

LUBORON™

ADVANCED LUBRICATION TECHNOLOGY



Metal & Cooling Treatments

Reduce Friction & Wear ~ Increase Performance

Displace Dirt, Rust & Carbon Varnish

Extreme Temperature/Pressure Applications ~ Environmental Values

The LuBoron™ Story

Most of the time when something sounds too good to be true, it is. Then again every so often a new idea, process or product comes along that truly changes the existing paradigm. I would like to introduce such a product to you and your company.

Several years ago a new and astounding discovery was made at The Department of Energy's Argonne National Laboratory affiliated with the University of Chicago. Argonne discovered that a small quantity of boric acid introduced onto opposing metal surfaces reduced frictional forces up to an astonishing 80% and reduced frictional wear up to 90%. (The highest levels of friction reduction are achieved with finer grained, well-machined parts).

The chemistry is more involved, but in short the process occurs because the boric acid reacts with the metal surfaces in the presence of heat, water vapor and oxygen forming boric oxide. The bottom layer of boric oxide attaches itself via ionic, covalent and hydrogen bonds to virtually any metal surface and creates multiple platelet layers of boric acid on top. The boric oxide surface also prevents oxidation. These boric oxide bonds are so strong that pre-existing dirt, rust and carbon varnishes are displaced. The companion boric acid layer on top of the boric oxide is composed of CLS (crystal lattice structure) platelets that slide over each other almost effortlessly, - much like a deck of playing cards. These nearly indestructible bonds literally change the metal surface's characteristics and create a self-healing friction barrier. This friction barrier is near permanent for the life of the metal treated and has hardness equal to 85% of a diamond. **Although applied via the lubrication system LuBoron™ products function more as a metal treatment than a lubricant enhancer.**

Several more years and several millions of dollars were spent developing various formulations and processes necessary to keep these sub-micron sized boric acid particles suspended in various oils, greases and lubrication systems. LuBoron's proprietary PAO (polyalphaolefin) based formulations and linking agents are of the highest quality. These products are totally compatible with **all** other lubricants, either mineral or synthetic based. New advancements have led to additional product and process patents being filed to further protect the technology. The end process is now referred to under a registered trademark; "Boron CLS Bond®." This name refers to the "crystal lattice structure" (CLS) bonding referenced above. As a result LuBoron, LLC now proudly offers these patented products under the "**LuBoron™**" label. Applications include: internal combustion engines, gear cases, automatic transmissions, hydraulic systems, bearings, pumps, mold release compounds, and many others. LuBoron™ is an **active** (not passive) lubricant.

LuBoron™ also has a group of products specially formulated for the **marine** industry. These products have all the superior characteristics of the base products, but are specifically designed to prevail in an adverse environment, displacing and deterring rust and corrosion. *In addition to the dramatic friction reducing characteristics, the environmental benefits achieved are outstanding. There are **no negative** environmental or health aspects with **LuBoron™** products. In addition,*

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The **key** ingredient, “Boron CLS Bond®” is what makes the **LuBoron™** products unique. A significant amount of time and money have been spent with world-class laboratories documenting all product claims. Argonne National Labs, Herguth Laboratories and BNM Research have done extensive testing in accordance with ASTM specifications. Major manufacturers especially in Europe and Japan, such as, Volvo, Daimler-Benz and Toyota have proven in laboratory and field tests the merits of this technology. For additional information and test results, please visit our website: www.luboron.com

This extensive research and testing has shown that engine efficiencies improve approximately 2 to 7% (dynamometer and road tested) along with significant increases in fuel efficiencies (2 to 5%). Rebuild cycles are reduced dramatically (at least two fold) and internally generated friction heat is significantly lowered (40 to 50%). Warranty issues notwithstanding, lubrication/filtration change cycles can be extended due to the enormous diminution of wear metals, slower acid build-up and reduced oxidation of the base oils. LuBoron will NOT harm metal components or systems in any way when used as directed. **LuBoron™** products and customers are covered by \$10 million of product liability insurance. In addition the latest tests indicate that boric acid is an ideal replacement for sulfur in diesel fuels. The boric acid provides an excellent lubricant additive for the fuel and significantly reduces cylinder wall/compression ring wear while solving sulfur related emissions issues completely. Incorporating boric acid in diesel fuel also functions as an excellent bio-stat thus preventing bacterial growth.

LuBoron™ products are **NOT** ground Teflon® (PTFE) based oil additives. In 1996 Consumer Reports tested motor oils and engine treatments and stated, “We found no discernable benefits from any of these (Teflon-based) products”. **LuBoron™ is a revolutionary product.** The claims outlined here are totally valid and will stand-up under the most rigorous scrutiny. Unlike PTFE products, LuBoron’s benefits are not instantaneous, but require reasonable time for the chemical processes to occur. **Depending primarily on temperature, the time line may be 2-4 hours for internal combustion engines up to a several weeks in the case of some grease applications.**

Upon completion of the chemical processes, the metal is totally protected with an extremely resilient corrosion barrier with phenomenal friction and wear reducing qualities. **LuBoron™ guarantees these products and customer satisfaction unconditionally.**

These product/processes will eventually be a part of all basic equipment manufacturing and/or after market applications. Obviously earlier adaptors will receive the maximum benefit. The representatives of **LuBoron™** would be happy to offer a more formal presentation to key members of your company, as well as discuss the wide range of potential business relationships and opportunities. Please contact us for a complete presentation packet and personal contact information. Thank you.

Cordially,
LuBoron, LLC

LuBoron™ with Boron CLS Bond® represents the most advanced and greatest technical break through in lubrication technology in modern times. Developed by the Department of Energy's Argonne Laboratories, these near permanent lubrication additives change the surface characteristics of all metals. These changes bring about enormous reductions in friction and wear. These bold but true claims are fully documented and outlined on the website.

A review of this information packet will provide an easy primer and more detailed technical validation. The technology IS NOT PTFE (Teflon®) based. Thank you for choosing LuBoron.

If you have moving parts, then LuBoron™ products will help them move better.

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New products arrive in the marketplace constantly, so what separates LuBoron™ from the rest? No other products compare and here are 15 ways LuBoron™ can benefit you.

Top 15 Reasons to use LuBoron™

- ✓ Reduces Wear up to 90%
- ✓ Reduces Friction up to 80%
- ✓ Increases Engine Efficiency 5-7%
- ✓ Increases Fuel Efficiency up to 12%
- ✓ Reduces Friction Heat 40-50%
- ✓ Rebuild Cycles Increase at least two fold
- ✓ Environmental Benefits
- ✓ ONE Time Application
- ✓ Increases Uptime
- ✓ Anticorrosive
- ✓ Reduces Maintenance Expense
- ✓ Reduces Repair/Warranty Expense
- ✓ Displaces Dirt, Rust & Carbon Varnish
- ✓ Reduces Emissions in Combustion Engines
- ✓ Biodegradable (depending on base fluids/ greases)

“Boron CLS Bond®” is the ingredient which makes LuBoron™ unique.

The chemistry is more involved, but in short the process occurs because the boric acid reacts with the metal surfaces in the presence of water vapor and oxygen forming boric oxide. The boric oxide attaches itself via ionic, covalent and hydrogen bonds to virtually any metal surface and creates multiple platelet layers of boric acid on top. The boric oxide surface also prevents oxidation. These bonds are so strong that pre-existing dirt, rust and carbon varnishes are displaced. The bottom layer of boric oxide is bonded to the metal substrate with a crystal lattice structure. The upper level boric acid platelets slide over each other almost effortlessly much like a deck of playing cards. These virtually indestructible bonds literally change the metal surface’s characteristics and create a self-healing friction barrier. This friction barrier is nearly permanent for the life of the metal treated and has hardness equal to 85% of a diamond..

*This process was developed by the Department of Energy’s Argonne National Laboratory affiliated with the University of Chicago and was awarded the very prestigious R & D 100 award in 1996. The exclusive rights to this patented technology is registered & trademarked under the name “Boron CLS Bond®”. After several more years, and millions of dollars spent on development and testing we are now able to offer you the products known as **LuBoron™**.*

*Not only has the testing demonstrated the extraordinary value of the product for equipment manufacturers and owners alike, the environmental benefits achieved are outstanding. There are **no negative** environmental or health aspects to these products and in addition a totally biodegradable and fire resistant hydraulic fluid will soon be available.*

*The **key** ingredient, “Boron CLS Bond®” is what makes the **LuBoron™** products unique. These product/processes will eventually be a part of all basic equipment manufacturing and/or after market applications. If lubrication is necessary, tests prove **LuBoron™** makes it better!*

*This product is **NOT** a ground Teflon® based oil additive. In 1996 Consumer Reports tested motor oils and engine treatments and stated “We found no discernable benefits from any of these (Teflon-based) products”. **LuBoron™** is a revolutionary product. Try it for yourself and see.*

LuBoron Products

Engine Treatment

This additive is designed to extend the life and operating range of your engine. It blends with your existing engine and contains boron-based components that protect vital working parts from friction and corrosive elements. The Engine Treatment actually forms a near-diamond hard surface on metal parts, providing a super-slick surface. The new surface also blocks oxygen to prevent corrosive activity. This micro-layer of protection is bonded to metal surfaces with strong covalent and ionic bonds. It provides long-lasting, low-friction surface impervious to most contaminants.

Gear Treatment

This additive is designed for use in all manual transmissions, manual transaxles, and final drives. It contains enhanced esters, synthetic-base oils and a complete boron anti-wear formulation. It improves shifting in manual transmissions, reduces wear on gears and rolling elements, lowers operating temperatures and prolongs fluid life. The end result is lower operating temperatures, longer equipment life and more power.

Automatic Transmission (ATF) Treatment

Extends the life and lowers the operating temperature of your automatic transmission. It blends with your existing transmission fluid and contains boron-based components that protect vital working parts from friction and corrosive elements. It toughens rotating components, inhibits overheating, smoothes out clutch shudder, clears stuck valve bodies and locked governors, and improves shift patterns. It provides durable, long-lasting wear surfaces.

General Purpose Aerosol Lubricant

This all purpose spray on lubricant has a limitless number of uses from household to industry. Sure to become a staple for every consumer it provides maximum lubricity, and protects against wear and corrosion in industrial, commercial, marine and similar applications.

General Purpose #2 Grease

The patented boron-based ingredient creates a near-permanent micro layer of extremely low-friction crystal lattice molecular structures that become part of the metallic surfaces Synthetic Greases have a wide range of applications because they are biodegradable, waterproof, non-corrosive, non-melting, and fortified with boron derivatives. Synthetic Grease #2 is formulated to seal out water and lubricate under the most adverse conditions. The highly adhesive and extreme pressure/extreme temperature properties prevent metal-to-metal contact in most applications and provide a long-lasting, low-friction surface impervious to most contaminants.

Diesel Fuel Treatment

This additive is a blend of ultra low sulfur fuel base and patented boron-based ingredients. The blend provides greatly enhanced lubricity to low sulfur diesel fuel because of an active chemical process which creates a near-permanent micro layer of extremely low friction crystal lattice molecular structures that become part of the metallic surfaces thus reducing friction, metal wear, oxidation, corrosion and emissions. Additionally, the boron derivatives act as a highly effective biostat.

Specialty Products

LuBoron™ Ice

Useful for performance in all cooling systems, LuBoron™ Ice extends component life and increases performance because of its ability to transfer heat and equalize temperatures in operating systems. Maintaining cooler operating temperatures extends the life of the oil and increases energy efficiency.

Marine Products

All the LuBoron™ products include the patented technology known as Boron CLS Bond®, which is what makes them unique. In an adverse environment where rust and corrosion often prevail, the LuBoron™ Marine Products have been specially formulated to excel in this atmosphere. These products not only deter rust and corrosion, but actually displace current buildup.

Marine Engine Treatment

Super strength treatment when added to engine creates a chemical reaction bonding directly to the metal surfaces displacing corrosion and forming a “super slippery” surface. Friction is dramatically reduced (up to 80%) which also means enhanced performance. Wear can be reduced as much as 90% and engine rebuilds can be significantly extended. Because this product actually bonds to the metal, generally one application is all that is necessary. It is recommended that a treatment be added after each rebuild.

Marine Gear Treatment

Just as the Marine Engine Treatment is specially formulated, so is the Marine Gear Treatment. LuBoron™ recognizes the fact that in an environment where metal is exposed to the elements a product was needed to protect components from extreme corrosion and pitting. This Boron based additive adheres to the metal surface forming a bond so strong that rust and corrosion are displaced. Naturally the performance is significantly enhanced and life of the components extended as much as 90%.

Marine General Purpose Grease

Water being the greatest friend and foe to the marine industry, this remarkable, specially formulated grease has the ability to repel water, displace rust and corrosion, and actually forms a chemical bond with metal. The bond is extraordinarily strong and the platelets which form during the chemical reaction are so “super slippery” that, as in the other marine products, friction is reduced up to 80% and the ability to repel water reduces wear dramatically.

Marine Spray Lubricant

Perfect for the marine industry, this well formulated spray lubricant can be used everywhere. It will protect against the build up of corrosion, dirt, rust and carbon based contaminants. It is easy to apply, particularly in those hard to reach areas, and provides maximum lubricity. In fact performance improves with use because of the chemical bond which allows it to adhere to metal surfaces.

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Mold Release

This product is water-soluble and potency may be adjusted by simple water dilution. The Mold Release derivatives provide stable metallic-surface coatings that insure nonstick release in high-temp compression or injection processes. As opposed to other petroleum or synthetic fluids that degrade over time, the effectiveness of this product actually improves with use. A uniform surface is maintained for extended periods of time because of the covalent and ionic bonds formed with the metal surfaces of the mold.

Notice – Coming Soon

The following products are in their final round of testing and should be available for commercial use shortly. We are currently accepting orders pending production. Due to the incredible response we have experienced already we recommend you contact us immediately to assure availability.

Biodegradable Hydraulic Fluid

Our constant efforts to provide environmentally friendly products, which are as effective, if not more so than their counterparts, have resulted in the evolution of biodegradable Hydraulic Fluid. Not only does this reduce the use of our natural resources, it minimizes hazardous waste and lowers disposal costs. In addition the Boron based technology will increase energy efficiencies helping to reduce power consumption.

Concrete Release

A slightly different chemical makeup, yet many similarities to the Mold Release this product will be available to the concrete industry shortly. The ionic and covalent bonds formed significantly reduce the adherence of concrete to metal surfaces. As is true with the Mold Release, effectiveness improves with use.

Gasoline Fuel Treatment

Similar to the diesel fuel treatment currently available, this Boron based additive improves power and performance because of an active chemical process which creates a near-permanent micro layer of extremely low friction crystal lattice molecular structures that become part of the metallic surfaces. This process reduces friction, metal wear, oxidation, corrosion and emissions. Additionally, the boron derivatives act as a highly effective bio-stat.

Hydraulic Treatment

Perhaps one of the most sought after treatments is the hydraulic treatment which requires a ONE time application and like the other LuBoron products reduces friction and wear as well as enhancing equipment efficiency and performance. It greatly extends the life of components because of its protective bond, and reduces heat because of the improved lubricity allowing better circulation of fluid.

Development

Development continues and more products are introduced regularly. If you have an application, and you do not see an applicable product, please contact us. It may be currently in development, or if the market warrants LuBoron may produce a specifically formulated product for that industry. Remember whenever possible these products are environmentally friendly and biodegradable.

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LuBoron™ Engine Treatment

The most advanced friction - reducing technology commercially available.

- ✓ **Reduces Wear**
- ✓ **Reduces Friction**
- ✓ **Increases Performance**
- ✓ **Anticorrosive**
- ✓ **Biodegradable**



16 oz (473 ml)

This treatment is designed to extend the life and operating range of your engine. It blends with your existing engine oil and contains boron-based components that protect vital working parts from friction and corrosive elements. The Engine Treatment actually forms a near-diamond hard surface on metal parts, providing a super-slick surface. Unlike Teflon® or mineral oil based products, the chemistry of Boron CLS Bond® is sub micrometer to micrometer size which allows the particles to penetrate into the tightest crevices between sliding metal parts. The new surface also blocks oxygen to prevent corrosive activity. This micro-layer of protection is bonded to metal surfaces with strong covalent and ionic bonds. It provides long-lasting, low-friction surface impervious to most contaminants.

LuBoron™ Engine Treatment is compatible with all engine oils and exceeds all manufacturers' engine warranty requirements. Base oil used meets or exceeds A.P.I. Service requirements.

LuBoron™ Gear Treatment

The most advanced friction - reducing technology commercially available



10 oz (296 ml)

- ✓ **Provides High Temperature Stability**
- ✓ **Reduces Varnish Buildup**
- ✓ **Inhibits Wear**
- ✓ **Extends Component Life**
- ✓ **One Time Application**

LuBoron™ Gear Treatment is for use in all manual transmissions, transaxles, and final drives. The primary ingredient, Boron CLS Bond®, provides high temperature stability, reduces varnish/gum buildup on synchros and gears, and inhibits wear. As a result, the life of the gearbox is extended and performance is significantly enhanced.

US Patent # 5,431,830

Boron CLS Bond® is biodegradable.

For detailed test results please visit our website: www.LuBoron.com.

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LuBoron™ Automatic Transmission Treatment

The most advanced friction - reducing technology commercially available.



10 oz (296 ml)

- ✓ **Inhibits Overheating**
- ✓ **Insures Proper Shift Patterns**
- ✓ **Reduces Clutch Shudder & Chatter**
- ✓ **Discourages Hung Governors**
- ✓ **One Time Application**

LuBoron™ ATF Treatment extends the life and lowers the operating temperature of your automatic transmission. This revolutionary product is a blend of liquid wax esters/derivatives and other elements essential to the life and performance of your transmission. It blends with your existing transmission fluid and contains boron-based components that protect vital working parts from friction and corrosive elements. It toughens rotating components, inhibits overheating, smoothes out clutch shudder, clears stuck valve bodies and locked governors, and improves shift patterns. It provides durable, long-lasting wear surfaces. Transmission performance is enhanced, wear is reduced and the life of your fluid is extended.

LuBoron™ Automatic Transmission Treatment will mix with any automatic transmission fluid.

LuBoron™ Synthetic Grease

The most advanced friction - reducing technology commercially available.

- ✓ **Highly Adhesive, Waterproof, Non-staining**
- ✓ **For Extreme Pressure/Temperature Applications**
- ✓ **Reduces Wear, Pitting & Corrosion**
- ✓ **Improves Performance & Efficiency**
- ✓ **Provides Maximum Lubricity**



14 oz (397 g)

As the name indicates this is synthetic grease, formulated with a patented boron-based ingredient. No other products offer this technology, which creates a micro-layer of extremely low friction, crystal lattice molecular structures that bond with metallic surfaces. It is this process which creates the lubricity which reduces wear, enhances performance and improves energy efficiency.

Synthetic Greases have a wide range of applications because they are biodegradable, waterproof, non-corrosive, non-melting, and fortified with boron derivatives. Synthetic Grease #2 is formulated to seal out water and lubricate under the most adverse conditions. The highly adhesive and extreme pressure/extreme temperature properties prevent metal-to-metal contact in most applications and provide a long-lasting, low-friction surface impervious to most contaminants.

US Patent # 5,431,830

Boron CLS Bond® is biodegradable.

For detailed test results please visit our website: www.LuBoron.com.

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LuBoron™ Aerosol Lubricant

The most advanced friction - reducing technology commercially available.

- ✓ **Provides Maximum Lubricity**
- ✓ **Protects Against Corrosion**
- ✓ **Reduces Wear**
- ✓ **For Extreme Pressure/Temperature Applications**

LuBoron™ General Purpose Aerosol Lubricant has a limitless number of uses from household to industry. Sure to become a staple for every consumer it provides maximum lubricity, and protects against wear and corrosion in industrial, commercial, and similar applications. As with the other LuBoron™ products, the chemistry is so unique that it is patented. The boron based product's chemical process creates a micro layer of extremely low friction crystal lattice structures (CLS) that becomes part of metallic surfaces. It is this bond which reduces wear and friction, and protects against corrosion.



16 oz (473 ml)

LuBoron™ Diesel Fuel Treatment

The most advanced friction - reducing technology commercially available.



16 oz (473 ml)

- ✓ **Reduces Heat & Wear Friction**
- ✓ **Increases Fuel Efficiency**
- ✓ **Improves Performance & Efficiency**
- ✓ **Reduces Exhaust Emissions**
- ✓ **Displaces Dirt, Rust & Carbon**

This treatment is a blend of ultra low sulfur fuel base and patented boron-based ingredients. The blend provides greatly enhanced lubricity to low sulfur diesel fuel because of an active chemical process which creates a near-permanent micro layer of extremely low friction crystal lattice molecular structures that become part of the metallic surfaces thus reducing friction, metal wear, oxidation, corrosion and emissions. Additionally, the boron derivatives act as a highly effective biostat.

US Patent # 5,431,830

Boron CLS Bond® is biodegradable.

For detailed test results please visit our website: www.LuBoron.com.

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LCC (LuBoron™ Commercial Concentrate)

The most advanced friction - reducing technology commercially available



16 oz (473 ml)

- ✓ **Universal use in Engines, Gear Boxes, etc.**
- ✓ **Reduces Friction and Wear**
- ✓ **Increases Performance**
- ✓ **Displace Dirt, Rust & Carbon Varnish**
- ✓ **Extreme Temperature/Pressure Applications**
- ✓ **Environmental Values**

Specially formulated for commercial use, LCC (LuBoron™ Commercial Concentrate) can be used in engines, gear boxes, manual transmissions, transaxles, and final drives. The primary ingredient, Boron CLS Bond®, treats the metal surfaces and creates a self-healing friction barrier. LCC (LuBoron™ Commercial Concentrate) provides high temperature stability, reduces varnish/gum build-up on synchros and gears, and inhibits wear. As a result, component life is extended and performance is significantly enhanced.

LuBoron™ BAGL 3

Water Soluble Product

- ✓ **Water Soluble**
- ✓ **Provide Stable Metal Surface Coatings**
- ✓ **Extreme Pressure/Temperature Applications**
- ✓ **Improves with Use**
- ✓ **Environmental Values**



16 oz (473 ml)

LuBoron BAGL 1 satisfies emerging requirements for environmentally friendly work fluids that may be easily disposed of. It is water-soluble and its potency may be adjusted by simple water dilution. LuBoron BAGL 1 derivatives provide stable metallic-surface coatings that insure nonstick release in high-temp compression or injection processes. LuBoron BAGL 1 actually gets better with use, as opposed to other petroleum or synthetic fluids that degrade over time.

US Patent # 5,431,830

Boron CLS Bond® is biodegradable.

For detailed test results please visit our website: www.LuBoron.com.

LuBoron™ Ice

“The Liquid Heat Sink”



32 oz (946 ml)

- ✓ **Accelerates Heat Transfer**
- ✓ **Reduces Engine & Water Temperature**
- ✓ **Prevents Overheating**
- ✓ **Eliminates “Hot Spots”**
- ✓ **Improves Air Conditioning**
- ✓ **Biodegradable and Non-toxic**

Useful for performance in all cooling systems, LuBoron™ Ice extends component life and increases performance because of its ability to transfer heat and equalize temperatures in operating systems. Maintaining cooler operating temperatures extends the life of the oil and increases energy efficiency.

Frequently Asked Questions LuBoron™ Ice

Q: Why should I use LuBoron Ice?

A: The most neglected part of today's sophisticated engine is the cooling system, yet it is at the heart of optimum engine performance. Temperature extremes (both hot and cold) literally destroy vital engine components. As little as one quart of LuBoron Ice:

- Reduces engine temperatures/prevents overheating
- Dramatically improves air conditioning output
- Enhances fuel performance
- Reduces exhaust emissions
- Reduces cold temperature engine wear and tear

Q: How much LuBoron Ice do I need?

A: Most automobiles require only one quart of LuBoron Ice added directly to their radiators for improved cooling system performance. Larger/heavier duty vehicles with expanded cooling system capacities may need two quarts of LuBoron Ice and/or a 1:10 ratio of LuBoron Ice to standard water/antifreeze mixtures.

Q: Will LuBoron Ice mix with my existing water/antifreeze mixture?

A: Yes, LuBoron Ice will mix with, and improve the performance of, all existing radiator mixes, including the new extended life antifreeze. LuBoron Ice is not a replacement for antifreeze, but can be used in a water-only coolant environment such as racing or hot weather industrial settings where freezing is not a concern.

Q: Will adding LuBoron Ice to my radiator affect my vehicle's warranty?

A: No, LuBoron Ice has been tested to be completely safe with all engine components and accessories. It is a pH neutral substance, with extensive testing by SGS US Testing Laboratories proving it to be non-corrosive to metal/aluminum surfaces. LuBoron Ice is also backed by a manufacturer's 2 million dollar product liability policy, assuring our customers full protection against any unknown causes of product failure.

Q: How long does LuBoron Ice work, i.e. when should it be repeated?

A: LuBoron Ice is a permanent cooling system treatment, and will work continuously until flushed out of your cooling system as part of your vehicle manufacturer's recommended maintenance intervals (usually 2 year/24,000 miles unless long life anti-freeze has been installed). LuBoron Ice should be added when your normal water/antifreeze mixture is replaced.

Q: What is LuBoron Ice?

A: LuBoron Ice is a biodegradable all natural plant cooling system additive that has proven to be an extremely effective heat sink. By definition, a heat sink is a substance or device for the absorption or dissipation of unwanted heat.

Q: How does LuBoron Ice work?

A: LuBoron Ice works by absorbing heat it comes into contact with and transfers it equally throughout the engine and cooling system. Through this process, LuBoron Ice equalizes the block temperature front to back and/or side to side, and helps eliminate hot spots in the engine. Once the coolant mixture is cycled to the radiator, LuBoron Ice transfers heat much more efficiently than any water or water/antifreeze mixture.

Q: Will LuBoron Ice harm anything in my engine?

A: No. LuBoron Ice is non-corrosive, biodegradable and compatible with all internal engine parts, seals, hoses and accessory equipment. Independent laboratory testing confirms LuBoron Ice is pH neutral and compatible with aluminum components.

Q: How often do I have to add LuBoron Ice?

A: LuBoron Ice works continuously once added to your cooling system, and need not be renewed until flushed out during normal system maintenance. Refer to and follow the recommended flushing requirements of your engine manufacturer's maintenance scheduled for the cooling system. LuBoron Ice can be added anytime, and should be replenished when flushing and changing your antifreeze.

Q: Is LuBoron Ice safe to use in both gas and diesel engines?

A: Yes

Q: In diesel engines, will LuBoron Ice affect any of the Supplemental Cooling Additives (SCAs) in the cooling system?

A: No, but attention should be paid to the dilution effect of adding LuBoron Ice in large capacity systems much as in the same manner as adding water.

Q: What should I expect to see after using LuBoron Ice?

A: The first thing you will notice is your vehicle will get to operating temperature faster. Secondly, you'll notice significantly improved air conditioning output at the interior ducts. Additionally, overall engine bay temperatures will be 10 to 30 degrees cooler depending on ambient air temperatures. Engine temperature reductions are often dramatic enough to notice immediate changes in dash gauge readings.

Q: How can a radiator additive reduce AC temps so dramatically?

A: The same way heat is drawn from your home in the winter months, an automotive AC condenser draws and absorbs heat that is driven away from the radiator, thereby reducing the efficiency of the condenser. By reducing water temperature and increasing the radiator's efficiency, much less heat is being absorbed by the AC condenser, allowing it to operate much more efficiently.

Q: What is the shelf life of LuBoron Ice?

A: The product in the original sealed container has an indefinite shelf life. LuBoron Ice is freeze/thaw stable.

Q: Is LuBoron Ice compatible with commercial antifreezes?

A: Yes. Independent laboratory tests reflect that when LuBoron Ice was added to antifreeze, its boiling and freezing points, pH level, survival of microbial population and effect on dimensional stability of rubber radiator hose was not changed.

Q: Will LuBoron Ice affect my emissions/engine management system?

A: No. Your thermostat still controls water flow by opening and closing at pre-set temperatures. As such, your thermostat will control temperatures allowing your engine management systems to operate in the correct range. LuBoron Ice works most effectively at reducing destructive heat above/beyond the thermostat setting, and in bringing temperatures up to optimal range in cold conditions, reducing destructive cold weather wear and tear.

Specialty Products

Marine Engine Treatment

The most advanced friction - reducing technology commercially available.

- ✓ **Specially Formulated for the Marine Industry**
- ✓ **Provides High Temperature Stability**
- ✓ **Significantly Improves Performance**
- ✓ **Reduces Varnish Buildup**
- ✓ **Inhibits Wear – Reduces Corrosion**



16 oz (473 ml)

Specially formulated, super strength treatment when added to engine oil creates a chemical reaction bonding directly to the metal surfaces displacing corrosion and forming a “super slippery” surface. Friction is dramatically reduced (up to 80%) which also means enhanced performance. Wear can be reduced as much as 90% and engine rebuilds can be significantly extended. Because this product actually bonds to the metal, generally one application is all that is necessary. It is recommended that a treatment be added after each rebuild.

LuBoron™ Marine Engine Treatment is compatible with all engine oils and exceeds all manufacturers’ engine warranty requirements. Base oil used meets or exceeds A.P.I. Service requirements.

Marine Gear Treatment

The most advanced friction - reducing technology commercially available



10 oz (296 ml)

- ✓ **Specially Formulated for the Marine Industry**
- ✓ **Provides High Temperature Stability**
- ✓ **Reduces Varnish Buildup**
- ✓ **Reduces Wear, Pitting & Corrosion**
- ✓ **Biodegradable**

Just as the Marine Engine Treatment is specially formulated, so is the Marine Gear Treatment. LuBoron™ recognizes the fact that in an environment where metal is exposed to the elements a product was needed to protect components from extreme corrosion and pitting. This boron based additive adheres to the metal surface forming a bond so strong that rust and corrosion are displaced. Naturally the performance is significantly enhanced and life of the components extended as much as 90%.

LuBoron™ Marine Gear Treatment is for use in transmissions, transaxles, final drives and gearboxes.

US Patent # 5,431,830

Boron CLS Bond® is biodegradable.

For detailed test results please visit our website: www.LuBoron.com.

Specialty Products

Marine General Purpose Grease

The most advanced friction - reducing technology commercially available.

- ✓ **Specially Formulated for the Marine Industry**
- ✓ **Waterproof, Highly Adhesive, Non-staining**
- ✓ **Extreme Pressure/Temperature Applications**
- ✓ **Reduces Wear, Pitting & Corrosion**
- ✓ **Improves Performance & Efficiency**



14 oz (397 g)

Water being the greatest friend and foe to the marine industry, this remarkable, specially formulated grease has the ability to repel water, displace rust and corrosion, and actually forms a chemical bond with metal. The bond is extraordinarily strong and the platelets which form during the chemical reaction are so “super slippery” that, as in the other marine products, friction is reduced up to 80% and the ability to repel water reduces wear dramatically.

Marine Aerosol Spray

The most advanced friction - reducing technology commercially available



16 oz (473 ml)

- ✓ **Provides Maximum Lubricity**
- ✓ **Protects Against Corrosion**
- ✓ **Reduces Wear**
- ✓ **For Extreme Pressure/Temperature Applications**

Perfect for the marine industry, this well formulated spray lubricant can be used everywhere. It will protect against corrosion and prevents the build up of dirt, rust and carbon based contaminants. It is easy to apply, particularly in those hard to reach areas, and provides maximum lubricity. In fact performance improves with use because of the chemical bond which allows it to adhere to metal surfaces.

US Patent # 5,431,830

Boron CLS Bond® is biodegradable.

For detailed test results please visit our website: www.LuBORON.com

Performance -Test Results

Did you realize:

“That as much as half the world’s energy production is lost to engine *friction* with an estimated \$100 billion of that loss suffered in the US alone.” Steven W. Colford – business writer Raleigh NC.

Friction in machinery, always a primary concern for equipment manufactures and owners, is the basis for wear and performance. In order to reduce *friction*, equipment manufacturers and owners constantly look for a better lubricant. Originally it was oil, then Dupont developed Teflon® (PTFE) as an additive and it became the base for many products. However, in the July 1996 report on motor oils and engine treatments, Consumer Reports stated that they “found no discernable benefits from any of these products”.

LuBoron™ now introduces boron based products in which the additive actually forms a chemical “bond” with the metal parts, “Boron CLS Bond®”. Where metal meets metal is where lubrication is most important because of the extreme pressures, but also where significant energy is lost to friction, deformation, and vibration.

Extensive testing and research has been done to verify the improved performance produced by - LuBoron’s Advanced Lubrication Technology.

Environment – Safety Tests

LuBoron’s mission is to discover and market products, which will either improve the environment, or replace existing products, which are not environmentally friendly, or energy conservative.

These products are so incredibly effective environmentally they:

- ✓ Reduce emissions
- ✓ Improve fuel efficiency
- ✓ Extend lubricant life
- ✓ Reduce energy costs
- ✓ Extend the life of components
- ✓ Are biodegradable (depending on base fluids/greases)
- ✓ Extend rebuild cycles
- ✓ Extend oil change intervals

For MSDS Sheets and detailed test results please visit our website: www.LuBoron.com.

History

Years of research was spent to develop technology which would bring a new standard of friction reduction to industry and consumers alike. This process developed by the Department of Energy's Argonne National Laboratory affiliated with the University of Chicago was awarded the very prestigious R & D 100 award in 1996. The exclusive rights to this patented technology is registered & trademarked under the name "Boron CLS Bond®". After several more years, and millions of dollars spent on development and testing we are now able to offer you the products known as **LuBoron™**.

Environmental issues are primary concerns to us when evaluating new products and extensive testing has proven *Boron CLS Bond®* to be biodegradable, energy conservative, able to increase fuel efficiency, and reduce emissions. We recognized that this was not just another lubricant. The tests showed almost unbelievable results and the fact that generally only one application was necessary we felt that *Boron CLS Bond®* could benefit nearly every industry.

In 2002 we began distribution of the products now known as **LuBoron™**. We have tried to target specific markets, but as word spreads about the effectiveness of this lubricant, we can only hope production can keep up with demand.

MSDS Sheets and detailed test results please visit our website: www.LuBoron.com.

Company

LuBoron™, as well as our sister company Filtroil, Inc., is constantly striving to find ways to protect the environment. With this mission in mind we offer the most effective products for performance as well as conservation of energy and materials.

Because of its unique and innovative technology LuBoron™ reduces friction which in turn allows objects to move against each other more efficiently. Heat is reduced, less fuel is required, component and lubricant life are extended and performance improved. An all around solution to an age old problem!

Customer service is as important to us as the products we sell. Please feel free to contact us at any time with suggestions, comments or requests.

LuBoron™ and Filtroil guarantee their products and customer satisfaction unconditionally.

For more information please visit our website: www.LuBoron.com

The Evolution and Benefits of a High-Performance Biodegradable Lubricant

The Problem: Tribology, the scientific study of friction, wear, and lubrication, has provided industry with meaningful insights into the varied forces created by and resulting from the interaction of opposing metal surfaces. As the movement and pressure between such surfaces increase, so does friction. Increased friction causes increased heat. Even the most finely polished metal surfaces have irregular surface peaks and valleys or “asperities.” Friction, and heat cause the destruction of asperities resulting in metal particulates aggregating between the surfaces. Initially these particulates act as grinding agents that gouge out more particulates. These metallic particulates react with moisture, impurities and lubricant additives to create corrosive acids that further pit the surfaces creating more asperities and oxidizing lubricant oils to create additional acidic compounds. These acids accelerate the wear related to acidic micro pitting. With sufficient heat (caused by pressure and friction), an oxidized lubricant rapidly deteriorates, the particulates melt and the surfaces essentially weld together resulting in the working failure of the metal parts.

The Challenge of a Lubricant: Given the "Problem," a lubricant is, by definition, anything, which prevents or delays the onset of parts failures. So, what can a lubricant do to abate this process? To delay wear related parts failure, a lubricant must reduce metal-to-metal contact and thereby reduce particulate wear from the interaction of opposing asperities. The lubricant must also reduce acid related corrosive micro pitting which produces new asperities.

The method of reducing metal-to-metal asperity interaction generally must be one that does not increase and preferably decreases the friction and related heat generated by the moving opposing surfaces. Therefore, a good lubrication regimen reduces the particulate metals produced by surface-to-surface contact (generally referred to as “wear”) and reduces the friction-related heat of the operating surfaces. Just as importantly, the lubricant or the byproducts of either the lubricant, or the chemical additives in the lubricant, must not create corrosive compounds. In practice, these desired lubricant properties are synergistic and the result is generally longer-lived parts operating with less energy input required to produce a given workload.

Simple enough! However, most of even the best lubricants have a nasty habit of degrading over time. Some of the same forces acting between the metal surfaces degrade the lubricant resulting in the lubricants having a limited effective life. The cycle of lubricant degradation most often begins with the chemical changes in the lubricant resulting from high wear-stress operating scenarios. Significant lubricant degradation also occurs when minute metallic wear particles or even the metallic surfaces of the parts themselves interact with air, moisture, and, often, compounds in the lubricant itself to oxidize the lubricant forming carbon and sulfur based acids. These acids begin to react with the metal surfaces creating new asperities (micro pitting), and the vicious cycle begins anew. Hydrocarbon lubricants undergo an oxidation process that breaks down long hydrogen/carbon chains producing short-chain carboxyl acids, which, while temporarily reducing friction, greatly increase acid-related corrosion.

Basic Forms of Lubricants: Lubricants generally fall into two categories; hydraulic (or fluid) lubricants and solid lubricants.

Hydraulic Lubricants: The most viable hydraulic lubricants today are hydrocarbon molecules in fluid state (usually derivatives of petroleum), such as olefins, paraffins or esters. All of these compounds are medium to long chain hydrocarbon molecules, classified as oils, waxes, or soaps, respectively. Often non petroleum-derived elements are left in the base oil such as sulfur; or added to the base oil such as graphite, molybdenum, or chlorine to form complex petroleum-related compounds that have less intermolecular friction than the base oil. In all cases, hydraulic lubricants work by creating a fluid boundary layer between the opposing metal surfaces that acts to minimize metal-to-metal contact where surface asperities could be ground, sheared, welded, or undergo any of the many other adverse wear modes. Generally, the less intermolecular friction and the less compressible the fluid molecules, the better the hydraulic lubricant.

The typical downfall of hydraulic lubricants occurs as a result of an imperfect boundary layer allowing asperity-to-asperity interaction, which introduces particulate metal into the lubricant. Heat, moisture, air, and metal particulates in combination with certain compounds in the lubricant interact to create acids which micro pit the metal surfaces and further oxidize the lubricant splitting the hydrocarbon chains into carbon-based, short-chain acids that also micro pit the surfaces and thus rapidly degrade the beneficial properties of the lubricant. Use of a pure hydraulic lubricant such as mineral oil in an automobile engine will require the oil to be changed every 2,000 miles.

Tribologists have demonstrated that a hydraulic lubricant works best when the metal surfaces it separates are as smooth as possible, i.e. few asperities. The efficiency and longevity of a hydraulic lubricant increases dramatically and directly as the metal surface irregularities diminish.

Theoretically, this is what occurs during engine break-in; the opposing asperities are allowed to shear each other until directly contacting asperities are minimized. Break in oils are changed out quickly before the metal particulates cause new damage. There is a reason for the evolution of highly polished chrome cylinder walls - to reduce micro pitting and friction and the benefit largely relates to the synergist lubrication improvement resulting from minimal asperities and providing for highly efficient hydraulic boundary layer lubrication. The concern with ultra polished surfaces is that they have insufficient surface irregularities to hold the boundary film during periods of inactivity and allow high stress metal-to-metal contact on "start-up.

Hydraulic lubricants are only effective when they have formed a sufficient film (boundary layer) between the metal surfaces. Periods of device or surface inactivity, variations in temperature, and starting/stopping are some of the normal operating procedures which cause uneven or failed distribution of the hydraulic lubricants and the cascading sequence of lubricant degradation described above. Unfortunately, the smoother the metal surfaces, the less they are inherently able to retain a sufficient boundary-layer film from a fluid lubricant

Solid Lubricants: This type of lubricant performs the same basic function as a hydraulic lubricant. In this case, however, the intent of the lubricant regimen is to form a solid (or non fluid) boundary layer of molecules that prevent surface-to-surface contact using a solid material which has both the properties of low molecular compression and low intermolecular friction. Graphite, molybdenum, phosphorus, zinc, and sulfur are examples of the more commonly used elemental components of solid-lubricant compounds. Maintaining a uniform dispersal is an even greater problem with solid lubricants as they are dependent upon mechanical distribution and pressure burnishing to achieve the semblance of a uniform boundary layer. If such a layer is achieved, solid-boundary lubricants can withstand a great deal of pressure, heat, and friction before weld failure. Practically, difficulties of uniform dispersion make solid lubrication alone a rarely used regimen, and, more importantly, the lubricants themselves almost always have a significant material adverse impact on the environment and when exposed to moisture and heat almost all of the solid lubricants used today produce strong acids.

Hybrid Lubricants: This class of lubricants is in very wide use today and most typically involves the use of solid lubricant compounds (or molecules) suspended in a hydraulic lubricant. The benefits related to this combination are multifold.

First, the hydraulic lubricant aids in the dispersal of the solid lubricants, and second, by being burnished into the asperities of the metal surfaces, the solid lubricant serves to smooth out the opposing surfaces increasing efficiency and effectiveness of the hydraulic lubricant. This mutual improvement represents the synergistic benefit of combining these two basic lubrication regimens.

Solid components can be increased in proportion to the hydraulic lubricant to help handle higher pressures and temperatures. Hybrid lubricants allow today's gasoline automobile engines to safely go an average of 5,000 miles between oil changes. Where hybrid lubricants are not recommended is in the "break in" period. This is because the solids together with the metal particulates from sheared asperities tend to collect and varnish or bake themselves into the spaces between the remaining asperities where their chemical interaction produces strong micro pitting acids. Moreover, the buildup of these acidic gums prevents retention of the oil film necessary to maintain the fluid boundary layer

The most significant downside of today's advanced hybrid lubricants continues to be that the solids are a significant environmental concern and most are soon to be eliminated due to the implementation of more stringent government regulations. Actual operating constraints reflect the individual limitations of each regimen. Solids are not permanent, requiring replenishment with each oil change; they are dependent upon the hydraulic lubricant (carrier) for dispersal and are therefore subject to the limitations of hydraulic dispersal.

Moreover, the converse to the mechanical synergy is the chemical dysfunction wherein most solid lubricants interact with metallic particulate catalysts to accelerate the acidification of the hydraulic lubricant. Concurrently, wear metal particles and the metal surfaces themselves oxidize the hydraulic lubricants' long hydrocarbon chains leading to breakdown of the hydraulic lubricant into carbon-based acids, thus further contributing to the corrosion and micro pitting of the metal surfaces. The result: in the short term there is less oil use and less initial wear, but over time the contaminates ultimately oxidize the fluid lubricant greatly reducing its boundary-layer effectiveness and greatly increasing the fluid lubricant's acidic corrosion potential.

Permanent, Effective, Synergistic and Biodegradable **Boron CLS Bond®**

In 1995, Dr. Ali Erdemir patented boric acid as a solid boundary-layer component additive to hydraulic lubricants. Dr. Erdemir's patents were the result of years of research at Argonne National Laboratory.

Boron CLS Bond® - A Permanent Solid Boundary Layer: Boric acid goes through a complex interaction with virtually all metal surfaces where it creates macro molecular and covalent bonds with the metal surface to form a highly adherent crystal lattice of boric acid platelets

Utilizing minute amounts of by-product boric oxide any sheared platelets are rapidly replaced in a self-renewing cycle of solid lubricant-to-metal surface regeneration and bonding. Once established, the boric-acid boundary layer requires only minimal amounts of “free” boric acid to replenish the crystal lattice boundary layer. Tests have shown that the boric-acid boundary layer has remained in place and effective in an automobile engine for over 100,000 miles and 22 oil drains without any outside replenishment. The ultimate duration of a CLS Bond system in an internal combustion engine is not currently known and will vary somewhat on circumstances. These tests are continuing and Volvo is currently testing a treated engine up to 1,000,000 miles. In addition the Boron CLS Bond[®] boundary layer is resistant to solvents, acids, and corrosives.

Boron CLS Bond[®] - A More Effective Boundary Layer: When boric acid establishes its solid-lubricant boundary layer, it does so by forming a 0.5 micron thick crystal lattice structure (CLS) of individual platelets approximately 500 angstroms thick that form like a loosely dispersed deck of playing cards. These platelets cover all the metal surfaces and align themselves in planer configuration parallel to the metal surface and conforming to the direction of movement. Each Boron CLS Bond[®] platelet has strong intra-molecule bonding, giving it the equivalent of 85 percent of the hardness of diamonds. Only weak Van der Waals forces attract the platelets to each other allowing virtually frictionless platelet-to-platelet interaction and translating to extremely low friction coefficients between the metal surfaces. The Boron CLS Bond[®] usually takes several hours to fully form its boundary layer but over time completely covers the surfaces and orients itself so as to virtually eliminate asperities in the metal surface.

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