

# **R.A.L.P.H.I.E.**

**(Rennsli Amalgamated List of Proven Historical Information of Effects)**

**September 8, 2016**

**Rennsli's technology has been successfully used in the global market for thirty years. Customers across various industries have realized measurable benefits from the use of Rennsli's products. This document provides examples of the benefits that we (via third-parties), and our customers, have been able to document due to our technology's ability to improve combustion efficiency. The primary benefits discussed below include: (1) lower emissions, (2) increased oil life, (3) improved fuel efficiency, (4) increased power, and (5) reduced carbon deposits on internal components.**

## **I. Emission Reduction**

Emissions reductions related to Rennsli's technology can be classified in two general categories: reduction of specific pollutants, e.g. NOx, CO2, etc., and reduction of exhaust particulates, i.e. opacity or smoke. Rennsli's products have a profound effect in both categories. The tests that we have regarding emissions reductions include the following:

**A. 9.2% reduction in NOx** - Intertek USA, Inc. Automotive Research Division, Final Report for Intertek Proposal No. 51445 Diesel Fuel Additive Testing, October 21, 2014.

**B. 77.9% reduction in opacity (smoke)** - Utah State Mobile Emission Testing Diesel Vehicle Inspection Reports 10-2725 2003 Caterpillar 330CL Long Reach Excavator. December 1, 2011 through February 7, 2012.

C. **7.21% - 22.67% reduction in NO<sub>x</sub>** - Utah State Emission Testing of twenty-three gasoline vehicles with baseline data compared to treated fuel. November 2009 - July 2010.

D. **Observed reduction of emissions and particulate smoke** - *Memorandum Regarding Fuel Catalyst*, Corporation of the City of Hamilton, Hamilton, Ontario, Canada. April 22, 1996.

E. **Observed reduction of exhaust smoke** - *Letter Regarding Ferox Fuel Additives*. Hamilton Fire Department, Hamilton, Ontario, Canada. August 16, 1994.

F. **8.66-38.82% reduction in unburned hydrocarbons** - *Evaluation of Ferox Treated Fuel at McCartney Construction Co., Inc.*, Ferox Petrochemical Corporation, Winter Park, Florida. February 3, 1993.

G. **51% reduction in unburned hydrocarbons** - *Smoke Reduction Test-City of Leesburg, Florida*. Ferox, Inc., Vineyard, Utah. December 1992.

## II. Improved Efficiency

From the beginning, Rennsli and its customers have sought to demonstrate the effect of Rennsli's products on fuel efficiency. However, without proper controls and consistent conditions, efficiency can be difficult to accurately measure. Nevertheless, over the years we have been able to demonstrate improved efficiency in real world applications. Examples of improved efficiency include:

A. **7.03-22.16% increase in fuel efficiency** - *Utelite Test Results*. Rennsli Corp., Orem, Utah. November 15, 2015.

B. **17.34% efficiency increase** - *Evaluation of Additive Impact on Diesel Fuel and Generator Efficiency*. Cummins Diesel Generator KTTA 19G 400Kva. Askari Rawalpindi, Pakistan. March 27, 2013.

C. **19.17% increase efficiency** - *Evaluation of Additive Impact on Tyre Oil and Boiler Efficiency*. Artistic Fabric Mills, Karachi, Pakistan. March 2013.

D. **16.86% efficiency increase** - *Evaluation of Additive Impact on Diesel Fuel and Generator Efficiency*. Warid Telecom, Islamabad, Pakistan. January 1, 2013.

E. **21.6% increase in steam production** - *Evaluation of Additive Impact on HFO and Boiler Steam Production Efficiency*. 400 horsepower Cleaver Brooks Boiler. El Salvador. 2009.

F. **16.3% increase in fuel efficiency** - *Ferox Fuel Efficiency Test*. Bill Barrett Corporation and Frontier Drilling Company, Roosevelt, Utah. August 22, 2008.

G. **11.7% increase in fuel efficiency** - *Ferox Fuel Efficiency Test*. Davis County Sheriff's Office, Farmington, Utah. January 28, 2008.

H. **5.5-6.1% increase in fuel efficiency** - *Evaluation of Ferox - Fuel Catalyst for Reducing Exhaust Emissions and Increasing Fuel Economy*. Environment Canada, Ottawa, Ontario, Canada. January 29, 1997.

I. **7.48% increase in fuel efficiency** - *Statistical Analysis Summary of Ferox 230 Fuel Economy Test*. Savage Industries, American Fork, Utah. July 6, 1990.

### III. Increased Power

Rennsli's products have produced measurable improvement on both engine and chassis dynamometers. These tests have been performed on gasoline and diesel engine passenger vehicles and heavy equipment. These tests show increases in both horsepower and torque. Results from these tests include:

A. **7.39% (130 ft. lbs.) increase in torque and 7.33% (45 hp) increase in horsepower at 1800 rpms** - Caterpillar D10T C27 Engine Dyno. Performed at Wheeler Cat, Salt Lake City, Utah. November 19, 2013.

B. **3.7% (13.03 hp) increase in horsepower** - 2011 Ford F-250 Super Duty Diesel Chassis Dyno. Premier Performance, Salt Lake City, Utah. August 11, 2011.

C. **4.66% (14.18 ft. lbs.) increase in torque and 4.66% (12.95 hp) increase in horsepower** - 1999 Corvette Z06 Chassis Dyno. Premier Performance, Salt Lake City, Utah. September 15, 2011.

- D. **5.20% (12.50 hp) increase in horsepower** - 2007 BMW 335i Chassis Dyno, DYNO DYNAMICS, Evolution Racing Technology, El Paso, Texas. March 8, 2008.
- E. **6.98% (23.32 hp) increase in horsepower** - Carlos Molina's BMW 335i Chassis Dyno, DYNOJET RESEARCH, California. December 19, 2007.
- F. **21.8% (60 ft. lbs.) increase in torque and 23.04% (71.7 hp) increase in horsepower** - Carlos Molina Lexus IS300 Turbo Chassis Dyno, DYNOJET RESEARCH, California. December 19, 2007.
- G. **7.02% (11.34 hp) increase in horsepower** - Carlos Molina 2003 BMW 323i Chassis Dyno, DYNOJET RESEARCH, California. November 14, 2007.

## IV. Reduced Carbon Deposits

Rennsli's technology has a unique ability to remove carbon deposits during the combustion process. Although we have never specifically tested the technology's effect on carbon deposits, several Rennsli customers have observed a reduction in carbon deposits after using Rennsli's products. During routine maintenance and engine tear-downs these customers have documented the reduction, or absence, of carbon on engine parts that normally suffer from excess carbon build up. Examples of observed carbon reduction include:

- A. **Engine Tear Down Pictures Caterpillar 3406 980 Front Loader** - 17,414 operating hours with over 9,000 hours of use with Ferox 230 treated fuel. Southern Aggregates and Yancey Brothers Caterpillar dealer. April 1995.
- B. **Engine Tear Down Pictures Cummins KT 2300** - L-800 Marathon La Tourneau 15-Yard Front-end loader. 14,000 operating hours with 900 hours of Rennsli treated fuel. January 1995.
- C. **Observed absence of carbon deposits on pistons and valve stems** - *Letter to Southern Aggregates*. Yancey Brothers Company ("Yancey CAT"), Augusta, Georgia. February 3, 1994.
- D. **Observed absence of carbon buildup on spark plugs** - *Spark Plug Replacement Handout*. Ferox, Inc., Vineyard, Utah. September 16, 1993.

E. **Engine Tear Down Pictures Caterpillar 3408** - 13,788 operating hours with Ferox treated fuel. Florida Crushed Stone Engine Tear-Down April 29, 1993.

## **V. Increased Fuel Lubricity**

Rennsli recently began evaluating its technology's effect on the lubricity of fuel. Although Rennsli is still in the initial phases of testing improvements to fuel lubricity, early results are positive.

A. **9.8%-24.4% (40-100 micron) wear scar improvement in diesel fuel lubricity** - *Certificate of Analysis*. SGS North America Inc., Oil, Gas and Chemical Services. March 17, 2015.