

**Solution Number:** 76091

**Solution Summary:** John Deere Diesel Fuel Conditioners

**Publication Date:** Aug 22 2008

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**\*\*Paper copies of solutions may not be the most current solutions\*\***

**Complaint or Symptom :**

Part numbers for fuel conditioners are difficult to find.

**Problem or Situation :**

With newer John Deere diesel engines using a High Pressure Common Rail and Electronic Injectors, it is critical to protect the fuel system from water and other contaminants. It is highly recommended to use the following fuel conditioners at all times to help ALL diesel engines perform at the highest level.

**Solution :**

The latest John Deere fuel conditioners have been tested for reactivity with additives (primarily corrosion inhibitors and lubricity additives) added in the fuel by refiners and found to be compatible. Compatibility is important since the combination of certain additive chemistries, catalyzed by the high temperatures and pressures present in the injection pump and injectors, can otherwise result in deposit formation which can happen even if the filtration system is in specification and functioning normally. The new fuel conditioners have been extensively tested and found to be superior to the existing John Deere fuel conditioner. Although the new conditioners represent an improvement over the existing conditioner, the John Deere Fuels Group continues to approve the use of existing conditioners offered by John Deere.

Biodiesel Fuel Conditioners

TY26496 – Summer Biodiesel Fuel Conditioner, 16 oz

TY26497 – Summer Biodiesel Fuel Conditioner, 1 gal

TY26493 – Summer Biodiesel Fuel Conditioner, 5 gal

TY26494 – Winter Biodiesel Fuel Conditioner, 16 oz

TY26495 – Winter Biodiesel Fuel Conditioner, 1 gal

TY26490 – Winter Biodiesel Fuel Conditioner, 5 gal

**Note:** The following part numbers are still available until stock is depleted:

TY26412 – Summer Biodiesel Fuel Conditioners, 16 oz

TY26413 – Summer Biodiesel Fuel Conditioners, 1 gal

TY26367 – Winter Biodiesel Fuel Conditioners, 16 oz

TY26368 – Winter Biodiesel Fuel Conditioners, 1 gal

Premium Diesel Fuel Conditioners

TY26491 – Summer Premium Diesel Fuel Conditioner, 16 oz

TY26492 – Summer Premium Diesel Fuel Conditioner, 1 gal

TY26531 – Summer Premium Diesel Fuel Conditioner, 5 gal

TY26488 – Winter Premium Diesel Fuel Conditioner, 16 oz

TY26489 – Winter Premium Diesel Fuel Conditioner, 1 gal

TY26530 – Winter Premium Diesel Fuel Conditioner, 5 gal

**Note:** The following part numbers are still available until stock is depleted:

TY16233 – Summer Premium Diesel Fuel Conditioners, 16 oz

TY16234 – Summer Premium Diesel Fuel Conditioners, 1 gal

TY16230 – Winter Premium Diesel Fuel Conditioners, 16 oz

TY16231 – Winter Premium Diesel Fuel Conditioners, 1 gal

### FUELSAVER

PM49614 – FUELSAVER (Used to Preserve and Protect Biodiesel and Petrodiesel Fuels), 32 oz

### Fuel Test Kit

AT180344 – DIESELSCAN Test Kit

**IMPORTANT:** Do NOT mix diesel engine oil or any other type of lubrication oil (ex: Automatic Transmission Fluid (ATF)) with diesel fuel. Improper fuel additive usage may cause severe damage to fuel injection components on diesel engines.

### **Additional Information :**

For more information on conditioners and their purpose, refer to the following links:

#### Biodiesel Fuel Conditioners

[https://jdparts.deere.com/partsmkt/document/english/pmac/38362\\_fb\\_BiodieselFuelConditioners.htm](https://jdparts.deere.com/partsmkt/document/english/pmac/38362_fb_BiodieselFuelConditioners.htm)

#### Premium Diesel Fuel Conditioners

[https://jdparts.deere.com/partsmkt/document/english/pmac/5496\\_fb\\_SummerWinterDieselConditioner.htm](https://jdparts.deere.com/partsmkt/document/english/pmac/5496_fb_SummerWinterDieselConditioner.htm)

### FUELSAVER

[https://jdparts.deere.com/partsmkt/document/english/pmac/40453\\_fb\\_Fuelsaver.htm](https://jdparts.deere.com/partsmkt/document/english/pmac/40453_fb_Fuelsaver.htm)

### Fuel Test Kit

[https://jdparts.deere.com/partsmkt/document/english/pmac/4573\\_fb\\_Dieselscan\\_Fuel\\_Analysis.htm](https://jdparts.deere.com/partsmkt/document/english/pmac/4573_fb_Dieselscan_Fuel_Analysis.htm)

450J, 6020, 4920, 624K, 6200SE, 550J, 2850, 9300, 7760, 9330, 7510, 8310, 6210L, 6100, 7330, 6620, 7750, 624KR, 670D, 6405, 6610SE, 5510SN, 5515HC, 1640, 8220, 5300SN, 9650, 2300, 9620T, 6920, 6750, 7430 Premium, 5215V, 648H, 9530T, 6400, 3210X, 9760STS, 7530 Premium, 6410S, 9100, 3200, 9300T, 2400, 7230 Premium, 7630, 5100RN, S560, 9430, 7930, 3050, 6420L, 624J, 3350, 9660STS, 6605, 9860STS, 6430, 6210SE, 9880iSTS, 9630, 6135, 9880STS, 6090, 9660CTS, 6850, 7200, 5400SN, 5410N, 6325, 7330 Premium, 5820, 6220L, 8420T, 7550, 6910, 740, 9570STS, 8530, 6010L, 3410X, 6110SE, 6310, 6830 Premium, 6650, 7520, 650J, 7710, 6220, 3400X, 3400, 7400, 9630T, 9420, 6081, 7450, 6400L, 6010, 6415, 4830, 524K, 7600, 6910S, 7830, 7920, 5515, 6120, 2650, 9430T, 9120, 6800, 6400SE, 6410SE, 6530, 3100, 9880HM, 8410, 6410, 5315, 6500L, 6110L, 9770STS, 3310, 6715, S690, 9560iSTS, 9220, 9550SH, 6510L, 7850, 5310N, 4720, 6620SE, 643H,

Chemicals	Features and benefits
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Fuel, diesel conditioners summer and winter formula

## Diesel fuel conditioners

John Deere Premium Diesel Fuel Conditioners are designed for use in any diesel engine.

### Index

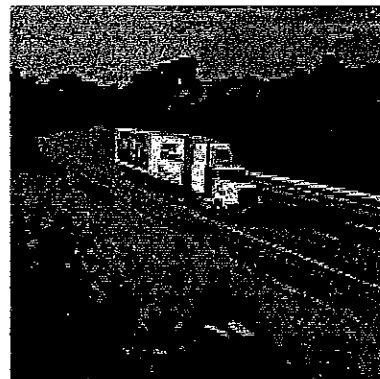
- [Premium Diesel Fuel Conditioner, Summer Formula](#)
- [Premium Diesel Fuel Conditioner, Winter Formula](#)
- [Questions and answers](#)



On the farm



Off road



Over the road

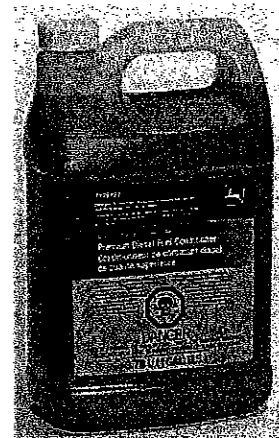
### Premium Diesel Fuel Conditioner, Summer Formula (TY26491, TY26492, TY26531)

Diesel fuel conditioner is a fuel additive for round use to improve diesel fuel quality and maintain peak engine efficiency. Regular use will minimize many of the problems caused by impurities in diesel fuels.

#### Summer formula

##### Features and benefits

- Keeps injectors clean – helps prevent injector erosion, lowers emissions, and cleans entire fuel system
- Maximizes fuel economy and performance – increases available power under heavy load, lowers maintenance cost, and extends fuel filter life
- Maintains fuel pump warranty
- Reduces fuel injection and pump wear
- Disperses gummy deposits, prevents plunger sticking, spray hole plugging, and fuel leakage past critical valve seat surfaces
- Minimizes smoking
- Improves water tolerance, combustion, starting, and cold weather fuel flow
- Protects against rust and corrosion
- Compatible with all diesel fuels



**Specifications**

Color	Yellow to amber
Clarity	Slightly hazy
Specific gravity at 60 degrees F (15.6 degrees C)	0.816 to 0.832
Density (lb./gal.)	6.8656
Flash point (T.O.C.)	165 degrees F (51.67) degrees C

**Treat rate**

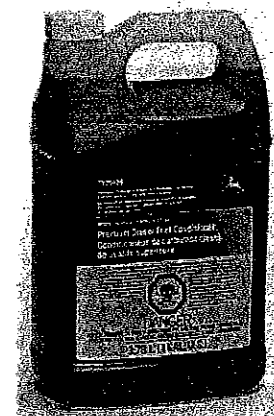
Part number	Size and pkg. qty.	Treat rate
TY26491	16 oz. (473 ml) per flask 12/carton (13.0 lb.; 5.90kg)	One 16-oz. bottle treats 105 gallons of diesel fuel
TY26492	1 gallon (3.7853 liters) per bottle 4/carton (37.0 lb.; 16.78 kg)	One gallon treats 840 gallons of diesel fuel
TY26531	5 gallons (18.9271 liters) per bottle	Five gallons treat 4200 gallons of diesel fuel

**Order information**

Part Number	Description	Size	Pkg. qty.
TY26491	Premium Diesel Fuel Conditioner, Summer Formula	16 oz.	12
TY26492	Premium Diesel Fuel Conditioner, Summer Formula	1 gal.	4
TY26531	Premium Diesel Fuel Conditioner, Summer Formula	5 gal.	1

**Warranty:** 90 days[Return to top](#)**Premium Diesel Fuel Conditioner, Winter Formula (TY26488, TY26489, TY26530)****Features and benefits**

- Maximizes fuel economy and performance
- Helps reduce maintenance costs
- Improves cold temperature fuel flow; lowers pour point of diesel fuel by up to 30 degrees F (16.7 degrees C) and controls fuel gel
- Disperses moisture and prevents ice formation
- Keeps injectors clean and removes existing deposits
- Improves combustion and cold starting
- Disperses gummy deposits; prevents plugging
- Protects against rust and corrosion
- Extends fuel filter life
- Works with all diesel fuels
- Registered with U.S. Environmental Protection Agency



- Ideal for oil heating equipment due to better combustion, lower fuel consumption, and reduced maintenance
- Does not:
  - Reduce the Cetane number of diesel fuel
  - Increase the ash content of diesel fuel
  - Contain any metallic compound or any other elements other than hydrogen, carbon, nitrogen, and oxygen
- Will not:
  - Measurably increase the vapor pressure or reduce the flash point of diesel fuel
  - Change the viscosity of the fuel
  - Form sludge suspensions with either water or sediment in the fuel
  - Remain indefinitely blended in the fuel after having been thoroughly mixed in with it
  - Change the cloud point of the fuel

### Specifications

Color	Yellow to amber
Clarity	Slightly hazy
Viscosity at 100 degrees C	3.8 cSt to 4.2 cSt
Viscosity at 40 degrees C	18 cSt to 26 cSt
Specific gravity at 60 degrees F (15.6 degrees C)	0.860 to 0.901
Density (lb./gal.)	7.3363
Pour point	-25 degrees F (-31.7 degrees C)
Flash point (T.O.C.)	165 degrees F (51.67 degrees C)

### Treat rate

Part number	Size and pkg. qty.	Treat rate
TY26488	16 oz. (473 ml) per flask 12/carton (13.0 lb.; 5.90kg)	One 16 oz. bottle treats 62.5 gallons of diesel fuel
TY26489	1 gallon (3.7853 liters) per bottle 4/carton (37.0 lb.; 16.78 kg)	One gallon treats 500 gallons of diesel fuel
TY26530	5 gallons (18.9271 liters) per bottle	Five gallons treat 2500 gallons of diesel fuel

### Order information

Part number	Description	Size	Pkg. qty.
TY26488	Premium Diesel Fuel Conditioner, Winter Formula	16 oz.	12
TY26489	Premium Diesel Fuel Conditioner, Winter Formula	1 gal.	4
TY26530	Premium Diesel Fuel Conditioner, Winter Formula	5 gal.	1

**Warranty:** 90 days

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**Why John Deere Premium Diesel Fuel Conditioners are your best buy**

1. Factory designed and approved formula
2. Improves performance in any diesel-powered equipment
3. Allows you control over when and where to use it
4. Gives you complete choice on your base diesel fuel supplier
5. Can add more or less fuel conditioner as needed
6. Regular use supports your warranty claims
7. John Deere packaging means you get fresh, uncontaminated additive every time

### Directions

Add to fuel before tank has been filled (to allow for mixing). To be effective in preventing fuel gelling and fuel filter plugging, the Premium Diesel Fuel Conditioner (Winter Formula) must be added at least 15 degrees F above the diesel fuel cloud point. If spilled on painted finish, flush immediately with water and wipe off.

### Toxicity

Harmful if swallowed. Vapor harmful. Irritant. Avoid contact with eyes. Use in a well-ventilated area. In case of contact with eyes, flush thoroughly with water. If swallowed, give one or two glasses of water or milk and contact your physician, Poison Control Center, or hospital emergency room for prompt medical attention.

Combustible. Keep away from heat or flame.

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### Questions and answers

#### 1. Is a diesel fuel conditioner really necessary and why?

Yes. The need to use a diesel fuel conditioner is now more important than ever. Diesel fuel quality can vary dramatically from source to source and even day to day. Inconsistent fuel quality can result in customer dissatisfaction over equipment life and performance. In addition, most diesel fuels (regular or premium) are not designed for use in off-road equipment. John Deere Premium Diesel Fuel Conditioner is strong enough to bring most any diesel fuel up to acceptable standards and will allow for optimum performance in any diesel engine. Therefore, it is recommended that John Deere Premium Diesel Fuel Conditioner be used throughout the year.

#### 2. There are many brands of fuel conditioners available over-the-counter as well as through co-ops and fuel distributors. Why is it strongly recommended that I use John Deere Premium Diesel Fuel Conditioner?

John Deere has a lot more at stake than just selling fuel additive. John Deere is in the business of providing customers with quality equipment that performs as promised. It is a fact that diesel equipment runs better and lasts longer when quality diesel fuel is used.

John Deere Premium Diesel Fuel Conditioner is a proprietary blend of fuel additives that are capable of improving most any diesel fuel. This is not true for other fuel conditioners available over-the-counter or through a local fuel supplier such as a co-op. Test data shows that many commercially available additives are either non-functional or incomplete in their respective formulation. In addition, fuel additives offered by local fuel suppliers and even major oil companies are usually purchased on bid by buyers who understand additive price more than they understand additive performance and quality. Therefore, performance is often secondary for such products. This can often lead to customer dissatisfaction. It is recommended that John Deere

Premium Diesel Fuel Conditioner be used in all diesel fuel working in any application.

### **3. What benefits will I get with John Deere Premium Diesel Fuel Conditioner?**

*Both the summer and winter versions have the following benefits:*

- Exclusive formula only available through John Deere
- Detergency – Cummins L-10 superior rating insures clean injectors and better fuel economy
- Modern lubricity technology – superior performance over a wide range of fuels
- Increased Cetane number for better start-ups, increased power and improved fuel economy
- Erosion/corrosion protection – for vehicle fuel systems as well as bulk storage tanks
- Stability protection for reduced sediment and filter plugging and maximum filter life
- Regular use inhibits the growth of fuel bacteria

*In addition, the winter version also offers:*

- Superior cold flow properties to prevent fuel gelling and filter plugging
- Non-alcohol based deicer to inhibit fuel and filter icing

### **4. Why is John Deere Premium Diesel Fuel Conditioner recommended for use in old and new diesel equipment?**

John Deere Premium Diesel Fuel Conditioner improves the diesel fuel itself, which makes any engine run better and last longer. New engines will enjoy these benefits right from the start. Older engines will run better after just a few fill ups. John Deere Premium Diesel Fuel Conditioner can be used in any diesel-powered equipment – John Deere or other makes – on or off the farm. In fact, other diesel engine manufacturers recommend John Deere Premium Diesel Fuel Conditioner to their customers for optimum operation and preventative maintenance.

### **5. Why did John Deere switch from Stanadyne to the new program?**

All-Season Stanadyne was a good product for the time. However, it only provided moderate lubricity protection, limited detergency, Cetane, and some cold weather operability.

Since the introduction of All-Season Stanadyne, more information on low sulfur-fuel has been obtained and improvements in the product were found to be necessary. John Deere Premium Diesel Fuel Conditioner offers the latest technology that provides the best performance in a wide variety of fuel sources.

### **6. Why was a summer and winter formula introduced?**

The summer formula offers the same important features as the winter formula without the costly winterization components. This results in a more cost-effective product. In addition, many John Deere customers are not concerned about winter weather, but their equipment will still benefit greatly from regular use of John Deere Premium Diesel Fuel Conditioner.

### **7. Can John Deere Premium Fuel Conditioner be added to my bulk fuel storage tank?**

Yes, and it should be. Treating fuel as it is added to the bulk fuel storage tank will ensure that the product is well mixed. As an added benefit, the conditioner contains a fuel stabilizer and corrosion inhibitor that should be added to any new fuel deliveries to maximize fuel storage, filter life, and to protect your bulk fuel storage tank from corrosion.

### **8. Why does the winter formula have to be added when the fuel is warm?**

Diesel fuel contains wax that begins to form crystals at the cloud point of fuel. These crystals are very large in size and will continue to grow until the equipment ceases to operate (gelled filter). The winter formula contains a "wax crystal modifier," or anti-gel, which allows the wax crystals to form, but changes the shape and size of the wax crystals as they form. Smaller crystals allow the filter to function at lower temperatures without plugged or shut-down. The only way to change the crystal shape is to add the winter formula at a warm temperature prior to when the crystals first start to form. This is why the conditioner must be added when the fuel temperature is at least 15 degrees F above the cloud point of the fuel. For example, if the diesel fuel cloud point is 10 degrees F, the Premium Diesel Fuel Conditioner (Winter Formula) must be added at 25 degrees F or higher.

**9. Why does the winter formula gel in the bottle when it gets cold?**

All fuel additives that contain large amounts of "anti-gel" will freeze in their concentrated form (prior to mixing with diesel fuel). Fuel additives that don't freeze contain little or no anti-gel components.

This is similar to antifreeze/coolant that is put into radiators. Undiluted antifreeze actually freezes at about 30 degrees F. It needs water to lower the freezing point and work at low temperatures. John Deere winter formula contains a large amount of anti-gel. Once added to the diesel fuel, it will outperform most competitive products. To prevent gelling of John Deere Premium Diesel Fuel Conditioner Winter Formula, store the bottle at or above 50 degrees F. If the product has gelled in the bottle, thaw it out and then add it to the diesel fuel. The product is still effective after thawing – just be sure that it is added at a high enough fuel temperature to work properly. See question 8 above for additional information.

**10. If John Deere Premium Diesel Fuel Conditioner Winter Formula is used, what temperature is the fuel protected to against gelling?**

John Deere Premium Diesel Fuel Conditioner Winter Formula has been sold for many years now throughout the U.S. and Canada. In this wide range of fuels, the winter formula typically protects down to -15 to -20 degrees F. This range will vary with some fuels, even when purchased from the same supplier. We recommend the addition of 20% No. 1 Diesel or Kerosene as your ambient temperature approaches -15 to -20 degrees F. Larger amounts of No. 1 fuel may be necessary if you are forced to operate in even lower temperatures. John Deere Premium Diesel Fuel Conditioner performs consistently better over a wide range of fuels when compared to other fuel additives.

**11. What is the Scuffing BOCLE and why is it important?**

The Scuffing BOCLE is a proposed industry test used to evaluate the lubricity of distillate fuels. Lubricity is an indication of a fuel's ability to protect fuel pumps and injectors from wear. Diesel fuels treated with John Deere Premium Diesel Fuel Conditioner have been, and continue to be, regularly evaluated on with this demanding test. John Deere Premium Diesel Fuel Conditioner has consistently performed at or above the levels set by engine and pump manufacturers. This means longer life from your fuel injectors and fuel pumps. In addition, you will have more precise "fuel control" throughout the life of your equipment, which results in better fuel economy and lower emissions.

**12. Does low-sulfur diesel fuel affect filter life?**

Yes. Low-sulfur diesel fuels have less tolerance for fuel sediment. However, John Deere Premium Diesel Fuel Conditioner contains special components to control sludge and sediment formation, thereby extending filter life.

**13. Does low-sulfur diesel provide less power than high-sulfur diesel?**

This has been reported, but has not been shown to be true. John Deere Premium Diesel Fuel Conditioner contains a highly effective detergent and Cetane improver to keep fuel injectors clean, providing maximum power and fuel efficiency in every gallon. In general, low-sulfur diesel is more stable. However, it still degrades in quality over time. In addition, low-sulfur diesel is a poorer solvent and therefore tends to drop out more sediment and sludge than high-sulfur diesel. Quality additives like John Deere Premium Diesel Fuel Conditioner are specially formulated to

allow long-term storage on and off the farm.

**14. How do John Deere Premium Diesel additives compare with other additives?**

The John Deere Premium Diesel Fuel Conditioner product line up will provide comparable or higher performance than other quality fuel additives. John Deere Premium Diesel Fuel Conditioner is extensively tested in a wide range of fuels and is specifically designed to meet the requirements of even the most demanding diesel user.

**15. What is the most important performance property of a premium diesel?**

Every aspect of the fuel is the most important part if it is important to the user. That's why John Deere Premium Diesel Fuel Conditioner is designed to offer the best combinations of all performance properties while remaining a good value for your fuel dollar.

**16. Are John Deere Premium Diesel Fuel Conditioners as good for on-road equipment as they are for off-road equipment?**

Yes. John Deere Premium Diesel Fuel Conditioners offer performance benefits to both on-road and off-road users.

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Last modified: 27Apr09.

**Solution Number: 82087**

**Solution Summary: Fuel Quality and High Pressure Common Rail Fuel Systems**

**Publication Date: Oct 6 2009**

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**\*\*Paper copies of solutions may not be the most current solutions\*\***

**Complaint or Symptom :**

Need information on Fuel related topics

**Problem or Situation :**

Need information on Fuel related topics - Quality, Sulfur, Biodiesel, Testing, Additives, Storage and Handling, Filtration, Diagnostics, or Warranty.

**Solution :**

John Deere continues to develop and utilize more advanced engine technology to meet worldwide emissions standards and customer expectations for performance and fuel economy. In recent years, Deere has begun using High Pressure Common Rail (HPCR) fuel systems for their precise fuel control. HPCR systems operate at much higher fuel pressures than most other fuel systems. This environment makes fuel quality and condition even more vital to the engine's performance, reliability, and durability. The following information provides John Deere dealers and customers with recommendations that will help ensure their engines operate as intended.

This bulletin supplements information provided in Engine Operator's Manuals and Component Technical Manuals.

Fuel Quality

Diesel fuels specified to EN 590 or ASTM D975 are required. 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 is acceptable for use at all percentage mixture levels. It is recommended that customers request a Certificate of Analysis from their fuel supplier to ensure it meets these specifications.

In all cases, the fuel shall meet the following properties:

**Cetane number of 45 minimum.** Cetane number greater than 50 is preferred, especially for temperatures below  $-20^{\circ}\text{C}$  ( $-4^{\circ}\text{F}$ ) or elevations above 1500 m (5000 ft).

**Cold Filter Plugging Point (CFPP)** at least  $5^{\circ}\text{C}$  ( $9^{\circ}\text{F}$ ) below the expected lowest temperature or Cloud Point below the expected lowest temperature.

**Fuel lubricity** should pass a maximum scar diameter of 0.45 mm as measured by ASTM D6079 or ISO 12156-1.

**Particulates** should be less than or equal to 10 mg/L per ASTM D2276 test method.

### **Sulfur Content**

- Diesel fuel quality and sulfur content must comply with all existing emissions regulations for the area in which the engine operates.
- Use of diesel fuel with sulfur content less than 0.10% (1000 ppm) is **STRONGLY** recommended. o Low Sulfur Diesel (0.05% or 500 ppm) and Ultra Low Sulfur Diesel (0.0015% or 15ppm) are both acceptable.
- Use of diesel fuel with sulfur content 0.10% (1000 ppm) to 0.50% (5000 ppm) may result in **REDUCED** oil and filter change intervals as shown in the table.
- **BEFORE** using diesel fuel with sulfur content greater than 0.50% (5000 ppm)..

### **Biodiesel Maintenance**

While less than or equal to 5% blends (B5) are preferred, 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 are recommended when using lower biodiesel blends, but are required when using blends of B20 or greater

John Deere engines can also operate on biodiesel blends above B20 (up to 100% biodiesel) **ONLY** if the biodiesel 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.

The petroleum diesel portion of biodiesel blends must meet the requirements of ASTM D975 (US) or EN 590 (EU) commercial standards.

### **Fuel testing**

Deere's Agriculture division offers FuelScan testing services. Deere's Construction & Forestry division offers a comprehensive Fluid Analysis Program. Each service can be used to monitor the quality of diesel fuel. The analysis verifies fuel type, cleanliness, water content, suitability for cold weather operation, and other key characteristics. These test programs are evaluated on a regular basis to ensure they keep pace with the fuels industry and available testing technology.

In some cases, these standard tests may not uncover fuel chemistry specifics that could be a factor in fuel system concerns. Consult the appropriate Deere field personnel (MPSO/TCSM) and/or Dealer Technical Assistance Center (DTAC) if fuel quality concerns cannot be resolved by the available testing.

### Additives

Use of John Deere Premium Fuel Conditioner is recommended to help ensure fuel quality and peak engine performance. These proprietary blends provide a superior combination of system cleaning, performance improvement, stability, and all weather compatibility. John Deere offers a full line of fuel conditioners for use with all types of diesel fuel, including biodiesel, and in all types of climates.

John Deere FUELSAVER helps prevent microbial growth (bacteria and fungus) that can degrade fuel and plug fuel system components. This is strongly recommended when using any level of biodiesel or Ultra Low Sulfur Diesel, as these fuels are more susceptible to microbial growth.

Use of some non John Deere additives can be harmful to the engine. Additives with the following characteristics will likely lead to fuel system damage, performance/power loss, general system fouling, and/or unwarrantable failures:

- Ash forming materials
- Calcium based additives
- Automatic Transmission Fluid (ATF)
- Home heating oil

Never use engine oil or any other lubricating oil as a fuel additive.

### Storage and Handling

Always be very careful when handling diesel fuel and never fill a fuel tank when the engine is running.

Diesel and biodiesel fuels degrade over time, so extended storage should be minimized. Straight diesel may begin to degrade after a year of storage. Biodiesel blends up to B20 must be used within 90 days of the date of biodiesel manufacture. Biodiesel blends from B21 to B100 must be used within 45 days of the date of biodiesel manufacture.

The following are recommendations for source/storage tanks:

- Fully functioning caps and vents.
- Keep tanks as full as practical to help prevent condensation and freezing.
- Allow 24 hours for a new batch of fuel to settle before pumping into another tank.
- Should have a well serviced filter between the pump pick up and the nozzle, capturing any debris before entering a vehicle tank.
- If equipped, drain sediment and water using a drain valve on the bottom surface of the tank.
- Completely drain the tank at least annually. Rinse with diesel fuel.
- Minimize direct sunlight and heat to aid fuel stability.
- Treat with John Deere FUELSAVER antimicrobial additive. A shock treatment is recommended when microbial growth is suspected. A maintenance treatment is recommended with each fill up.

The following are recommendations for equipment tanks:

- Fully functioning caps and vents.
- Should be topped off at the end of each day to help prevent condensation and freezing.
- If equipped, drain sediment and water using a drain valve on the bottom surface of the tank.

### Filtration

John Deere engines come with dual stage fuel filtration optimized for the fuel system operating conditions. These filters capture harmful debris and water before they reach downstream components. Filters should be properly maintained and replaced at least every 500 hours. Use of John Deere filters is recommended.

The fuel filters are equipped with a water bowl and Water-in-Fuel sensor. The water bowl should be checked daily and drained of any water. If the WIF sensor triggers an alarm, the engine should be stopped immediately and water should be drained.

### Diagnostics

In cases where an engine has a fuel system related symptom, proper diagnostics through Service Advisor should be followed based on Diagnostic Trouble Codes and Observable symptoms. Use of available Dealer Technical Assistance Center (DTAC) Solutions, through Service Advisor or through the DTAC system, is also strongly recommended. These provide real time updates on new information and findings by Deere personnel.

### Warranty

John Deere warranty covers defects in material and workmanship. Low quality fuel, poor storage and handling practices, or use of non Deere approved additives may result in unwarrantable fuel system failures.

### **Additional Information :**

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450J, 6020, 550J, 6420SE, 3554, 7330, 6620, 8330T, 7750, 6120SE, 330CLC, Miscellaneous, 8345R, 7220, 350DLC, 6920, 850JR, 7430 Premium, 9760STS, 8270R, 7530 Premium, 7230 Premium, 7630, 7130 Premium, 6920SE, 370C, 7930, 6420L, 6630 Premium, 6330, 9660STS, 6430, 9880iSTS, 6530 Premium, 9880STS, 6830, 8245R, 7200, 7330 Premium, 6220L, 6230, 7550, 8430T, 9570STS, 6320L, 8530, 6520L, 2454D, 8345RT, 6830 Premium, 7520, 650J, 8230T, 6220, 7400, 8295RT, 9560STS, 2954D, 7450, 7830, 6120, 6520SE, 6530, 2154D, 8130, 9880HM, 750J, 9770STS, 7300, 9560iSTS, S690, 7730, 7130, 7700, 6120L, 240DLC, 160DLC, 6620SE, 8320R, 6320, 7250, 6230 Premium, 8430, 6630, 6020L, 7500, 8225R, 6320SE, 7320, 6330 Premium, 7350, 6520, 200D, 9670STS, 3754D, S690 Hillmaster, 6920S, 6930 Premium, 7420, 200DLC, 6220SE, 8330, 850J, 8230, 270DLC, 6020SE, 700J, 6420, 8295R, 7230, 6420S, General, 6430 Premium, 6930, 6130, 6820, 9870STS, 120D, 8320RT

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FUEL, INJECTION, NOZZLE, PTS, ADGFY09R CRCFY09R, ENG, F0413

**Solution Number: 84160**

**Solution Summary: HPCR Fuel System Clean Up Procedure Using the Injector Flush Tool**

**Publication Date: Nov 6 2009**

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**\*\*Paper copies of solutions may not be the most current solutions\*\***

**Complaint or Symptom :**

HPCR Fuel System Clean Up Procedure using the Injector Flush Tool SW10015JD, Diesel Fuel System Clean Up TY26688 or MCTY26688 in Region 2, and Injector Flush Tool Filters SW10967P1.

**Problem or Situation :**

Procedure not in CTM for Fuel System Clean Up

**Solution :**

Verify DTAC Solution [82072](#) is completely followed before performing fuel system flush process to rule out other potential fuel system issues the flush do not address.

1. Change primary and secondary fuel filters.
2. Prime fuel system and start engine.
3. Run engine long enough to get to operating temperature.
4. Shut down engine.
5. Disconnect fuel supply to primary fuel filter.
6. Connect 6' red hose (supply) to primary filter using appropriate adapter in kit.
7. Disconnect fuel return to fuel tank.
8. Connect 6' black hose (return) to tank line using appropriate adapter in kit.
9. Connect other end of red 6' hose to bottom fitting of flush tank. Open valve on tank.
10. Connect other end of black 6' to return side of flush tank so that return fuel flows through flush kit filter.
11. Fill reservoir with full contents of flush solvent.
12. Key on to check for leaks and verify return fuel is coming back to flush tool. If flush tank fuel level drops quickly shut off and check to make sure all of return fuel is getting back to the tool reservoir.

13. Start engine and run at 1100 rpm.

14. Engine will run between 20 and 40 minutes. Watch for fuel to get to bottom of warning decal. Do not let engine starve for fuel or die.

15. Shut engine down.

16. Inspect return filter for debris. If badly fouled, rerun flush with clean flush filter to determine system is fully clean.

17. Reconnect fuel lines.

18. Start engine and check for leaks. Run 10-15 minutes to purge cleaner from fuel system.

The flush tank will take the place of the vehicle tank and the solvent will serve as the fuel. Mixing with fuel in the filters, pump, rail, and injectors is critical. Make sure to have engine running and warmed up prior to cleaning.

[84160\\_1.jpg](#)

[84160\\_2.jpg](#)

[84160\\_3.jpg](#)

[84160\\_4.jpg](#)

[84160\\_5.jpg](#)

[84160\\_6.jpg](#)

[84160\\_7.jpg](#)

[84160\\_8.jpg](#)

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6130D, 4920, 4730, 4830, 6140D, 7920, 7830, 8520T, 6120, 7330, 8330T, 8420, 8130, 9770STS, 8220, 7220, 748H, 7730, 7130, 6100D, 7430 Premium, 648H, 4720, 9760STS, 6320, 6230 Premium, 7530 Premium, 848H, 8430, 8120T, 7230 Premium, 748G-III, 7130 Premium, 8520, 7630, 7320, 6068, 7930, 6330 Premium, 6330, 4930, 9660STS, 6430, 9670STS, 640G-III, 7420, 8330, 6090, 8230, 8220T, 7820, 460D, 548H, 6110D, 7330 Premium, 6125D, 8420T, 6420, 7720, 6230, 7230, 9570STS, 8430T, 643J, 843K, General, 8530, 8120, 6430 Premium, 4045, 8320T, 6115D, 7520, 8230T, 8320, 6220, 648G-III, 643K, 640H, 843J, 9560STS

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INJECTION, PTS, ADGFY09R, ENG, F0413, NEWSOLUTION



## Reference Guidelines For Wear Metals, Contaminants, Lubricants, Coolant and Fuel Version 18 August 2008

### Changes on this and Previous Versions

#### Recent adopted figures shown in bold

##### On this Edition

- New table for small crawler hydraulics
- New readings for Aluminum on Isuzu engines
- New engine oil classifications
- New table for Typical Signatures with Torq-Gard CJ4 engine oils added

##### Changes on previous edition

- New silicon levels for sealed hydraulics
- Revised compatibility chart
- Silicon for hydrostatics modified
- Iron critical readings for backhoe axles
- Iron reading for 844J axle

### Wear Metals and Contaminant Guidelines

The following tables contain general information taken from real applications and are system focused rather than machine family specific with few exceptions. These should be used only as a guideline. Keep in mind that application, environment, filtration and type of lubricants, attachments, could produce different readings that may not be indicative of malfunction or contamination.

**Time Dependant Elements:** Certain elements tend to increase with time with regard to others and independently from filtration. These tables identify those elements and suggest the hours for these readings.

### Units of Measure

**PPM (Part Per Million)** is used to indicate relative concentration of wear metals, water, contaminants and additives measured in weight in relation to the fluid sample volume weight.

**Percentage (%)** of concentration is used to indicate relative water and fuel contamination.

**Particle Counts** are used to indicate different groupings of particle concentrations. They are typically measured in 4 micron and higher, 6 micron and higher, 14 micron and higher, 23 micron and higher and 50 microns and higher concentrations per milliliter. These numbers are then compared to an ISO chart to obtain a three number cleanliness code. See explanation in page 4.

**ISO Cleanliness Codes** were created to classify fluid cleanliness measurements more easily. Until 1999 the ISO 1944 particle size classification was used to measure 5 and 15-micron particle concentration expressed in a two number code. After 1999, a revision to this standard was put into effect, which measures 4/6/14 micron particle concentrations. The older two numbers for 5/15-micron measurement closely correlate to 6/ 14-micron current measurements.

**Absorbance, abs/cm** is a unit to report oxidation, nitration and sulfation. This unit is a direct reading from the FTIR instrument (Fourier Transform Infrared Spectroscopy) and expresses the wavelengths of certain chemical compounds of interest representative of the required tests.

Engines	Normal 250-Hr Readings		Abnormal	Critical
	Lower Limits	Upper Limits		
Silicon (1) *	0-5	6-20	21-30	>30
Iron (1) *	0-40	41-70	71-100	>100
Copper (2)	0-15	16-25	26-40	>40
Sodium	0-5	6-30	31-50	>50
Aluminum * (3)	0-6	7-15	16-20	>20
Lead	0-15	16-25	26-40	>40
Chromium	0-5	6-10	11-15	>15
Nickel (Report only)	0-2	3-4	5-8	>8
Tin (Report only)	0-1	2-3	4-5	>5
Potassium	0-10	11-30	31-50	>50
Fuel	<1%	1-1.5%	1.6-2%	>2%
Water	<0.1%	0.1-0.2%	0.21-0.99%	>1.00%
Nitration (see page 4)	<15 abs/cm	15 to 20 abs/cm	21 to 25 abs/cm	>25
Sulfation (see page 4)	<20 abs/cm	21 to 25 abs/cm	26 to 30 abs/cm	>30
Soot	<1.5%	1.5-2.9%	3-4.9%	>5%

\*Time dependant elements. (For 500 hours intervals multiple these figures by 2.

(1) Expect higher iron and silicon levels with break-in oil during break-in period.

(2) Expect high copper readings with CI-4 oils during break-in periods and up to 500 hours of use, or any time different oil is used.

(3) Aluminum readings in 500 hours for 650D and 850 D excavators normal, 0 - 40 PPM , abnormal 41 - 60, critical >60 PPM.

Power Shift Transmissions *Except ADT's	Normal *1000-Hr Readings		Abnormal	Critical
	Lower Limits	Upper Limits		
Silicon*	0-20	21-30	31-60	>60
Iron*	0-60	61-100	101-180	>180
Copper	0-70	70-120	121-200	>200
Sodium	0-30	31-50	51-80	>80
Aluminum*	0-4	5-10	11-15	>15
Lead	0-8	9-15	16-20	>20
Chromium	0-2	3-6	7-10	>10
Tin (Report only)	0-2	3-6	7-10	>10
Water (Assumes Hy-Gard)	<750 (<0.075%)	751-1000 (0.075-0.1%)	1001-1500 (0.10-0.15%)	>1501 (>0.1.5%)

Exceptions: 444E/444H/544G/E, 624E/G, 644E/G lead levels, Normal <200, abnormal 240-280, critical >280 PPM, copper levels Normal <125 PPM, abnormal 126-190 PPM, critical >190 PPM

ADT/ZF 250D-300D Power Shift Transmissions	Normal *1000-Hr Readings		Abnormal	Critical
	Lower Limits	Upper Limits		
Silicon*	0-5	6-15	16-20	>20
Iron*	0-60	61-120	121-180	>180
Copper	0-24	25-45	46-60	>60
Sodium	0-30	31-50	51-80	>80
Aluminum*	0-25	26-60	61-85	>85
Lead	0-5	6-20	21-35	>35
Chromium	0-1	2-3	4-5	>5
Tin (Report only)	0-2	3-5	5-10	>10
Water (Assumes Transynd)	<500 (<0.05%)	500-750 (0.05-0.075%)	750-1000 (0.075-0.10%)	>1000 (>0.10%)

\*Time dependent elements