



ULTRA LOW SULFUR DIESEL Q & A FOR THE END USER

BACKGROUND:

What is ULSD?

ULSD stands for Ultra Low Sulfur Diesel. ULSD is diesel fuel that is defined by the United States Environmental Protection Agency (EPA) to have a maximum sulfur content of 15 parts per million (ppm). ULSD will be phased in between 2006 and 2010 and eventually will replace today's on-highway diesel fuel known as conventional Low Sulfur Diesel (LSD), which may contain as much as 500 ppm sulfur content.

Why is ULSD being mandated for on-road use?

EPA is requiring a transition to ULSD to help reduce the emissions produced by vehicles that run on diesel fuel. ULSD will facilitate the next generation of advanced emission control devices, which cannot tolerate high levels of sulfur in the fuel. Under penalty of law, trucks equipped with 2007 (and later) diesel engines must be refueled with ULSD.

When will the ULSD mandate take effect?

Beginning June 1, 2006, refiners and importers had to ensure that 80% of the on-road diesel fuel they sell is ULSD compliant. The ULSD requirement takes effect on October 15, 2006 for retail outlets. From 2006 to 2010 both ULSD and LSD will be available in the marketplace for on-road diesel use. The phase-in is intended to assure that ULSD is widely available before cars and trucks equipped with emission control devices become available in 2007. In California, 100% of the on-road diesel fuel refined or imported must be ULSD compliant on June 1, 2006 – the California provisions apply to retail outlets on September 1, 2006.

SUPPLY AND DISTRIBUTION:

Do you expect the introduction of ULSD to cause supply disruptions?

Historically, the introduction of a new on-road fuel has resulted in certain imbalances between supply and demand. EPA's precompliance report indicates that there may be a decline in domestic refining capacity for on-road diesel fuel. This shortfall will likely be addressed through increased imports of refined diesel fuel. Participants in EPA's Workshop have indicated that at times ULSD may be difficult to find in certain geographic markets. During the early stages of the phase-in, a relatively small number of post 2007 vehicles requiring ULSD will be on the road; however, owners of these vehicles may have to take additional steps to ensure that they are able to refuel with ULSD.

Do all service stations have to offer ULSD for sale?

No. The ULSD regulations do not require service stations to sell ULSD. EPA's rule is intended to ensure that ULSD will be the dominant fuel during the phase-in period; however, there may be certain geographic locations where ULSD is not available. As a result, owners of post-2007 model year trucks requiring ULSD may have to take additional precautions to ensure that they are able to refuel with ULSD.

It is anticipated that most retail service stations that have only one diesel tank will sell ULSD exclusively. Larger service stations and trucks stops with more than one diesel tank and the ability to completely segregate these products will be more likely to have both ULSD and LSD available. All retail outlets selling ULSD and/or conventional LSD are required to label their



diesel fuel dispensers to indicate which fuel is being sold from that dispenser.

Can I continue to purchase conventional diesel fuel, if I prefer to use it in my older vehicle?

Yes, where it is available. EPA's refinery precompliance reports indicate that as much as 90% of the on-road diesel will be ULSD when it leaves the refinery gate. Today's on-road LSD will be available only in limited supply and may not be available in all areas. Some ULSD will become contaminated with sulfur during its transportation from the refinery to the retail point of sale and will be reclassified as LSD if its sulfur content exceeds 15 ppm. Beginning in 2010, all on-road diesel must be ULSD compliant.

How will I know whether a service station is selling ULSD?

Except in California, EPA regulations require service stations to label pumps with the specific type of diesel fuel being dispensed. At each retail outlet, consumers must check the pump label to ensure that they are refueling with the proper type of diesel fuel for their vehicle.

What will prevent service stations from selling LSD as ULSD?

It is unlawful to sell LSD as ULSD. EPA and state enforcement agencies have the ability to review records, such as product transfer documents and to test product samples to prevent noncompliant fuel from being offered for sale as ULSD. In addition, any party in the distribution chain downstream from the refiner can independently test samples in order to defend against potential allegations of supplying noncompliant fuel; however, accurate sulfur testing will require samples to be sent to a certified laboratory and will take 1-2 days to complete.

What are the penalties for failing to meet the ULSD sulfur standards?

Any person that violates the new ULSD regulations may be subject to civil penalties of up to \$32,500 for each violation.

Will ULSD be available for cross-border operations in Canada and Mexico?

Canada has issued a ULSD rule that is virtually identical to the U.S. rule in terms of requiring the production of ULSD in 2006. Mexico will begin the transition to ULSD in 2008; however, the Mexican government has indicated that ULSD will be available near the U.S. border in 2007.

COST:

Will ULSD cost more than conventional diesel fuel?

U.S. refiners have made significant capital investments in processing equipment to take the sulfur level down to ultra-low levels below 15 ppm. Investments made to ensure ULSD integrity throughout the supply chain also will contribute to the increased cost of producing and delivering ULSD. EPA estimated that ULSD will *cost* 5 cents more per gallon to refine; however, many other factors affect the *price* of fuel.

The costs of transporting ULSD from the rack to the retailer will further increase if dedicated equipment is required, or if additional steps must be taken for a tank trailer to haul a load of ULSD after hauling other petroleum products. Depending on the availability of ULSD, trucks may have to travel longer distances to load and deliver ULSD. This could alter existing distribution patterns and decrease fleet utilization, thus increasing transportation costs.

It is difficult to determine how much more ULSD will cost at the pump because ULSD is a commodity whose price is determined by supply and demand. Thus, while the cost of producing and distributing ULSD will be



higher than the current cost of producing LSD, it is not possible to determine how much of a retail price increase there may be since the price of diesel to consumers depends upon unforeseen market and business conditions at the time.

Will there be other cost increases that the trucking industry will face in 2007?

Yes. The benefit of reduced diesel engine emissions comes at a price. First, the increased cost of new trucks that will require ULSD is estimated to be between \$7,000 and \$10,000 per vehicle because of engine modifications and new emissions control aftertreatment equipment. It also is expected that these trucks will be less fuel efficient and weigh more than current trucks. Operating costs also are expected to increase as the advanced emissions control devices on these new trucks will require additional maintenance.

OPERABILITY:

How will ULSD affect fuel economy?

The process used to remove the sulfur also reduces aromatics and density of the fuel, which lowers its energy content by about 1%. This may result in slightly decreased power and fuel economy.

How will ULSD affect the operations of the existing fleet?

ULSD is expected to be fully compatible with the existing fleet. Engine manufacturers are not anticipating that existing truck owners will have to make any changes to their equipment to operate on ULSD; however, some existing vehicles may require replacement of certain engine and fuel system seals that may degrade and need to be changed to prevent leakage. Studies on test fleets have indicated that fuel system leaks are not exclusive to a particular engine type, fuel type or geographic region. It is anticipated that that only a small fraction of

the vehicles may be affected. Check with your local dealer for additional information.

ULSD requires lubricity, conductivity and anti-corrosion additives, which will be added to ULSD prior to its retail sale.

Will ULSD require any additional truck maintenance?

ULSD may clean out the sediment that naturally accumulates in a truck's fuel system and could result in the need to change the truck's fuel filter ahead of its regularly scheduled fuel filter maintenance. In addition, for those companies that have their own central refueling facilities, the initial conversion to ULSD may require up to three fuel filter changes on these storage tanks.

Can conventional LSD be burned without operational problems in 2007 and later model year trucks?

No. EPA regulations prohibit the use of LSD in trucks equipped with 2007 compliant diesel engines. These new trucks will be equipped with advanced exhaust after treatment devices for tighter control of emissions. These devices could experience significant reductions in emission control efficiency and durability issues if operated on LSD. Using LSD in a vehicle designed for ULSD may invalidate the manufacturer's warranty. The use of LSD is likely to reduce fuel economy due to additional particulate filter regeneration events and excessive back pressure in emission control systems with particulate filters. The trucking industry does not yet have sufficient operational experience with the post-2007 truck technologies to accurately predict the impact of various misfueling scenarios.

What is being added to the fuel to maintain lubricity?

Lubricity is a measure of the fuel's ability to lubricate and protect the various parts of the engine's fuel injection system from excessive wear. The processing required to

reduce sulfur to 15 ppm also removes naturally-occurring lubricating agents in diesel fuel. To manage this change, the American Society for Testing and Materials (ASTM) adopted the lubricity specification defined in ASTM D975 for all diesel fuel which went into effect on January 1, 2005. Fuel suppliers will add lubricity agents to ULSD in the distribution system to ensure that it meets these lubricity specifications when dispensed at the retail pump. There is no need for end users to add lubricity agents to the fuel tanks of their vehicles.

Can biodiesel be blended into ULSD?

Biodiesel made from soy should not exceed 15 ppm sulfur and therefore may be used as an additive to improve the lubricity of ULSD. ULSD and biodiesel fuel have different properties, particularly biodiesel thickens at higher temperatures than petroleum-based diesel. Because of this, special care needs to be taken when blending the two fuels together, especially in cold weather. Consequently, biodiesel and ULSD should be blended by the distribution facility rather than mixed in an individual vehicle's fuel tank. Engine manufacturers have stated that low percentage blends of biodiesel (<5%) should not adversely impact operability, provided that the fuel complies with the applicable ASTM standards.

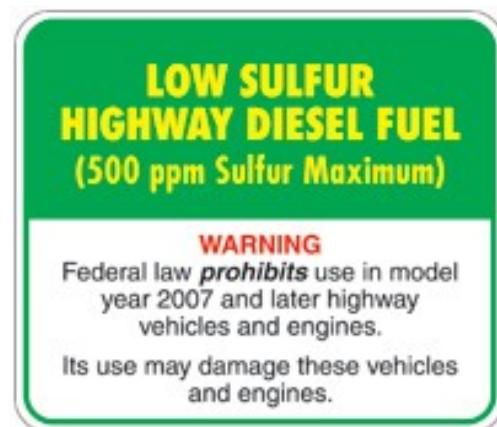
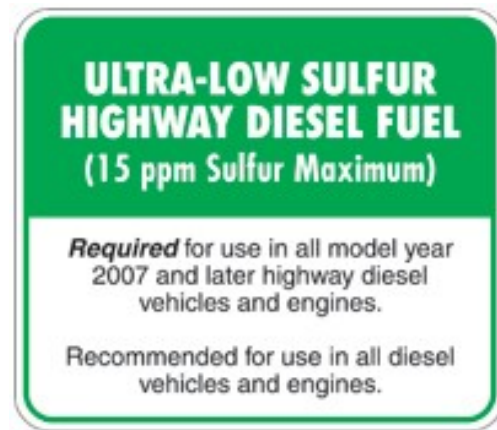
May I continue to blend No. 1 diesel (kerosene) to improve cold weather performance?

Yes, but only if the kerosene is ultra-low sulfur (<15 ppm) may it be blended with ULSD. ULSD is expected to have similar cold flow properties as LSD, which may require the use of additives or kerosene to ensure proper cold weather performance. EPA regulations prohibit the blending of fuels or use of additives that will contaminate ULSD. Some refiners have announced plans to produce ultra low sulfur kerosene to improve the cold flow properties of ULSD.

Central Refueling Operations:

Do I have to label my central refueling facilities?

Yes. Beginning June 1, 2006, fleets that are refueled in-house through their own central refueling facilities must label their diesel pumps with one of two labels to indicate the sulfur content of the fuel being dispensed. The labeling requirements are intended to assure that misfueling will not occur.



Labels may be downloaded at ATA's website: www.truckline.com/dieselpumplabel
The label text and size requirements are set forth in EPA's regulations at 40 CFR § 80.570. California fleets that are centrally-refueled are exempt from the pump labeling requirement, as only ULSD may be sold in that state.

How does a centrally-fueled fleet convert an on-site storage tank to ULSD?

On-site refueling facilities should empty their bulk tanks to the lowest point possible and cycle the tanks four times in this manner with ULSD. At the completion of the fourth cycle, fuel samples should be sent to a laboratory for sulfur content verification. If the testing reveals a sulfur level higher than 15 ppm, then high sulfur sediment remaining in the tank may be causing contamination. In this instance, the facility owner should pump out the tank and have it inspected and cleaned.

What is ULSD downgrading?

Downgrading ULSD occurs when an entity receives 15-ppm fuel, but then distributes or dispenses that fuel as as 500-ppm fuel. When fuel is downgraded, the label on the dispenser must be changed and a notation must be made on the Product Transfer Document. Centrally-fueled fleets should establish a system to document and track these downgrades to ensure that the 20% limitation on downgrading is not exceeded. Downgrading provisions are only in effect until May 31, 2010, at which time all on-road diesel fuel must be ULSD compliant. As an example, assume a fleet typically dispenses only 500-ppm fuel, but due to market conditions is forced to purchase a load of ULSD, residual high sulfur product in the tank would contaminate the ULSD and require the fleet to change the designation to 500-ppm -- this would be considered a downgrade.

Why are there limitations to the amount of fuel that can be downgraded?

EPA enacted downgrading limits to ensure that ULSD is widely available. If unlimited amounts of fuel were downgraded to 500-ppm, drivers of vehicles equipped with post-2007 engines would have difficulty finding the required 15-ppm fuel.

Can centrally fueled fleets downgrade ULSD (15 ppm) they receive and manage it as conventional LSD (500 ppm)?

Yes. Centrally-fueled fleets may downgrade the ULSD they receive, subject to a 20% downgrade limitation. Operations that dispense only ULSD or simultaneously carry both grades of diesel are not subject to the 20% downgrade limitation and may downgrade an unlimited quantity of fuel.

How do I calculate the 20% downgrade limitation?

Centrally-fueled fleets are subject to the 20% downgrade limitation based upon the amount of ULSD they take custody of and the amount of on-road diesel fuel they dispense on an annual basis. Each facility may downgrade ULSD in an amount no greater than 20% of the total volume of on-road diesel fuel it dispenses annually. The limitation applies separately at each facility. Thus a facility that dispenses 1,000,000 gallons of on-road diesel fuel could downgrade up to 200,000 gallons of ULSD annually.

Are there record keeping requirements?

Yes. Product transfer documents (PTD), which are commonly referred to as invoices or bills of lading, must be maintained by all parties in the distribution chain for 5 years. PTDs are required each time fuel is transferred throughout the distribution chain, except for when fuel is dispensed into motor vehicles at a retail location or wholesale purchaser-consumer facility. PTDs must provide specific information including:

- The name and address of the transferor and transferee;
- The volume of the diesel being transferred;
- The designation of the fuel (*i.e.* for use in motor vehicles; nonroad equipment; as appropriate); and
- The sulfur content of the fuel.



TANK TRUCK TRANSPORTATION ISSUES

Are there special handling concerns related to tank truck delivery of ULSD?

ULSD may become contaminated when mixed with higher sulfur products. Unless tank trucks are dedicated to ULSD service, tank truck carriers must take precautions when unloading other petroleum products to ensure that the tank truck is completely drained. Tank trailer manufacturers have indicated that trailer configuration is not a concern and that "flat-bottom" trailers may be used for ULSD service. Regardless of whether the tank truck carrier elects to use a sloped or a flat-bottom trailer, it is of far greater significance that the carrier unload on a level surface where possible. Tank truck carriers are advised to communicate with their customers to dispel any concerns regarding trailer configuration and to ensure that unloading surfaces are adequate.

Will loading racks provide so-called "slop tanks" for tank truck carriers to discharge previous product residues?

Tank truck carriers are advised to consult with the terminal racks at which they load to determine whether such tanks will be available. If slop tanks are unavailable, tank truck carriers must take precautions to ensure that all high sulfur products are adequately drained prior to loading ULSD.

Can tank truck carriers downgrade off-spec fuel from the 15 ppm ULSD standard to the lesser 500 ppm standard for low sulfur diesel?

Yes. Tank truck carriers may downgrade ULSD in an amount that does not exceed 20 percent of the on-road diesel they haul on an annual basis. In the event the tank truck carrier believes that it may have caused product contamination, the carrier could downgrade the shipment in order to avoid the liability associated with tendering ULSD that exceeds the 15 ppm standard. A carrier that elects to downgrade product must retain

the relevant product transfer documents for five years to demonstrate compliance with the downgrading provisions of the ULSD regulation.

Is there a concern for a potential increase in static electricity due to the reduction of sulfur?

ULSD has extremely low conductivity, which could increase static electricity during ULSD loading into tank trucks. To minimize the risk of fire during switchloading (with gasoline), ATA and NTTC have approached the terminal industry and EPA to raise this concern and discuss ways to lessen the potential for static electricity. Possible solutions include altering the loading process by using wider loading piping to reduce friction, reducing ULSD flow rate, relocating microfiltration devices away from the rear of the loading pipe, and using static dissipation additives. EPA regulations allow for static dissipators to exceed the ULSD 15 ppm sulfur standard as long as the resulting fuel does not exceed the 15 ppm limit after additization. Tank truck carriers are advised to consult terminals at which they load to discuss any concerns they may have regarding ULSD conductivity.

ATA and NTTC participate in a multi-industry coalition to provide consumers and the media with information on the transition to ULSD.

**Additional information is
available at:**

www.clean-diesel.org