

**Fuel Specifications
City of Cedar Rapids**

GASOLINE

This specification covers two types of regular grade gasoline for use in automotive spark-ignition engines. The two types are those commercially designated as gasohol and regular unleaded with a 'valve save' additive. Unleaded shall not contain lead anti-knock compounds or phosphorous containing deposit modifiers. Gasohol shall be a blend, by volume, of 90% unleaded gasoline and 10% denatured ethyl alcohol (Iowa DOT U87E10). Each type shall meet the requirements of Chapter 214A of the Code of Iowa.

All gasoline shall meet the minimum seasonal requirements of 'major brand' gasoline. The minimum octane rating, based on the anti-knock lead index (R+M/2), shall be 87 for gasohol and 87 for 'regular' unleaded gasoline.

NO. 1 LOW SULFUR DIESEL FUEL

No. 1 low sulfur diesel fuel shall be refined petroleum distillate meeting the following requirements:

▪ Kinematic viscosity @ 100F (37.8C), cSt		1.40 to 3.00
▪ Carbon residue on 10% bottoms, % wt., max		0.15
▪ Sulfur, % wt., max		0.05
▪ Cetane Number, min		40
▪ Sediment and water, % max		0.01
▪ Ash, % wt., max		0.01
▪ Flash point, closed cup, degrees F, min		100
▪ Cloud point of fuel delivered during the months of September through March, not higher than		-30 degrees F
▪ Pour point of fuel delivered during the months of September through March, not high than		-30 degrees F
▪ Distillation, degrees F:	90% recovery, max	550
	End point, max	625

Sulfur and ash content shall be the lowest available (not to exceed the above specification) on each delivery. The City needs low sulfur and ash fuels to reduce emissions and for newest design engines. Supplier shall supply red dyed fuel if available.

NO. 2 LOW SULFUR DIESEL FUEL

No. 2 low sulfur diesel fuel shall be low emission refined petroleum distillate meeting the following requirements:

▪ Kinematic viscosity @ 100F (37.8C), cSt		2.00 to 3.00
▪ Carbon residue on 10% bottoms, % wt., max		0.20
▪ Sulfur, % wt., max		0.05
▪ Cetane Number, min		40
▪ Sediment and water, % max		0.01
▪ Ash, % wt., max		0.01
▪ Flash point, closed cup, degrees F, min		125
▪ Cloud point of fuel delivered during the months of September through March, not higher than		14 degrees F
▪ Pour point of fuel delivered during the months of September through March, not higher than		0 degrees F
▪ Distillation, degrees F:	90% recovery, max	640
	End point, max	650

Sulfur and ash content shall be the lowest available (not to exceed the above specification) on each delivery. The City needs low sulfur and ash fuels to reduce emissions and for newest design engines. Supplier shall supply red dyed fuel if available.

BLENDED LOW SULFUR DIESEL FUEL

(Required percentage of blend will be specified at time of order)

Blends of No. 1 low sulfur and No. 2 low sulfur diesel fuel intended for winter use shall meet the following requirement:

▪ Cloud point of fuel delivered during the months of September through March, not higher than	-20 degrees F
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NO. 2 HIGH SULFUR DIESEL FUEL

No. 2 high sulfur diesel fuel shall be refined petroleum distillate for off-road use in an incineration process.

BIODIESEL (Originating supplier of biodiesel must be a registered fuel marketer as listed with the National Biodiesel Board [NBB])

B100 soybean based biodiesel fuel to be blended at a ratio of up to 20% biodiesel and 80% petrodiesel (No. 1 LS, No. 2 LS, D-Grade or a blend of these) to be determined at time of order. Pricing for B100 fuel must include blending.

Biodiesel is defined as the mono alkyl esters of long chain fatty acids derived from renewable lipid sources for use in compression-ignition (diesel) engines. This specification is for pure (100%) biodiesel as described below, prior to use or blending with diesel fuel.

Property	ASTM Method	Value	Unit
• Flash Point	D93	100.0 min	° Celsius
• Water & Sediment	D2709	0.050 max	Vol. %
• Carbon Residue (100% sample) *	D4530	0.050 max.	Wt. %
• Sulfated Ash	D874	0.020 max.	Wt. %
• Viscosity @ 40 ° Celsius	D445	1.9 - 6.0	mm ² /sec
• Sulfur	D2622	0.05 max.	Wt. %
• Cetane Number	D613	40 min.	
• Cloud Point	D2500	By customer	° Celsius
• Copper Strip Corrosion	D130	No. 3 max.	
• Acid Number	D664	0.80 max.	Mg KOH/gm
• Free Glycerin †	G.C.	0.020 max.	Wt. %
• Total Glycerin †	G.C.	0.240 max.	Wt. %

* The carbon residue shall be run on the 100% sample.

† The GC method for biodiesel is contained in Annex A1 of ASTM PS 121.

D-GRADE DIESEL FUEL

Specification Points	ASTM Test Method	Shipments (from Refineries)		Deliveries at Terminals may be
		Minimum	Maximum	
Gravity, degrees API	D-287			
		Summer	33.5	39.0
Winter		33.5	40.0	
Flash, degrees F	D-93			
		Summer	145	
Winter		140		5 lower
Cloud Point, degrees F	D-2500			
		Summer		+15
Winter			0	
Pour Point, degrees F	D-97			
		Summer		+10
Winter			-10	
Water & Sediment, %	D-1744			Trace

Specification Points	ASTM Test Method	Shipments (from Refineries)		Deliveries at Terminals may be
		Minimum	Maximum	
Carbon Residue on 10% bottoms (ramsbottom) - %	D-524		-0.20	
Viscosity, S.U. seconds at 100 degrees F	D-455	33		
Sulfur, weight %	D-1266		0.047	
Color	D-1500		2.00	½ higher
Cetane index	D-976-80	45.0		
Distillation, degrees F	D-86			
Initial Boiling Point		340		
50% recovered		460		
90% recovered		540	625	
End point			650	
Corrosion, copper strip at 122 degrees F	D-130		1	
Stability Residue, after 16 hours oxidation, ASTM D-525 – Modified and Steam Jet Evaporation @ 485 degrees F, soluble and insoluble, mg/100 ml			15	

DIESEL ADDITIVE DESCRIPTION

Treat Rate: 1 gallon of additive treats 3000 gallons of diesel fuel

Detergency

- Additive shall contain the detergency needed to achieve a "Clean Up" rating in the DW10 Standard Injector Coking Test
- Keeps injectors clean and maintains proper fuel spray pattern to avoid incomplete combustion
- Prevents formation of sticky deposits
- Prevents power loss caused by plugged injectors

Stability

- Reduces or delays thermal oxidation, the leading cause of black filters which can lead to filter plugging
- Improves storage life by 2-3 times as long without additives by preventing the formation of gums

Corrosion/Rust Inhibition

- Prevents corrosion of fuel storage tanks and vehicle tanks
- Protects injectors and fuel systems from corrosion and rust formation
- Prolongs fuel equipment life

Water Tolerance

- Promotes rapid separation of water when there is a major problem with free water
- Rapid separation allows you to pump out the water and get back into business ASAP

Lubricity

- Exceeds lubricity standard in ASTM D975 and EMA premium diesel requirement
- Reduces friction in engine parts
- Provides protection against accelerated wear
- Prolongs fuel system equipment life

NOTES:

- Summer grade specifications apply on shipments February 1st through August 15th.
- Winter grade specifications apply on shipments August 16th through January 31st.

- Additives: D-Grade diesel fuel shipments shall meet the requirements of Paragraph II, IV-C and IV-D in specifications, "Additive Requirements for Gasoline and Petroleum Fuel and Oil Distillate Products" of the Carrier.
- Method of Inspection: Inspection shall be in accordance with the MSTI, "Instructions Governing the Measurement, Sampling and Testing of Products for Acceptance and Delivery", currently in effect on Inspection date.
- Bill of lading must clearly indicate Pipeline 'D-Grade' diesel.

Blended D-Grade

Fuel shall be a blend of D-Grade Diesel and No. 1 Low Sulfur as requested. Required percentage of blend will be specified at time of order. This blend could range from 10/90 to 90/10 (D-Grade to No. 1 LS).