



EcoSave EXT™

Extreme Pressure & Anti-Wear

Metal Conditioner

Prepared by:

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Welcome to the world of Boundary Lubrication and ECOSAVE EXT, our Extreme Pressure and Anti-Wear Lubricant Additive for use in all compatible oil and grease systems.

The applications for ECOSAVE EXT are endless, from consumer products to industrial uses.

Unlike other lubricant additives, ECOSAVE EXT is *an advancement in applied metallurgy*.



Boundary Lubrication

Overview

Boundary Lubrication

Boundary lubrication is a form of lubrication between two wearing surfaces without the existence of a full-fluid lubricating film. Boundary lubrication can be made more effective by including a wide variety of additives to the primary lubricating fluid that provide dramatically altered lubricating characteristics, thus preventing excessive friction and possible abrasion and scoring of the lubricated surfaces.

There are varying degrees of effectiveness of boundary lubrication additives, depending on the severity of the service required. For mild conditions, “oiliness” agents can be added ; by sheeting out on metal surfaces in a thin but durable film, oiliness agents can reduce friction and abrasion under some conditions that are too severe for straight petroleum oils. Compounded oils, which are formulated with polar fatty oils, are sometimes used for this purpose. For more severe boundary lubrication applications, anti-wear additives can be used. These are the more sophisticated compounds typically found in commercial “oil enhancing” products on the market today.

The most severe cases of boundary lubrication are defined as extreme pressure conditions; they are met with lubricants containing Extreme Pressure (EP) additives that prevent wearing surfaces from actually fusing together at high local temperatures and high pressures.

How Does ECOSAVE EXT Work?

As we have just learned, Extreme Pressure (EP) additives, are lubricant additives formulated to be added to primary lubricants whose role then is to decrease the wearing of machined surfaces that are exposed to severe conditions of very high pressures or very high temperatures.

Today’s commercial EP additives typically contain organic sulfur, phosphorus, zinc compounds which attempt to produce a chemical reaction with the metal surface under these high pressure and high temperature conditions. Other commercially available products claiming EP characteristics are based on micro-waxes and polymerized plastics.

Under such extreme conditions, small unevennesses (asperities) on the wearing surfaces cause localized hot-spots of high temperature (300-1000°C / 570–1830°F), without any significant increase of the surrounding average surface temperature. Thus, the chemical reaction between the EP additive and the surface is localized to this area.



Unlike other EP additives, ECOSAVE EXT is a true metal conditioner, and works by a mechanism of molecular disassociation (i.e., the separation of the chemical compound into smaller molecules) of the actual EP agents.

ECOSAVE EXT functions by addressing the condition whereby at the high local temperatures associated with the metal-to-metal contact, the EP agents in ECOSAVE EXT disassociate from the product and combine chemically with the metal surface to form a surface film that prevents the welding of opposing asperities (rough surfaces), and the consequent abrasion and scoring that is destructive to these wearing surfaces under these extreme conditions.

ECOSAVE EXT's EP agents are free halogen compounds (halogen-substituted hydrocarbons). As these extreme temperature or pressure conditions are met, the activity of these halogenated molecules increases with decreasing stability of the carbon-halogen bond. What this means is that at local contact temperatures ranging between 305-330°C (580-660°F), the EP additive thermally decomposes and the reactive halogen atoms form a surface layer of metallic halogenides on the wearing surface, thereby protecting that point and dramatically increasing its "slip", or lubricity factor. The eventual failure of this new contact point comes only from abrasion or when the contact temperature exceeds the melting point of the new iron halide layer.



Product Overview and Data Sheet

ECOSAVE EXT - BOUNDARY LUBRICATION TECHNOLOGY

PRODUCT OVERVIEW

EXTREME PRESSURE ADDITIVE AND ANTI-WEAR SUPPLEMENT: BOUNDARY LUBRICATION

In today's high-tech world of advanced mechanical designs, high revving engines, and industrial equipment costing millions of dollars, we are still using lubricating methods invented a century ago! Why do you treat a million dollar investment with a 90 cent can of oil?

ECOSAVE EXT creates a chemical condition known as Boundary Lubrication. Actually a molecular change to the wearing surfaces being treated, ECOSAVE EXT will greatly reduce the friction, wear, and damage on any metal surface requiring lubrication. ECOSAVE EXT's unique chemical ability effectively reduces this friction and wear. It creates a chemical reaction with the metal surfaces being treated and does not remain in the primary lubricant, as other so-called additives do.

ECOSAVE EXT is safe to use on any metal-to-metal friction generating application. The savings when using ECOSAVE EXT greatly overshadows the cost of the product. ECOSAVE EXT treats the wearing metal surfaces and, as such, requires only a small amount of product. ECOSAVE EXT is compatible with all types and forms of lubricating oils, gear oils, motor oils, compressor oils, hydraulic fluids, etc.

THEORY OF OPERATION

ECOSAVE EXT is a unique approach to the field of advanced Extreme Pressure lubrication. NOT a lubricant...

ECOSAVE EXT is a metal treatment and conditioner offering unsurpassed anti-wear characteristics.

Under normal lubricating conditions, the two metal surfaces to be lubricated will be covered by a thin film of lubricant which will act to provide the desired reduction of friction of the two surfaces. In this lubricating film are found a wide assortment of contaminants, all of which can act in an abrasive manner on the metal surface the lubricant was designed to protect!

Under extreme pressure lubricating conditions, and as normal lubricating oils can only withstand a limited amount of pressure and heat before losing their lubricating properties, all of the liquid lubricant is forced out of the area of contact between the two metal surfaces, leaving an



undesired metal to metal contact and resulting damage caused by friction, heat, wear, and microscopic contaminants.

With the addition of EcoSave EXT, the heat caused by the normal friction of metal-to-metal contact will cause a thermal reaction whereby molecules of EcoSave EXT are released and combine with the surface of the metal. This reaction creates a NEW metal surface that now has a much lower coefficient of friction than the original metal surface.

This new surface tends to fill in the microscopic depressions and irregularities found on all metal surfaces, thereby creating smoother surfaces at the points of contact and leaving no voids to collect abrasive contaminants while greatly reducing friction and wear.

FEATURES & BENEFITS:

- Contains no Teflon or Fluorocarbons.
- Will not corrode yellow metals.
- Compatible with all petroleum and synthetic oils & greases
- For use in new and old applications.
- Chemical reaction reduces friction, heat, wear, corrosion, rust and chemical attack.
- High temperature operating range.
- Keeps metal surfaces free of contaminants and solid particulates.
- Triples lubricant efficiency.
- Reduces acidic formations in internal combustion engines.
- Constant viscosity reduces "dry" start-ups.
- Easier cold weather starts in internal combustion engines.

GENERAL PROPERTIES:

- | | | |
|--|--|---|
| <input type="checkbox"/> Color: Amber | <input type="checkbox"/> Odor: Slight | <input type="checkbox"/> Vapor Density: 5.0 |
| <input type="checkbox"/> % Volatile: 100% | <input type="checkbox"/> Boiling Point: 397° F. | <input type="checkbox"/> Viscosity: 39.1 4 @ 75° F. |
| <input type="checkbox"/> Ash: 93% ±1% @ 75° F. | <input type="checkbox"/> Solubility in Water: Insoluble | |
| <input type="checkbox"/> Vapor Pressure: 0.4mm | <input type="checkbox"/> Specific Gravity: 1.067 to 1.095 @ 75° F. | |

PACKAGING:

Available in 8-ounce plastic bottles, 1-gallon jugs, and 5-gallon pails.



Uses & Applications

ECOSAVE EXT™

GENERAL APPLICATIONS AND USE

As ECOSAVE EXT is a highly concentrated product, only a small amount is required for most applications.

INDUSTRIAL APPLICATIONS:

Light Loads	Add 1 ounce per 1 quart of the primary lubricant
Medium Loads	Add 1.5 ounces per 1 quart of primary lubricant
Heavy Loads	Add 2 ounces per 1 quart of primary lubricant
Hydraulic Systems	Add 8 ounces per 5 gallons of hydraulic fluid
Industrial Engines	Add 2 ounces per 1 liter of engine displacement
Differentials	Add 1 ounce to 1 pound of lube/grease
Automatic Transmissions	Add 6 ounces every 12 months or 30,000 miles
Compressors	Add 1 ounce per 1 quart of oil at each oil change
Ball & Bearing Assemblies	Add 8 ounces per each pound of grease
General Lubrication	Add 1 ounce to each 16 ounces of lubricant

AUTOMOTIVE APPLICATIONS:

Crankcase	2 ounces per quart of oil every 6 months or 15,000 miles
Automatic Transmission	6 ounces every 12 months or 30,000 miles

WHEN DO I ADD MORE?

To achieve the optimum results of ECOSAVE EXT, you must be sure that the product is completely circulated in the system and allowed enough time, heat, and pressure to assure the reaction to occur. Since EcoSave EXT is a metal treatment, the new metal surface created by the ECOSAVE EXT treatment must physically wear off before a re-treatment is required. This period may vary greatly and depends on the amount of metal-to-metal contact, pressure, etc. A careful monitoring of performance of the treated equipment will clearly tell when a new treatment is required.



Note: Use of a measurement of metal wear particles in the primary lubricant will tell when a re-treatment is required. When the count returns to the same area it was at prior to the original treatment, it is time to re-treat.

TYPICAL APPLICATIONS

- Gasoline Engines
- Diesel Engines
- Two-Cycle Engines
- Industrial Motors
- Winches & Come-A-Longs
- Transmissions
- Gearboxes
- Differentials
- Transfer Cases
- Bearings
- Air Compressors
- Metal Working Equipment
- Hydraulic Systems
- Rotary Compressors (Air Conditioning)
- Two-stage Refrigeration Compressors
- Air Tools
- Pumps
- Drill Bits
- Saw Blades
- Generators
- Drive Shafts
- Steam Valves
- Stampings
- Drawing and Forming Equipment
- Universal Joints
- Power Steering Units
- Reduction Gear Assemblies
- Chains, sprockets, open gears, conveyors, and all metal-to-metal applications



Weapons Treatment Data Sheet

ECOSAVE EXT-WT – BOUNDARY LUBRICATION TECHNOLOGY

DESCRIPTION: **ECOSAVE EXT Weapons Treatment** protects and treats your firearms. It is far superior to commercial lubricating oils because it provides advanced boundary lubrication technology in an easy to use lubricant base. Boundary Lubrication protects against the damages and loss of performance caused by heat and wear. The organo-metalllic catalyst leaves a novel molecular bound within the steel's surface that surpasses the ability of normal lubrication and will not attract dirt, dust or grit which can permanently damage a firearm. It increases muzzle velocity, improves accuracy and consistency, reduces wear from friction and prevents rust and corrosion. ECOSAVE EXT-WT offers far superior weapons conditioning and performance than Teflon, dry graphite, Armalube™, ProTec™ gun oil, Militec™ and more. ECOSAVE EXT-WT is a surface metal conditioner for use wherever any conventional lubricants can be used. Unlike lubricants that simply coat the metal surface, ECOSAVE EXT-WT forms a molecular bond that chemically reacts with the metal compound to create a remarkably strong surface that serves to drastically reduce friction, creating a significant reduction in heat and wear.

USES: As a barrel treatment in all conventional weapons.

DIRECTIONS FOR APPLYING ECOSAVE EXT TO THE GUN BARREL:

Step #1: *Barrel Preparation*

Begin with a clean barrel. Spray the interior barrel surface liberally with a reliable barrel solvent. Thoroughly brush the barrel using a barrel cleaning brush. Dry the barrel with a wiping swab.

Step #2: *Applying ECOSAVE EXT EP treatment to the barrel*

Fire a full magazine or cylinder of live ammunition. Using a patch, swab the barrel several times to apply a coating of ECOSAVE EXT-WT on to the interior surface of the barrel. Allow the coating to remain on the surface. Do not wipe off. Fire an additional magazine or cylinder to activate the boundary lubrication agents.

Step #3: *Firearm use and subsequent applications*

The firearm may be fired as usual following the treatment. Due to the chemical makeup of the product, the beneficial properties are formed by the heat and friction of the live firing. Regular maintenance applications will further establish the benefits of the extreme pressure agents.



Shipping Information

Shipping Information:

DOT Name: Petroleum Distillates
NFPA Class 3: Combustible
Packing Group: Not Regulated
DOT Class: Not Regulated
UN#: Not Available
Schedule B Code: 2710199000
NFPA/HMIS
Health Hazard: 1
Flammability Hazard: 1
Reactivity Hazard: 0
Specific Hazard: NA
Personal Protection: B

Code of Federal Regulations : Title 49 Transportation

Shipping Consumer Products in Accordance With Federal Law.

In the continental United States, consumer products may be shipped as:
Other Regulated Materials, Domestic: ORMD "if the material meets the definition of a "consumer commodity," as stated in 49 CFR 171.8, the exception allows the material to be renamed "Consumer Commodity" and reclassified as ORM-D material."

Other Regulated Material Domestic: ORMD



This is the official DOT ORM-D Label

* These labels are blue in color to meet Department of Transportation (DOT) regulations.

* They are also UPS approved for consumer commodities shipping.

ORM is for Other Regulated Materials according to D.O.T. regulations 49 CFR 172.316.

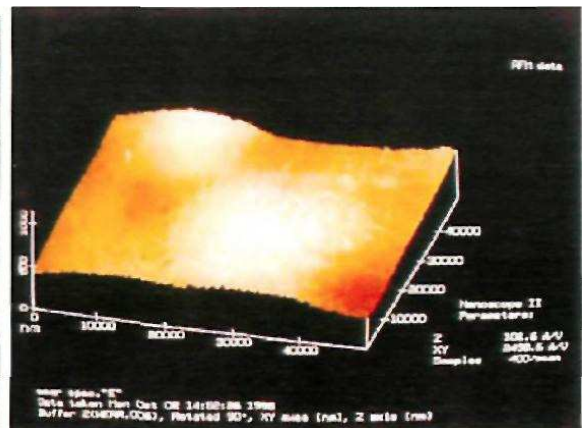
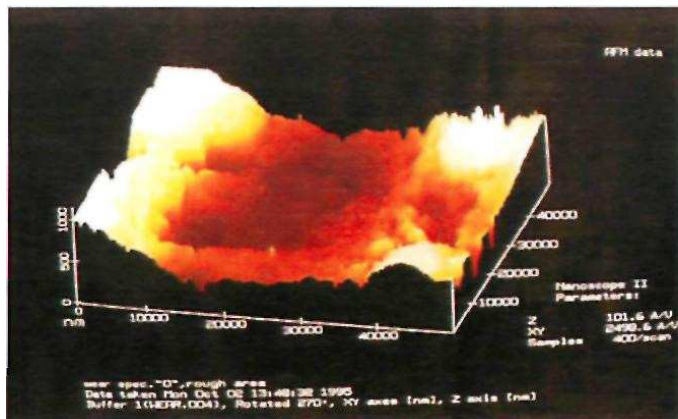


Surface Imaging Study: Untreated Oil vs. Oil Treated with EcoSave EXT

Southwest Research Institute performed surface imaging analysis using Atomic Force Microscopy (AFM).

The photographs are of measurements from a Nanoscope II Atomic Force Microscope, an instrument that provides measurements of fine scale surface topography. Wear scars that were reportedly found under identical conditions using untreated oil and EcoSave EXT treated oil were examined. The results of the AFM measurements clearly show a dramatically reduced surface roughness on the EcoSave EXT treated sample.

In summary, the analyses performed at SwRI indicate that the EcoSave EXT treatment produced a much smoother wear surface.





Road Trials

Ecochek Laboratories

Motor Oil Additive Analysis

Project Scope:

CSI Inc., on behalf of Earth Eco Research, has requested that Ecochek conduct an independent, scientific, research analysis on motor oil additives. This scientific analysis will be conducted under guidelines furnished by CSI, Inc and the US Government. (GSA, General Services Administration). Data collected from this project will be used to determine any increased performance values or benefits achieved from using motor oil additives. Any analysis, or data derived from this research shall be considered proprietary, and the sole property of CSI.

Method of Analysis:

1. A total of three (3) automobiles were used in this experiment. Each automobile used in this study had more than 25,000 miles in odometer readiness. Test vehicles used are described as follows:

Vehicle 1

- 1.1. (1) Four cylinder engine. A 1981 Jeep CJ 7, with a 151 cubic inch displacement engine, manual shift transmission. Tires were Pathfinder Radial APR, with a tread wear rating of 260, temperature B traction A. Standard tire pressure of 35 psi was maintained throughout the study. This vehicle was driven over a course of local mileage. Course duplication of base line data and after additive was almost exact. Beginning odometer reading 90,100.0 miles.

Vehicle 2

- 1.2. (1) Eight cylinder engine. A 1993 Lincoln Town Car, with a 4.6 liter engine, auto transmission. Tires were Michelin XW4, with tread wear rating of 520, temperature B and traction A. Standard tire pressure of 35 psi was maintained through the study. This vehicle was driven over a local course. Beginning odometer reading of 98,300.0 miles.



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Vehicle 3

- 1.3. (1) Eight cylinder engine. Also was a 1993 Lincoln town Car. with a 4.6 liter engine, automatic transmission. Tires were Michelin XW4, with a tread wear rating of 520, temperature B and traction A. Standard pressure of 35 psi was maintained throughout the study. This vehicle was driven over long range highway miles. Beginning odometer reading of 174,953.0 miles.
2. Data for base line analysis was obtained from 400 miles actual usage over actual road conditions.
3. After base line data had been obtained and properly documented, the automobiles were serviced at Jiffy Lube. This service included oil and oil filter change. Two ounces of ECOSAVE EXT Oil Additive/qt. were added to the oil at oil change. This procedure was supervised and documented by the individual driver and Jiffy Lube personnel.
4. Data was again collected, and documented for a period of 400 miles over actual road conditions and of a similar course. Only Vehicle One (I) posted an immediate mileage/gal improvement.
5. Based on previous experience and experimentation, performance value should increase after 400 miles usage of the oil additive. Both Vehicle Two (2) and Three (3) exhibited this same trend, with best performance increases obtained after 1200 to 1300 miles use after the ECOSAVE EXT Oil Additive was added.
6. Very limited knowledge about the chemical nomenclature, or the physical attributes of ECOSAVE EXT Oil Additive product was known. Information was maintained as proprietary, and supplied on a "Need to Know" basis. Also, this product was not analyzed, or reverse-engineered.

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Comparative Chart of Gasoline Mileage Before and After Using

EcoSave EXT Oil Pressure Additive

	Initial MPG	MPG with EXT	MPG Increase	% Increase
Vehicle 1	17.20	19.48	2.20	+ 13.26
Vehicle 2	21.27	23.00	1.73	+ 8.13
Vehicle 3	22.56	24.76	2.20	+ 9.75

Motor Oil Additive Analysis Summary

Several observations were made during the course of this study.

1. First and foremost, the study reveals documented evidence of increased gas mileage in all three Test Vehicles.
2. Other noteworthy observations must include Vehicle I, a four-cylinder engine showed immediate improvement in gas mileage with addition of ECOSAVE EXT Oil Additive at oil change.
3. Both Test Vehicles 2 and 3. (Eight cylinders) responded much slower. No increase in gas mileage was noted before 1200 - 1300 miles after addition of ECOSAVE EXT Oil Additive was added to the oil at oil change.
4. No maintenance was performed on any of the Test Vehicles.



ECOSAVE EXT Oil Additive

This addendum covers continued independent analysis of ECOSAVE EXT Oil Additive for CSI. Previous collection of data analysis from the original study consisted of performance values taken after 400 road miles of testing. Data collected from the original study showed an immediate gas mileage increase of 13.26% of Test Vehicle #1.

Subsequently, this addendum evaluates extended road mileage testing to further analyze extended performance of the Test Vehicle treated with ECOSAVE EXT Oil Additive.

Test Vehicle #1 continued to reach 29.61% increase in gas mileage. This increase was incremental on a tankfill by tankfill basis, with the last two tankfills producing almost the same 29.6% increase. This increase occurred after an additional 651 road miles of testing. Total test mileage on Test Vehicle #1 was 1147 miles.

Test Vehicle #1

Initial MPG	Avg. MPG After 400 Miles	% Increase after 400 Miles	Avg. MPG after 1151 Miles	% Increase after 1151 Miles
17.2	19.48	13.26	22.39	29.59

same 29.6% increase. This increase occurred after an additional 651 road miles of testing. Total test mileage on Test Vehicle #1 was 1147 miles.

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