



## Centron Fuel Additives: A Proven Green Solution

### 3<sup>rd</sup> Party Independent Test Results

There are always big issues to be faced in an organization's development: perhaps none bigger than "going green" and contributing to a healthier, cleaner environment for future generations. Therefore meeting higher standards of environmental performance by implementing proven solutions has become a market & operational necessity.

The most harmful exhaust emissions affecting our health & environment are Particulate Matter (PM), Hydrocarbons (HC), Nitrogen Oxides (NOx), Opacity (black smoke) & Sulfur Dioxide (SO<sub>2</sub>). Environmental Protection Agency Regulations for Health & Environmental Concerns state:

*"PM & HC contribute to serious public health problems that include premature mortality, aggravation of respiratory and cardiovascular disease, and aggravation of existing asthma, acute respiratory symptoms and chronic bronchitis. Beyond the impact diesel engines have on ambient air quality, exposure to diesel exhaust has been classified by as being likely carcinogenic to humans"*

*"NOx is a major component of smog and acid rain. NOx emissions combine with HC in the atmosphere to form ground-level ozone, the primary constituent of smog. Ozone is a highly reactive pollutant that damages lung tissue, causes congestion, and reduces vital lung capacity, in addition to damaging vegetation. NOx also causes headaches, eye and nasal irritation, chest pain, and lung inflammation."*

**A proven cost effective solution** to these harmful exhaust emissions is now available. After extensive certified 3<sup>rd</sup> party independent testing confirmed by years of real world use, **CENTRON** Fuel Additives are proven to provide the following environmental benefits:

- **Dramatically reduces** Hydrocarbons (HC), Particulate Matter (PM), Nitrous Oxides (NOx) Opacity (black smoke), Carbon Monoxide (CO), Carbon Dioxide (CO<sub>2</sub>) & Sulfur Dioxide (SO<sub>2</sub>)
- **Increases** fuel economy by 5% to 15% in turn reducing CO<sub>2</sub> & greenhouse gas emissions
- **Creates** cleaner combustion thereby **Improving** operational efficiency & **Prolonging** useful life of engines; increasing residual asset value and extending capital outlay requirements
- **Creates** environmental leaders that are able to contribute to a healthier, cleaner environment for current & future generations.

**CENTRON** is a patented blend of environmentally safe materials that is U.S. EPA registered & 3<sup>rd</sup> party verified. The following is a summary of 3<sup>rd</sup> party independent test results verifying the performance efficacy of Centron fuel additives:

**Roush EPA Certified Emissions Laboratory** An evaluation conducted at Roush Emissions Laboratory in Michigan proves the efficacy of Centron in a new gasoline automobile. These results were generated on a new car running a FTP 75 test cycle on a chassis dynamometer.

## Roush Emissions Laboratory

- **EPA certified Emissions Lab**
- FTP75 (“city”) test schedule in accordance with CFR-40 part 86.
  - **New cars (2006 Chevy Impala) were used for this evaluation**
  - Base fuel – E10 87 Octane (R+M)/2
  - Non-Methane HC was reduced 6.7%
  - Methane was reduced 17.7%
  - **Fuel Economy Improvement of 2.12%**

**New cars showed a 30% reduction in NOx and a 9% reduction in Hydrocarbons in a controlled EPA approved emissions test**

<b>ROUSH</b>	Weighted NOx (g/mi)	Weighted THC (g/mi)
FTP75 with Base Fuel	0.017	0.041
FTP75 with Base Fuel and Centron	0.012	0.037
Percent Decrease with Centron	-30.77 %	-9.44 %



**Table: Results from an automotive emission test show a 18% reduction in methane, 31% reduction in NOx and a 9% reduction in Total HC. This test also yielded a fuel economy improvement of 2.1% considered a significant improvement for on a brand new OEM engine.**

**Stephenson Environmental**, a leading environmental measurement and management company in Australia, conducted an evaluation of Centron Diesel Fuel Additive over a 3 week period in March of 2009 on an Isuzu FRR550 delivery truck operating in the Sydney metro area.

### 3rd Party Analysis

#### Emission Results from Stephenson Environmental, Australia

- Stephenson Environmental Management is a leading emissions testing company in Australia.
- Study showed a **68% reduction in Total Solid Particulate** (primarily hydrocarbons), a **15.7% reduction in NOx**, and a **27% reduction in Carbon Monoxide**.
- Stephenson also tested for **Sulfur Dioxide**, a leading contributor in forming acid rain, which Centron **reduced almost 74%**.
- Stephenson commented: “...this is unusual in conventional engine management with NOx and CO generally being inversely proportional. This may imply that **Centron has modified the burn rate of the fuel during combustion.**”

SUMMARY RESULTS for Emissions - mg/m <sup>3</sup>					
	TSP	CO2	SO2	CO	Nox
Before Centron	38.4	2.3	11.0	285	502
After Centron	12.3	2.4	2.9	208	423
% Change	-68.0%	4.3%	-73.6%	-27.02%	-15.7%



**Table: Results from Stephenson Environmental in Australia showing a Total Solid Particulate (TSP) reduction of 68% and substantial reductions in SO2, CO, and NOx.**

The Illinois Department of Transportation tested Centron over a nine month period resulting in a dramatic reduction in hydrocarbons (76%), carbon monoxide (69%), and NOx (40%).

## Midwestern State DOT

Ultra Low Sulfur Diesel

SUMMARY RESULTS for Emissions					
	HC (PPM)	CO2 (%)	O2 (%)	CO (%)	NOx (PPM)
Before Centron	6	2.05	17.94	0.030	294
After Centron	1	2.33	17.80	0.009	175
% improvement	-76%	14%	-1%	-69%	-40%

### Additional benefits :

- 5.5% decrease in fuel consumption
  - Superior fuel stabilizer
  - No cold start issues in test group; multiple in control group
- \* Fleet of 14 trucks over a 9 month period



**Table: Illinois Department of Transportation has realized significant emission reductions from using Centron additives.**

Milwaukee County, WI Department of Transportation tested Centron over a 12 month period in 2008 and 2009.

## Evaluation Results – Major Midwest DPW

- Hydrocarbons were reduced by **over 55%** and NOX were reduced by **more than 25%**.
- Engine efficiency was improved resulting in a combined average of **12.1% reduction in fuel consumption.\***
- Assuming a similar result to the test group and a fuel usage rate of approximately 478,000 gallons per year and the **fuel savings is roughly \$90,000 per year with an ROI of 253%**.
- **CO2 reduction of 605 tons per year**

	MPG	HC (PPM)	CO (%Vol)	CO2 (%Vol)	O2 (%Vol)	NOX (PPM)
Before CENTRON	4.38	14	0.021	1.74	18.74	373
After CENTRON	4.91	6	0.020	1.76	18.73	278
Change	0.53	-8	0.000	0.01	-0.01	-94
% Change	12.1%	-56.2%	-1.2%	0.8%	-0.1%	-25.3%

\* Fuel data was collected by the DPW using their fuel tracking system and they calculated the MPG improvement.



**Table : Milwaukee County evaluation results showing HC reductions of 56%, NOx reduction of 25%, and an annualized carbon footprint reduction of 605 tons.**

**Society of Automotive Engineers (SAE)** test schedule was performed with Centron Diesel Fuel additive in 2008 resulting in significantly reduced harmful emissions and improved cylinder blow-by. The result of cylinder blow-by is dirty oil caused by greater raw hydrocarbon crank case emissions; dirty oil causes greater levels of hazardous exhaust emissions and shorter oil change intervals.

## Society of Automotive Engineers

- 2005 Freightliner with 450 HP engine and more than 275,000 miles
- Quotes from Claude Travis, SAE Engineer:
  - *“We have undertaken many tests before and **we have never seen emission reductions as dramatic as these.**”*
  - *“**The blow-by reduction was particularly surprising** because the starting pressure of 8” (of water) was lower than expected for most trucks on the road after logging more than 275,000 miles.”*



	<u>At Idle</u>	<u>Under Load</u>
NOx	-38%	-66%
HC	-23%	-42%
Blow-by	n/a	-25%



**Table :** Results from an independent SAE evaluation showing a 66% reduction in NOx, a 42% reduction in HC, and a 25% improvement in cylinder blow-by.

**Southwest Research Institute** an EPA certified emissions lab performed an engine dynamometer emissions test on a 2009 Tier IV diesel engine treated with Centron Diesel Fuel Additive.

## Diesel Engine Emission Test

### 3rd Party Analysis

- EPA Certified Emission Test Lab in July 2009
- Emissions evaluation on an engine dyno using a **2007 engine with 100 hours**. (New engine just past break-in)
- Ran FTP 77 Duty Cycle for emission collection
- **Hydrocarbon emissions were reduced by 8% at 100 hrs of testing**
- **NOx emissions were reduced by 10% at 150 hours of testing**
- Based on this testing we believe our products would have a **much greater impact on older engines** which are more representative in the marketplace
- ***The test engineers were very surprised to see an additive make this much of an impact on emissions of a late model engine.***



**Table :** Centron fuel additives were tested on an engine dyno in a new Tier IV 2009 diesel engine. Hydrocarbons were reduced by 8% at 100 hours. NOx readings continued to improve so testing was extend to 150 hours producing a 10% reduction.

The Mexico City Transit Authority conducted a mileage and emissions test on a fleet of their diesel busses. The results concluded that Centron fuel additive had a dramatic effect on the amount soot produced by the buses.

### 3rd Party Analysis Major MetroTransit Authority

- Major Metro Transit Authority ran an independent fuel economy and smoke opacity study of the effects of Centron.
- Study showed:
  - **20.6% improvement in fuel economy**
  - **23.9% reduction in smoke opacity**

Bus #	Mileage (km/Lt)			Opacity		
	Baseline	Centron	% Change	Baseline	Centron	% Change
B-004	0.90	1.09	21.0%	0.75	0.79	5.3%
B-022	0.80	1.04	30.1%	1.11	0.93	-16.2%
B-024	0.90	1.07	18.4%	1.73	0.72	-58.4%
B-025	0.90	1.07	18.5%	4.03	3.44	-14.6%
B-048	0.80	1.08	34.6%	1.00	0.65	-35.0%
B-053	0.90	0.97	7.9%	0.72	0.55	-23.6%
B-055	0.80	1.06	32.4%	0.91	0.64	-29.7%
B-071	1.00	1.11	11.0%	0.53	0.59	11.3%
B-087	0.90	1.17	29.9%	0.88	0.74	-15.9%
B-077	0.90	0.97	7.3%	0.93	0.53	-43.0%
<b>Fleet Average</b>	<b>0.88</b>	<b>1.06</b>	<b>20.6%</b>	<b>1.26</b>	<b>0.96</b>	<b>-23.9%</b>



**Table: Mexico City Transit Authority testing resulted in a 24% reduction in opacity (soot and black carbon) and 21% improvement in fuel economy performance.**

Sanset International performed a fuel economy and smoke test on five (5) excavators & four (4) dozers at the Letšeng Diamond Mine in Lethoso, Africa Oct 2009 thru Jan 2010

Unit	First 10 Days			Last 10 Days			% Change
	Hours	Liters	LPH	Hours	Liters	LPH	
1040001 365/01	239	9258	<b>38.7</b>	219	7614	<b>34.8</b>	<b>-10.2%</b>
1040002 365/02	170	6713	<b>39.4</b>	226	8477	<b>37.5</b>	<b>-4.8%</b>
1040003 385/01	232	13309	<b>57.3</b>	192	9626	<b>50.3</b>	<b>-12.2%</b>
1040004 385/02	n/a	n/a	<b>n/a</b>	n/a	n/a	<b>n/a</b>	<b>n/a</b>
1040006 385/03	220	12921	<b>58.9</b>	220	12724	<b>57.8</b>	<b>-1.8%</b>
<b>FLEET TOTAL</b>	<b>861</b>	<b>42202</b>	<b>49.0</b>	<b>857</b>	<b>38442</b>	<b>44.9</b>	<b>-8.4%</b>

**Table: Letšeng Diamond Mine testing resulted in a fuel economy improvement of 8.4% and elimination of black smoke from the excavators & dozers treated with Centron. An 8.4% reduction in fuel usage equates to 2,519 Reduction in Metric Tons of CO2**

Centron fuel additives are compatible with all fuel blends:

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## **Fuel Compatibility**

**Centron** is compatible with all diesel and gasoline blends including bio-fuels.

- All Gasoline and Ethanol Blends
- #1 & #2 Diesel
- O2 Diesel (Oxygenated)
- Ultra Low-Sulfur Diesel (ULSD)
- Bio Diesel - B2, B5, B20



**Centron** is safe for all engines and engine parts and works without any engine modifications



**Centron is also:**

- Ultra Low Sulfur Diesel (ULSD) Compliant - contains less than 15 ppm sulfur
- Comprised of environmentally safe biodegradable petrochemicals
- Will not harm engines, engine parts, fuel lines, or storage tanks
- Does not void engine manufacturer's warranties
- Works in all diesel engines without modification
- Does not contain alcohol, methanol, isopropyl, MBTE, sulfur or metal
- EPA registered, Patented, MSDS listed
- Dosage Rate = 1 : 320

**Specifications:**

Lubricity.....380 HFRR  
PourPoint / Gel Inhibitor to -20 Deg. F.  
IBP.....315-610  
Flash Point.....105 Deg F.  
Base Fluid.....Proprietary  
Derived Cetane.....4-5 points  
Vapor Pressure.....0.18 (mm Hg.)  
DOT.....Hazard Class 3 - Packing II

## Use of Centron Fuel Additives with Biodiesel Fuels

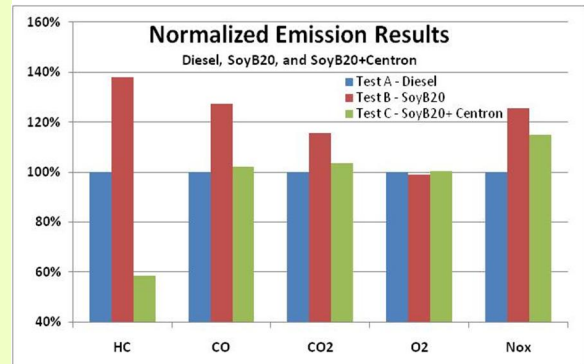
National Biodiesel Ltd performed a test with their B20 Soy Biodiesel treated with Centron Diesel Fuel Additive to determine the affects on fuel economy performance, emissions, & black smoke. Centron also improves power lost from the lower BTU content of biodiesel, and eliminates water, algae, sludge and gelling issues associated with biodiesel.

# Biodiesel Evaluation

## Diesel, SoyB20, SoyB20+Centron

Summary Emissions Results	Average Emissions				
	HC (PPM)	CO (%)	CO2 (%)	O2 (%)	NOx (PPM)
Test A - Diesel	10	0.033	1.71	17.86	76
Test B - SoyB20	13	0.042	1.98	17.70	95
Test C - SoyB20+ Centron	6	0.034	1.77	17.95	87
Change Diesel to SoyB20	4	0.009	0.27	-0.16	19
% Change Diesel to SoyB20	38%	27%	15.8%	-0.9%	26%
Change SoyB20 to SoyB20 + Centron	-8	-0.008	-0.21	0.25	-8
% Change SoyB20 to SoyB20 + Centron	-58%	-20%	-10.6%	1.4%	-8.4%
Change Diesel to SoyB20 + Centron	-4	0.001	0.06	0.09	11
% Change Diesel to SoyB20 + Centron	-41%	2%	3.5%	0.5%	15%

- Isuzu 4.5L non-turbo delivery trucks
- **Strong emission reductions across the range**
- Drivers reported trucks became sluggish, reduced power, and more black smoke with straight B20 vs. standard diesel fuel.
- **With addition of Centron to the B20 the smoke went away, power returned, and drivers commented the performance was better than on straight diesel.**



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**Table : Centron reduced emissions, reduced black smoke, and improved power when compared with the B20 biodiesel blend. Emissions of HC were reduced 58%, CO was reduced 20%, CO2 was reduced 11%, and NOx were reduced 8%.**

## Centron Gasoline Fuel Additive positive impact on gasoline evaporation

Southwest Research Institute performed a Reid Vapor Pressure (RVP) on Centron gasoline additive to measure improvements in gasoline evaporation a leading contributor to hydrocarbon emissions. Even a 1% change in RVP is a significant reduction in terms of hydrocarbon emissions because of the concentration of raw hydrocarbons in evaporated gasoline.

### Southwest Research Institute

- Reid Vapor Pressure (RVP) Testing showed a significant decrease of the Reid Vapor Pressure in both Conventional and Reformulated Gasoline.
- RVP is the measure of how quickly fuel evaporates and how stable it is over time.
- RVP represents the largest impact on evaporation of fuel which is the highest concentration of hydrocarbon emissions; much higher than what is exhaust emissions.



	Conventional Gasoline			E10 Reformulated Gasoline			E85 Reformulated Gasoline		
	Baseline	w/ Centron	% Change	Baseline	w/ Centron	% Change	Baseline	w/ Centron	% Change
Average RVP (psi)	8.06	7.85	-2.6%	6.85	6.77	-1.2%	6.58	6.48	-1.5%
ASTM D 5191 RVP									

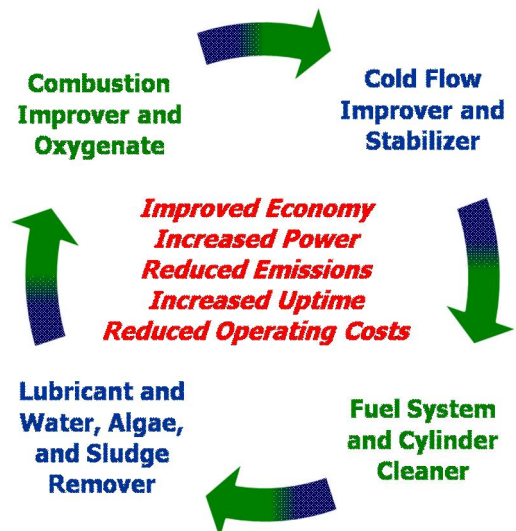


**Table: Reid Vapor Pressure (RVP) is reduced showing a reduction in the ability of gasoline to evaporate, thus reducing hydrocarbon emissions.**

*In summary, the results of independent 3<sup>rd</sup> party testing verifies the efficacy of Centron Fuel Additives for reducing harmful exhaust emissions and improving fuel economy performance.*

#### **Centron works in four ways to reduce emissions:**

*Centron's patented formulation reduces all levels of hazardous emissions from internal combustion engines. It does this through chemical cleaning, introduction of additional oxygen to the combustion process, eliminating contamination from the fuel system, and modification of the fuel at the molecular level.*



**Centron Cleans** deposits from fuel tanks, lines, injectors, valves, and piston rings and keeps them clean with continuous use bringing engine back to “like new” performance.

- Improved sealing of valves and piston rings reduces blow-by improving performance and fuel economy.
- Improves injector spray pattern to facilitate improved atomization
- Reduces Operating and Maintenance Costs: A cleaner engine lasts longer and runs better.
- Eliminates EGR valve fouling and reduces diesel particulate filter (DPF) regenerations saving time, money, and increasing DPF life.

**Centron Improves Combustion** by reducing fuel surface tension and introducing additional oxygen to the combustion process.

- Reduced surface tension allows better atomization so more of the fuel molecule to exposed to oxygen during the combustion process
- Oxygenates enable a more complete fuel burn providing better fuel economy, more power, reduced black smoke & soot.
- The improved combustion reduces hazardous emissions and particulate matter (PM) through a more efficient yet lower temperature combustion process.

**Centron Lubricates** pumps, valves, injectors, and piston rings.

- Replaces lost lubrication of ULSD and improves the performance and extends the life of pumps and injectors, reducing maintenance costs.
- Provides lubricity equal to that of 3000 ppm sulfur content fuel
- Increased Lubrication to the upper cylinder area, valves and top rings reduces blow-by thus improving efficiency and reducing oil contamination and dilution

**Centron Conditions** fuel by removing water from by carrying it through the combustion process.

- Resolves algae and sludge issues, making Centron one of the best algae and sludge solutions on the market today
- Emulsifies water and suspends it allowing it to exit the fuel system through combustion instead of accumulating
- Keeps fuel tanks and lines from rusting out
- Eliminates fuel line freeze during cold weather
- Protects and conditions bulk tank storage

**Centron Stabilizes** fuel allowing it to stay fresh over an off season, protecting against corrosion, water issues, and wax and varnish deposits

- Promotes molecular balance in the fuel and makes it shelf and tank stable, thus enhancing the oxidation stability of straight diesel, biodiesel blends, gasoline and gasoline ethanol blends
- Controls water accumulation during storage
- Easier starting after storage