity fuels may also reduce fuel system durability. The use of John Deere approved fuel conditioners (check with your local John Deere dealer) at the specified concentration is recommended. Special internal fuel system components are provided for some rotary fuel injection pumps when low viscosity fuel is used.

Jet A type fuel should only be used on John Deere engines with the approved harden fuel components. Engine operation using extremely low viscosity fuels such as JP-4 and Jet B is not recommended. Significant fuel injection equipment wear results from use of fuels with viscosities below 2.0 centistokes. If aviation fuels are used as an emergency fuel, lubricity must be raised by adding John Deere approved fuel conditioners (at the specified concentration). Even with additives, a performance loss should be expected. If the need to use other-than-recommended fuels is anticipated, contact John Deere Application Engineering.

## High Viscosity Fuels

The use of high specific gravity (viscosity) fuels could result in power levels that exceed the engine's approved power rating. Operation above the approved engine power level will result in reduced engine life and increased operating costs. The use of these fuels is not recommended for PowerTech Plus engines due to likely high sulfur levels. 'Heavy' fuels may cause fuel filter plugging at low temperature, poor starting, additional combustion zone deposits and higher wear due to higher sulfur levels. Pretreatment of 'heavy' fuels may be required, such as prefiltering, water separation and heating. If the need to use other-than-recommended fuels is anticipated, contact John Deere Application Engineering.

## BIODIESEL FUEL

Biodiesel is a fuel comprised of mono-alkyl esters of long chain fatty acids derived from vegetable oils. Biodiesel blends are biodiesel mixed with petroleum diesel fuel on a volume basis. Most common feedstocks are:

- Soybean Methyl Ester - SME, predominant in North America
- Rapeseed (or Canola) Methyl Ester - RME, predominant in Europe
- Palm Methyl Ester - PME, predominant in Asia

Biodiesel users in the U.S. are strongly encouraged to purchase biodiesel blends from a BQ-9000 Certified Marketer and sourced from a BQ-9000 Accredited Producer (as certified by the National Biodiesel Board). Certified Marketers and Accredited Producers can be found at the following website:

http://www.bq-9000.org

While 5% blends are preferred (B5), biodiesel concentrations up to a 20% blend (B20) in petroleum diesel fuel can be used in all John Deere engines. Biodiesel blends up to B20 can be used ONLY if the biodiesel (100% biodiesel or B100) meets ASTM D6751 (US), EN 14214 (EU), or equivalent specification. Expect a 2% reduction in power and a 3% reduction in fuel economy when using B20. John Deere approved fuel conditioners containing detergent/dispersant additives (check with your local John Deere dealer) are recommended when using lower biodiesel blends, but are required when using blends of B20 or greater.

John Deere engines can operate on biodiesel blends above B20 (up to 100% biodiesel) ONLY if the biodiesel is permitted by law and meets the EN 14214 specification (primarily available in Europe). Engines operating on biodiesel blends above B20 may not fully comply with all applicable emissions regulations. Expect up to a 12% reduction in power and an 18% reduction in fuel economy when using 100% biodiesel. John Deere approved fuel conditioners containing detergent/dispersant additives are required. Biodiesel concentration above B20 is not allowed on engines with Exhaust Filters. For additional information, see Operator's Manual.

Tank blending is not an acceptable method for combining biodiesel and petroleum Diesel fuel. Tank blending will result in uneven concentrations of biodiesel fuel that can result in engine durability, performance and storage problems.

When using biodiesel fuel, the engine oil level must be checked daily. If oil becomes diluted with fuel, shorten oil change intervals. Refer to Diesel Engine Oil and Filter Service Intervals for more details regarding biodiesel and engine oil change intervals.

**Important**: Raw pressed vegetable oils are NOT acceptable for use as fuel in any concentration in John Deere engines. Their use could cause engine failure.

## RENEWABLE DIESEL FUEL

Renewable diesel is basically identical to petroleum diesel fuel that is created by Hydrotreating fats and oils. Renewable diesel that meets EN 590 or ASTM D975 can be substituted for petroleum derived fuel for use at any concentration level.

## MILITARY APPLICATIONS (FUEL)

Special fuel usage capability comprises only one requirement for military contract applications. Military contracts should be reviewed carefully to confirm that all requested performance and application component requirements have been previously demonstrated on the fuel system and engine model being quoted. If the performance capability or availability of required application components for the engine are unknown or in doubt, the military contract product description information should be forwarded to your John Deere Power Systems Regional Sales Manager or Sales Engineer for review and comment prior to quotation of the engine package.

## FUMIGATION / GAS INDUCTION ON COMPRESSION IGNITION ENGINES

Air inlet fumigation of alternate fuels (examples of but not limited to: natural gas, propane, and methane) is not endorsed by John Deere. John Deere compression ignition engines are designed, calibrated, and EPA emission certified to run on Diesel fuels.

Operation on alternate fuels or controls (such as fumigation) can increase heat rejection above specified limits as well as alter the stated performance of the engine. Operation in this manner may be subject to EPA fines and other penalties.

Warranty coverage on performance affected hardware may be rejected. Component failures caused by alternate fuels are not considered defects in materials or workmanship and are thereby not reimbursable. John Deere is not responsible for the personal safety of those involved in operation or maintenance of the product when operated on fumigated fuels.

## FUEL CAPABILITIES BY PRODUCT

### PowerTech (and earlier) and PowerTech M Engines with Mechanical Rotary and DE10 Electronic Fuel Injection Pumps (2.4L / 2.9L / 3.0L / 4.5L / 6.8L)

| DESCRIPTION | TYPE | COMMENTS |
|---|---|---|
| **Diesel Fuels** | No. 2-D | Recommended fuel for ambients above 40 °F (5 °C). Use of diesel fuel with sulfur content less than 2000 mg/kg (2000 ppm) is RECOMMENDED. Use of diesel fuel with sulfur content 2000 mg/kg to 10,000 mg/kg (2000 ppm to 10,000 ppm) REDUCES the oil and filter change interval. For additional information, see the Operator's Manual. |
| | No. 1-D | Recommended for ambients below 40 °F (5 °C). Power loss up to 5% can be expected. |
| | DF-2 | U.S. Federal Specification, regular grade. See No. 2-D comments. |
| | DF-1 | U.S. Federal Specification, winter grade. See No. 1-D comments. Power loss up to 5% can be expected. |
| | DF-A | U.S. Federal Specification, arctic grade. Power loss up to 6% can be expected. Injection pumps may exhibit increased component wear with extended use of this fuel due to high dewaxing and low viscosity. Special transfer pump and drive component parts are required for Stanadyne injection pumps. Stanadyne mechanical gen-set pumps also require special governor components. Stanadyne mechanical fuel injection pump options identified as "Jet A, JP5/JP8 Fuel Capable" are equipped with the required parts. Standard Stanadyne mechanical pumps can be converted by installing a Stanadyne Arctic conversion kit. Special components are not required for Lucas-CAV injection pumps. All DE10 electronic fuel injection pumps are jet-alternative-fuel capable as described below with no component changes. All 2.4L and 3.0L engines are jet-alternative-fuel capable as described below with no component changes. |
| **Biodiesel** | B5 | Allowed if fuel meets ASTM D975 or EN590 when blended. The 100% biodiesel or B100 portion of the blend must meet ASTM D6751, EN 14214, or equivalent standard. Small power loss (0.5%). |
| | B20 | Allowed if fuel meets ASTM D7467 when blended. The 100% biodiesel or B100 portion of the blend must meet ASTM D6751, EN 14214, or equivalent standard. Power loss up to 2% can be expected. John Deere approved fuel conditioners containing detergent/dispersant additives are recommended. |
| | >B20 | Allowed ONLY if the 100% biodiesel or B100 meets EN 14214 specification (primarily available in EU). Power loss up to 12% and reduction in fuel economy up to 18% can be expected. John Deere approved fuel conditioners containing detergent/dispersant additives are REQUIRED. Engines operating on biodiesel blends above B20 may not fully comply with, or be permitted by, all applicable emission regulations. |
| **Burner Fuels** | No. 2 | Higher density and specific gravity than base fuel No. 2-D. A power increase up to 3% can be expected. |
| | No.1 | Lower viscosity than base fuel No. 2-D. A power loss up to 2% can be expected. |
| **Aviation Fuels** | Jet A | Lower viscosity and density than base fuel No. 2-D. Power loss up to 10% can be expected. Injection pumps may exhibit increased component wear with extended use of this fuel. Special transfer pump and drive component parts are required for Stanadyne mechanical injection pumps. Special components are not required for Lucas-CAV injection pumps. See DF-A comments for details. |
| | Jet A-1 | See Jet A and DF-A comments. Power loss up to 10% can be expected. |
| | Jet B | Not Recommended. Lower density and extremely low viscosity compared to base fuel No. 2-D will result in greatly accelerated injection pump wear, poor starting, and a power loss of up to 14%. Lucas-CAV injection pumps should not be used with Jet-B fuel. |
| | JP-4 | Not Recommended. Military equivalent of Jet B. See Jet B comments. Power loss up to 14% can be expected. Lucas-CAV injection pumps should not be used with JP-4 fuel. |
| | JP-5; JP-7; JP-8 | See Jet A and DF-A comments. Power loss up to 10% can be expected. |

## FUEL CAPABILITIES BY PRODUCT (Continued)

### PowerTech (and earlier) Engines (4.5 L / 6.8 L / 8.1 L / 10.5 L / 12.5 L)

| DESCRIPTION | TYPE | COMMENTS |
|---|---|---|
| **Diesel Fuels** | No. 2-D | Recommended fuel for ambients above 40 °F (5 °C). Use of diesel fuel with sulfur content less than 2000 mg/kg (2000 ppm) is RECOMMENDED. Use of diesel fuel with sulfur content 2000 mg/kg to 10,000 mg/kg (2000 ppm to 10,000 ppm) REDUCES the oil and filter change interval. For additional information, see the Operator's Manual. |
| | No. 1-D | Recommended for ambients below 40 °F (5 °C). Power loss up to 5% can be expected due to lower viscosity and reduced lower fuel heating value. |
| | DF-2 | U.S. Federal Specification, regular grade. See No. 2-D comments. |
| | DF-1 | U.S. Federal Specification, winter grade. See No. 1-D comments. Power loss up to 5% can be expected. |
| **Biodiesel** | B5 | Allowed if fuel meets ASTM D975 or EN590 when blended. The 100% biodiesel or B100 portion of the blend must meet ASTM D6751, EN 14214, or equivalent standard. Small power loss (0.5%). |
| | B20 | Allowed if fuel meets ASTM D7467 when blended. The 100% biodiesel or B100 portion of the blend must meet ASTM D6751, EN 14214, or equivalent standard. Power loss up to 2% can be expected. John Deere approved fuel conditioners containing detergent/dispersant additives are recommended. |
| | >B20 | Allowed ONLY if the 100% biodiesel or B100 meets EN 14214 specification (primarily available in EU). Power loss up to 12% and reduction in fuel economy up to 18% can be expected. John Deere approved fuel conditioners containing detergent/dispersant additives are REQUIRED. Engines operating on biodiesel blends above B20 may not fully comply with, or be permitted by, all applicable emission regulations. |
| **Burner Fuels** | No. 2 | Higher density and specific gravity than base fuel No. 2-D. A power increase up to 3% can be expected. |
| | No.1 | Lower viscosity than base fuel No. 2-D. A power loss up to 2% can be expected. |
| **Aviation Fuels** | Jet A | Lower viscosity and density than base fuel No. 2-D. Power loss up to 10% can be expected. Not recommended for engines with VP44, HPCR or EUI fuel systems. |
| | Jet A-1 | See Jet A comments. Power loss up to 10% can be expected. |
| | Jet B | Not Recommended, potential failure to fuel system. For more details, see page 3. Lower density and extremely low viscosity compared to base fuel No. 2-D. Power loss up to 14% can be expected. |
| | JP-4 | Not Recommended. See Jet B comments. |
| | JP-5 | See Jet A comments. Power loss up to 10% can be expected. |
| | JP-7 | See Jet A comments. Power loss up to 10% can be expected. |
| | JP-8 | See Jet A comments. Power loss up to 10% can be expected. |

## FUEL CAPABILITIES BY PRODUCT (Continued)

### PowerTech E Engines (2.4 L / 2.9L / 3.0 L / 4.5 L / 6.8 L / 9.0L / 13.5L)

(If any of these engines have John Deere supplied Diesel Oxidation Catalyst, or Selective Catalytic Reduction system, see page 9.)

| DESCRIPTION | TYPE | COMMENTS |
|---|---|---|
| **Diesel Fuels** | No. 2-D | Recommended fuel for ambients above 40 °F (5 °C). Use of diesel fuel with sulfur content less than 1000 mg/kg (1000 ppm) is RECOMMENDED. Use of diesel fuel with sulfur content 1000 mg/kg to 10,000 mg/kg (1000 ppm to 10,000 ppm) REDUCES the oil and filter change interval. For additional information, see the Operator's Manual. |
| | No. 1-D | Recommended for ambients below 40 °F (5 °C). Power loss up to 4% can be expected due to lower viscosity and reduced lower fuel heating value. |
| | DF-2 | U.S. Federal Specification, regular grade. See No. 2-D comments. |
| | DF-1 | U.S. Federal Specification, winter grade. See No. 1-D comments. Power loss up to 4% can be expected. |
| **Bio-diesel** | B5 | Allowed if fuel meets ASTM D975 or EN590 when blended. The 100% biodiesel or B100 portion of the blend must meet ASTM D6751, EN 14214, or equivalent standard. Small power loss (0.5%). |
| | B20 | Allowed if fuel meets ASTM D7467 when blended. The 100% biodiesel or B100 portion of the blend must meet ASTM D6751, EN 14214, or equivalent standard. Power loss up to 2% can be expected. John Deere approved fuel conditioners containing detergent/dispersant additives are recommended. |
| | >B20 | Allowed ONLY if the 100% biodiesel or B100 meets EN 14214 specification (primarily available in EU). Power loss up to 12% and reduction in fuel economy up to 18% can be expected. John Deere approved fuel conditioners containing detergent/dispersant additives are REQUIRED. Engines operating on biodiesel blends above B20 may not fully comply with, or be permitted by, all applicable emission regulations. |
| **Burner Fuels** | No. 2 | Higher density and specific gravity than base fuel No. 2-D. A power increase up to 2.5% can be expected. |
| | No. 1 | Lower viscosity than base fuel No. 2-D. A power loss up to 1.5% can be expected. |
| **Aviation Fuels** | Jet A | Not Recommended, potential failure to fuel system. For more details, see page 3. Lower viscosity and density than base fuel No. 2-D. Power loss up to 10% can be expected. |
| | Jet A-1 | See Jet A comments. Power loss up to 10% can be expected. |
| | Jet B | Not Recommended, potential failure to fuel system. For more details, see page 3. Lower density and extremely low viscosity compared to base fuel No. 2-D. Power loss up to 14% can be expected. |
| | JP-4 | Not Recommended. See Jet B comments. |
| | JP-5 | See Jet A comments. Power loss up to 10% can be expected. |
| | JP-7 | See Jet A comments. Power loss up to 10% can be expected. |
| | JP-8 | See Jet A comments. Power loss up to 10% can be expected. |

## FUEL CAPABILITIES BY PRODUCT (Continued)

### PowerTech Plus Engines (4.5 L / 6.8 L / 9.0 L / 13.5 L)

(If any of these engines have John Deere supplied Diesel Oxidation Catalyst, or Selective Catalytic Reduction system, see page 9.)

| DESCRIPTION | TYPE | COMMENTS |
|---|---|---|
| **Diesel Fuels** | No. 2-D | Recommended fuel for ambients above 40 °F (5 °C). Use of diesel fuel with sulfur content less than 1000 mg/kg (1000 ppm) is RECOMMENDED. Use of diesel fuel with sulfur content 1000 mg/kg to 2000 mg/kg (1000 ppm to 2000 ppm) REDUCES the oil and filter change interval. For additional information, see the Operator's Manual. BEFORE using diesel fuel with sulfur content greater than 2000 mg/kg (2000 ppm), contact your John Deere Dealer. |
| | No. 1-D | Recommended for ambients below 40 °F (5 °C). Power loss up to 4% can be expected due to lower viscosity and reduced lower fuel heating value. |
| | DF-2 | U.S. Federal Specification, regular grade. See No. 2-D comments. |
| | DF-1 | U.S. Federal Specification, winter grade. See No. 1-D comments. Power loss up to 4% can be expected. |
| | DF-A | U.S. Federal Specification, arctic grade. Highly dewaxed and low viscosity. Power loss up to 5.5% can be expected. |
| **Bio-diesel** | B5 | Allowed if fuel meets ASTM D975 or EN590 when blended. The 100% biodiesel or B100 portion of the blend must meet ASTM D6751, EN 14214, or equivalent standard. Small power loss (0.5%). |
| | B20 | Allowed if fuel meets ASTM D7467 when blended. The 100% biodiesel or B100 portion of the blend must meet ASTM D6751, EN 14214, or equivalent standard. Power loss up to 2% can be expected. John Deere approved fuel conditioners containing detergent/dispersant additives are recommended. |
| | >B20 | Allowed ONLY if the 100% biodiesel or B100 meets EN 14214 specification (primarily available in EU). Power loss up to 12% and reduction in fuel economy up to 18% can be expected. John Deere approved fuel conditioners containing detergent/dispersant additives are REQUIRED. Engines operating on biodiesel blends above B20 may not fully comply with, or be permitted by, all applicable emission regulations. |
| **Burner Fuels** | No. 2 | Not recommended. Higher sulfur levels likely, resulting in deposits and wear. Higher specific gravity than base No. 2-D fuel. A power increase up to 3% can be expected. |
| | No.1 | Not recommended. Higher sulfur levels possible, resulting in engine wear and deposits. Lower viscosity than base fuel No. 2-D. A power loss up to 2% can be expected. |
| **Aviation Fuels** | Jet A | Not recommended, potential failure to fuel system. For more details, see page 3. Lower viscosity and density than base fuel No. 2-D. Power loss up to 10% can be expected. Unique engine components have been released on some engine models and are jet-alternate-fuel capable. For details, contact your JDPS Sales or Application Engineer. |
| | Jet A-1 | See Jet A comments. Power loss up to 10% can be expected. |
| | Jet B | Not Recommended, potential failure to fuel system. For more details, see page 3. Lower density and extremely low viscosity compared to base fuel No. 2-D. Power loss up to 14% can be expected. |
| | JP-4 | Not Recommended. See Jet B comments. |
| | JP-5 | See Jet A comments. Power loss up to 10% can be expected. |
| | JP-7 | See Jet A comments. Power loss up to 10% can be expected. |
| | JP-8 | See Jet A comments. Power loss up to 10% can be expected. |

## FUEL CAPABILITIES BY PRODUCT (Continued)

### PowerTech EWX, PWX, PWL, PWS, PVX, PVL, PVS, PSX, PSL, PSS, Engines (2.9L / 4.5 L / 6.8 L / 9.0 L / 13.5 L) (Engines with John Deere supplied Diesel Oxidation Catalyst, or Selective Catalytic Reduction system)

The maximum fuel sulfur content must not exceed 0.002% (20 ppm) for any of the below listed fuels. This is the critical limit for the material in the Diesel Oxidation Catalyst and the Selective Catalytic Reduction system. Higher levels will cause permanent damage to the catalytic device.

| DESCRIPTION | TYPE | COMMENTS |
|---|---|---|
| **Diesel Fuels** | No. 2-D | Recommended fuel for ambients above 40 F (5 C). Fuel sulfur content of 0.0015% (15 ppm) or less is recommended. The maximum fuel sulfur content must not exceed 0.002% (20 ppm). For additional information, see the Operator's Manual. |
| | No. 1-D | Recommended fuel for ambients below 40 F (5 C). Fuel sulfur content of 0.0015% (15 ppm) or less is recommended. The maximum fuel sulfur content must not exceed 0.002% (20 ppm). Power loss up to 4% can be expected due to lower viscosity and reduced lower fuel heating value. |
| | DF-2 | U.S. Federal Specification, regular grade. See No. 2-D comments. Fuel sulfur content must be less than 0.002% (20 ppm). |
| | DF-1 | U.S. Federal Specification, winter grade. See No. 1-D comments. Power loss up to 4% can be expected. Fuel sulfur content must be less than 0.002% (20 ppm). |
| | DF-A | U.S. Federal Specification, arctic grade. Highly dewaxed and low viscosity. Power loss up to 5.5% can be expected. Fuel sulfur content must be less than 0.002% (20 ppm). |
| **Bio-diesel** | B5 | Allowed if fuel meets ASTM D975 or EN590 when blended. The 100% biodiesel or B100 portion of the blend must meet ASTM D6751, EN 14214, or equivalent standard. The fuel sulfur content must be less than 0.002% (20ppm). Small power loss (0.5%). |
| | B20 | Allowed if fuel meets ASTM D7467 when blended. The 100% biodiesel or B100 portion of the blend must meet ASTM D6751, EN 14214, or equivalent standard. The fuel sulfur content must be less than 0.002% (20ppm). Power loss up to 2% can be expected. John Deere approved fuel conditioners containing detergent/dispersant additives are REQUIRED. For additional information, see Operator's Manual. |
| | >B20 | Not Allowed. Biodiesel concentration above B20 may harm the engine's emission control systems and should not be used. Risk may include, but not limited to, more frequent stationary regeneration, soot accumulation, and increased intervals for ash removal. Engines operating on biodiesel blends above B20 may not fully comply with, or be permitted by, all applicable emission regulations. For additional information, see Operator's Manual. |
| **Burner Fuels** | All | Not allowed. Burner Fuel has quality and cleanliness concerns and the sulfur content level is greater than 0.002% (20 ppm). These fuels are not allowed for use with John Deere engines with Diesel Oxidation Catalyst. This includes fuels such as; No. 2 and No. 1. |
| **Aviation Fuels** | All | Not allowed. Aviation Fuel has sulfur content levels greater than 0.002% (20 ppm) and are not allowed for use with John Deere engines with Diesel Oxidation Catalyst. This includes fuels such as; Jet A, Jet A-1, Jet B, JP-4, JP-5, JP-7 and JP-8. |

## History of Changes

| Date | Section Owner | EIB | Page(s) | Description of Change(s) |
|---|---|---|---|---|
| 09 Jul 24 | Lester Franzen | | All pages | Entire section was reviewed for compatability with IT4 engines. |
| | | | page 2 | Diesel fuel sulfur content references have been revised. |
| | | | pg. 5, 6, 7, 8 | Biodiesel references have been revised. |
| | | | page 9 | “Fuel Capabilities by Product” information for IT4 engines was added. |
| 11 Apr 05 | Lester Franzen | - - - | page 6 | To Aviation Fuels \ Jet A, “VP44” added to the ‘not recommended’ list. |
| 12 Jan 17 | Lester Franzen | - - - | pages 5-9 | Revised Biodiesel information. |
| 12 May 31 | Lester Franzen | - - - | pages 5-8 | Several minor text revisions. |
| 12 Mar 22 | Lester Franzen | - - - | pages 1, 2<br>pages 7,8,9 | • New text added, “Diesel Exhaust Fluid (DEF).”<br>• Titles modified: New engine models added; Reference to ‘see page 9.’ |
| 13 Sep 11 | Lester Franzen | - - - | pages 2<br>page 3<br>pages 5-9 | • New text added, “ULSD Fuel Hazard.”<br>• New text added, “Machine Refueling Static Control Information.”<br>• Revised ‘Comments’ text for No. 2-D. |
| 13 Oct 09 | Lester Franzen | | pages 5-8 | Selected text removed. |
| 14 May 15 | Lester Franzen | | pages 3 | Minor text revision added. |
| 15 Feb 12 | Lester Franzen | | pages 7-9 | Titles modified to include ‘Selective Catalytic Reduction system,’ and added new engine models. |
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