# Steel Shield Technologies

Serving the industry since 1985

Commitment to Excellence

**Our customers are meant to come for a reason.**

"Reliability is our first concern... there is no room for weapon dysfunction when officers and soldiers lives are on the line."

We're here to Change the World

## Military


Not Just Oil... IT'S TECHNOLOGY

METAL TREATMENT & LUBRICATIONS

# Customers are meant to come for a reason

*"It is our conviction that total satisfaction is not sufficient,*
*we are here to help customers to achieve the highest return on investment."*

## Company Vision & Commitment


- **Steel Shield Technologies Inc. (USA)** sole purpose is to manufacture premier quality metal treatments, additives, greases and lubricant oils that have been tested to exceed the normal parameters of extreme pressure and anti-wear products in the aftermarket, hereby offering matchless performance and unsurpassed protection against wear while saving maintenance costs, downtime, energy and improving overall functionality of your machineries.

- **Steel Shield "Not Just Oil, It's Technology" which makes a difference to the World of Lubrication.**

- **Steel Shield aims at helping customers to achieve the highest return on investment (ROI). Steel Shield is committed to strengthening business and global commerce through manufacturing and distributing, World-wide, the full line of ABF Technology products made in the USA, Singapore and Hong Kong.**

# THE CORPORATION & FACILITIES

Steel Shield Technologies Inc. (USA) with it's history traced back to 1985 when in USA Pennsylvania the scientist Dr. George C Fennell in the research and development of high-end specialty lubricants for motor racing and industrial applications invented the unique ABF Formula – a New Technology in lubrications. Since then Dr. Fennell has been quickly earning his fame in the lubricants society and the product has become a must for the combat units of the US Armed Forces. SST is the only lubricant product in the World to guarantee fire arms of any kind free from clogging barrels, feeds and magazines.

The Company's blending and manufacturing capabilities are state of the art and the ability to produce limitless volume of product is unsurpassed as well as the product quality. The equipment is all stainless steel including the flow lines, pipes and couplers. All pumps and gauges are digitally interpreted and of the highest quality and accuracy to ensure production of the most superior quality lubricants.

Steel Shield Technologies (Asia Pacific) Limited was incorporated in 2012 in Hong Kong and is the official representative of Steel Shield Technologies (USA) to provide distribution and technical support for the entire Asia-Pacific Rim.

# INVENTOR SCIENTIST – Dr. George C Fennell


Father of ABF Technology

Doctor of Astronomy and Astrophysics

Accreditation**:**

SAE (Society of Automotive and Aerospace Engineers) Member

ASNE (American Society of Naval Engineers) Member

NCMA (National Contract Management Association) Member

STLE (Society of Tribologists and Lubricant Engineers) Member

In 1985, Dr. George C Fennell, a former scientist in Astronomy and Astrophysics doing consulting and contract work in advanced lubrication and surface Tribology, formulated a revolutionary metal treatment oil additive which can activate “ABF” (Advanced Boundary Film) through a proprietary and unique “electro-chemical ionization” (ECI) process. He has been known in the industry as the “Father of ABF Lubrication”.

On the basis of ABF technology, a series of specialty lubricants have been developed to meet the stringent requirements of various purposes and working conditions, as to date is still the most advanced formula in lubrication.

Over the years, there have been countless people trying to resemble Dr. Fennell’s unique formula and advanced chemistries, none was found even remotely close. To this date, Dr. Fennell is still the leader in tribology and lubrication.

# THE BIRTH OF ABF TECHNOLOGY

- During World War II, the German Science and Technology Research Institute was commissioned to develop a new lubricant technology in meeting the stringent demand for heavy duty military application such as artillery, armored vehicles, tanks, battleships and fighter-aircrafts to avail them in performing their maximum fighting capacity with minimal maintenance.

- The scientists proposed the concept of Zero friction, i.e. Faraday's Law Like-Charge-Repel.

- Shortly after WW II, a great number of intelligent scientists migrated to the United States from Europe. One of them was the grandfather of Dr. George Fennell, who came to USA along with him a large volume of research data and material about Zero friction. The old scientist continued to pursue his scientific research and eventually in 1985 his grandson Dr. George Fennell came with a breakthrough in the technology. Through Electro Chemical Ionization (also known as Reactive Chemical Bonding) Dr. Fennell was able to realize Maglev between two metallic surfaces and to achieve a close to Zero Friction Coefficients.

- The great accomplishment was the result of relentless efforts of 3 generations scientists over half a century. In recognition of the excellent contribution of Fennell’s family to the country, the US Government has named the street outside their old factory Fennell Avenue as a compliment.

# HOW ABF WORKS

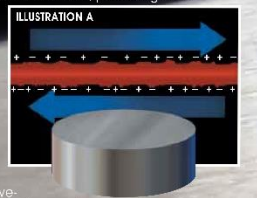
# Steel Shield Technologies Has Redefined Lubrication.

Webster's Dictionary defines lubricants as substances capable of reducing friction, heat and wear when introduced between two solid surfaces. From the initial development and use of lubricants, chemical technology has constantly advanced to make them more effective. From changes in refinement processes to the development of additives, the concentration has always been to increase the ability of the lubricant to reduce the friction, heat and wear. **Steel Shield Technologies** has changed the approach to lubrication and, in essence, given new definition to the term. First, there are a few points to consider.

## Metal Against Metal

The structure of all metals creates a surface characterized by a series of sharp peaks and valleys, some microscopic and some larger. As two metal surfaces contact each other and move in opposite directions, friction is caused, producing heat and metal deterioration. This friction-causing physical dynamic is heightened by the electromagnetic field created on the surfaces of each metal. The sharp peaks, known as asperities, and valleys, referred to as micro-pores and fissures, have opposite electro-magnetic charges. **Illustration A** shows a new metal with positive-charged asperities and negative-charged micro-pores and fissures. The constant interaction of these opposite-charged features works to weaken the structure of the metal, causing eventual deterioration of the surface of the part.

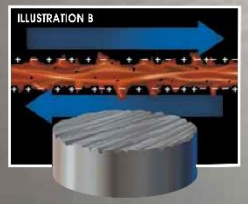
ILLUSTRATION A



## Normal Lubricants Help

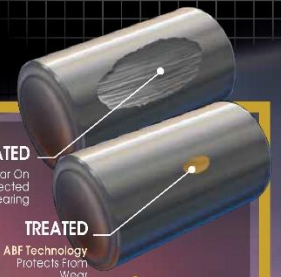
All lubricants help to slow this process to different degrees. **Illustration B** shows the results after a period of time of use of a typical oil lubricant. The constant friction and electro-magnetic interaction has caused the weakened metal to break off or chip away creating metallic debris in the lubricant leading to abrasive wear from wear metal particles. This fact is evidenced in the need to change the engine oil of automobiles frequently as the lubricant 'breaks down' due to the heat and metallic debris.

ILLUSTRATION B



ABF TECHNOLOGY™

## Advanced Boundary Film Technology- There Is No Better Protection Against Wear.



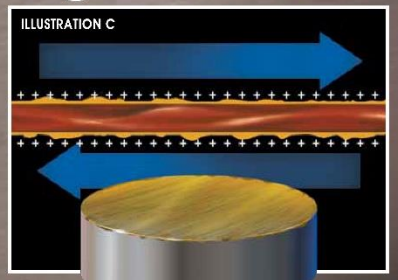

See Extreme Condition Lubrication Test At www.steelshieldtech.com

**Steel Shield Technologies** has redefined lubrication by breaking away from the standard approach to making the lubricant more effective through adjusting the refinement process or through the use of additives. Instead, **Steel Shield Technologies** approaches lubrication by improving the surface characteristics of the metal through the process of **Advanced Boundary Film** formation. This technological breakthrough is accomplished by addressing the naturally formed asperities, micro-pores and fissures and the electro-magnetic charges they create.

**Steel Shield** products consist of an advanced combination of halogens which react under thermal (heated) conditions to form electro-negative surface attaching compounds. They seek out and affix themselves to the lower surface areas, filling the micro-pores and fissures. As this process is working, the thermal conditions are effecting the asperities. Instead of breaking off because of a weakened metal state, the asperities gradually roll out or flatten. So while the micro-pores and fissures are filling up, the asperities are flattening for an end result of a metal surface that is greatly improved. Created in this process is a total positive state of polarity. When the metal surface polarity becomes uniform in charge, there is a reduction in friction due to the Faraday reaction of like-charges. This electrochemical process continues at the molecular level to form an **Advanced Boundary Film** on the surface of the metal. **Illustration C** shows the end result of the production of the **Advanced Boundary Film** and the resulting uniform positive polarity.

Another aspect of this advanced technology is the organo-metallic substitution which is the chemical process designed to inhibit halide formation. Here, the halogens used to form the surface attaching compounds react with reagents having similar properties to the iron atom. The halogens, therefore, do not scavenge the target metal surface to find iron with which to react, forming halides and creating a chemically corrosive wear syndrome. Instead, an organo-metallic complex is formed as the basis of the **Advanced Boundary Film.**

ILLUSTRATION C



## Industrial Success Comes To The Consumer

**Steel Shield Technologies** is now bringing this breakthrough technology to the consumer after great success on the industrial level. The level of commitment to the Steel Shield product in the railroad industry is an indication of its performance in the most extreme conditions imaginable. This same technology is now available to you.

As has been explained, the **Advanced Boundary Film Technology** is a redefining approach to lubrication which provides outstanding benefits to the user.

## Practical Elimination Of Metal-To-Metal Wear

**Steel Shield Technologies** addresses the three areas that cause the weakening and deterioration of the metal surfaces:

- The physical friction of rough surfaces
- The opposite electro-magnetic charges that exist on the metal surface
- The chemical reactions that produce corrosive agents.

**Advanced Boundary Film Technology** instead strengthens the metal and practically puts an end to metallic debris in the lubricant.

## Reduced Operating Temperatures

Friction is reduced so significantly that the operating temperature in treated mechanisms is notably reduced. The end result is a stronger metal that maintains its original specifications and performance level. An example of the reduction of operating temperatures is found in the independent tests that show a drop of an average of 30 Fahrenheit degrees in treated automobile engines.

## Increased Effectiveness Of The Lubricant

Whatever lubricant is used as the carrier of the **Steel Shield Technologies** additive, that lubricant is allowed to perform at its maximum efficiency. Lubricant flow will be enhanced with the elimination of rough metal surfaces; the reduction of heat and elimination of metal debris will protect the lubricant from "break down."

STEEL SHIELD™ TECHNOLOGIES

# ABOUT ABF TECHNOLOGY

## BOUNDARY FILM LUBRICATION THROUGH ADVANCED HALOGENATION TECHNIQUES: OXIRANE ACID SCAVENGING AND ORGANO-METALLIC SUBSTITUTION By GEORGE C. FENNELL

### BOUNDARY FILM LUBRICATION THROUGH ADVANCED HALOGENATION TECHNIQUES:
### OXIRANE ACID SCAVENGING AND ORGANO-METALLIC SUBSTITUTION

By GEORGE C. FENNELL

Steel Shield Technologies' mechanism of operation is based upon Tribology methods that improve lubricity and load carrying capacity by improving surface characteristics and creating a stable chemical, corrosion controlled halide-based boundary film. Steel Shield's active components react with each other and the contacting asperities of the metallic surfaces to provide five mechanisms of improvement.

1. Advanced chemical boundary film formation through reactive chemical bonding.
2. Ring opening, oxirane acid scavenging and advanced corrosion inhibition.
3. Organo-metallic substitution of surface metal and free radical reactionaries.
4. Improved surface smoothness and rolling out of irregular contacting asperities.
5. Re-conditioning and molecular reconstruction of the original contacting metal surfaces.

The process of advanced boundary film formation is accomplished with an advanced combination of halogens that are controlled and rendered non-corrosive to the base metals of the system and pose no threat to the ozone layer or waste oil recovery systems due to their origins and long chain molecular lengths. These halogens initially react under thermal conditions with the organo-metallic reagents to form surface attaching compounds, thereby limiting and controlling the formation of halides from the base metals themselves. These surface attaching reagents or "electro-negative compounds" seek out and affix themselves to the lower surface areas referred to as micro-pores and fissures, as all metals are crystalline in structure and exhibit a lattice type matrix. This complex process also incorporates Van der Waal forces and dipole-dipole surface reactions. During this process, surface lapping and asperity *(irregular microscopic contacting and opposing surfaces)* roll-out is also achieved, yielding improved spread characteristics of the surfaces themselves. Due to the increase of film strength by the filling of the micro-pores and fissures, along with thermal modification of the asperities, the resulting effect is a gradual rolling out or flattening of the metal asperities rather than a breaking off or chip-away process, which would create metallic debris in the lubricant leading to abrasive wear from wear metal particles. The resulting improvement in the opposing metal surfaces further increases the fluid film strength, which is dependent on the degree of surface roughness and viscosity.

Viscosity, however, is a lesser consideration when incorporating boundary additives or halogenation techniques.

In general, boundary friction and wear consists of two components, a shear or adhesion component and a plowing or deformation component. Considering the following equation:

$$Fs=SAr$$

Where Fs is the shear component, which predominates except when asperities sink too deeply into a boundary lubricant film or a soft opposing surface. When movement or sliding occurs, the shear friction force depends on the shear resistance per unit area, S, of any "boundary film" in the real load-supporting area between asperities. Dividing by the load, W gives the shear contribution to the friction coefficient, becoming independent of total load and apparent area of contact:

$$fs = S * Ar / W = S / Pp \text{ or } S / Pe$$

The boundary film shear resistance, S, is assumed equal to the plastic flow shear stress, Tp, of an ideal elastic, plastic solid. Such a solid gives shear stress independent of strain and strain rate at strains sufficiently large enough to cause plastic flow. The conditions that produce the "glass transition" from liquid to plastic-like behavior are dependent on the viscosity of the material at normal temperatures and pressures and the variation of viscosity with temperature and pressure. In other words, glass transition depends strongly on chemical composition.

These results show that liquid lubricants act like plastic solids in the films between asperities. Therefore, S=Tp in the previous equation and the friction coefficient is Tp/Pp or Tp/Pe. Since Tp is a weak function of temperature and pressure, and Pp or Pe are independent of apparent contact load, the frictional coefficient for a given combination of lubricant and sliding surfaces tends to be independent of operating conditions.

Elasto-hydrodynamic lubrication (ELH) on an asperity scale deposits film material between sliding surfaces in "micro-rheodynamic" (micro-RHD) lubrication. As one surface slides, each asperity carries with it an aggregation of SST additive. Sufficient pressure and temperature is developed within the film to elastically deform the asperity and to force the extreme pressure reagent between the surfaces or into the micro-pores and fissures. During this time, high thermal conditions involving pressure and asperity contacts initiate a re-conditioning of the surfaces utilizing the existing oil to quench and cool the surfaces in the same process. A thermal restructuring of these asperity contact areas creates a deviation from the normal crystalline structure of the metal, expanding it into an austenitic crystalline pattern, which is more evenly structured and allows the SST additive to bond to the actual lattice of the metal, endowing it with new and unique properties upon cooling.

Organo-metallic substitution is a technique developed and designed to inhibit the process of halide formation from the base metals of the system under reaction. For example, instead of the halogen reacting with the iron in the system to form iron halides, a boundary surface salt, it reacts with a reagent having very similar properties to the iron atom itself, thereby forming a organo-metallic complex without scavenging the target metal surface itself, and depleting the metal in a chemically corrosive wear syndrome.

The process is very similar or analogous to the saponification of organo-metallic compounds in the manufacturing of greases. During this reaction or saponification, compounds react at a certain catalytic temperature and exchange characteristic components to form new compounds. These new chemical compounds are then used to aid in a boundary regime by providing an added protection to the actual surfaces being lubricated. Ring opening oxirane acid scavenging and corrosion inhibition is another chemical technique used to neutralize acids and inhibit oxidation and corrosion. This technique involves the use of specifically engineered complex ethylene oxide; oxirane rings, that possess reactive reagents which will cause a cleavage of the ring when encountering acids or strong alkaline. These reactions occur in the presence of both anionic- and cationic-type catalysts. Anionic catalysts can include alkoxide ions, hydroxides, metal oxides, and some organo-metallic derivatives while Lewis acids and protonic reagents initiate cationic reactions.

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          O
        /   \          Ethylene Oxide Reagent
n H2C   -   CH2 n
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The lubricity, load carrying capacity, surface improvement, and wear reduction are greatly improved while corrosive aspects of halogenation are virtually eliminated.


References:

(1) CRC "Handbook Of Lubrication, Theory And Practice", Volumes 1 & 2, by E. Richard Booser, Ph.D., Society of Tribologists and Lubrication Engineers (STLE), copyright 1992, Eighth Printing.

(2) "Organic Chemistry" 4th Edition, by Robert Morrison, Ph.D. and Robert Boyd, Ph.D., copyright 1983 by Allen & Bacon.

(3) "Lubrication - A Tribology Handbook", edited by M.J. Neale OBE, BSc(Eng), published by Society of Automotive Engineers (SAE), copyright 1993, Butterworth-Heinemann, Ltd.

(4) CRC "Handbook Of Chemistry and Physics", 1986 Edition, by CRC Press, edited by David R. Lide, copyright 1986 by CRC Press.



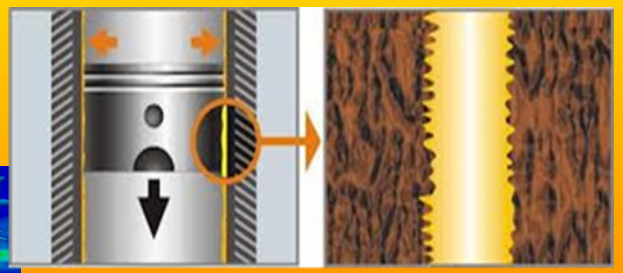

STEEL SHIELD TECHNOLOGIES

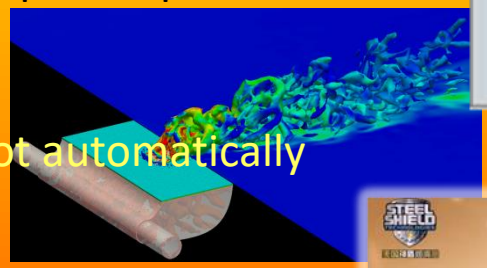
ABF TECHNOLOGY

Not Just Oil... IT'S TECHNOLOGY

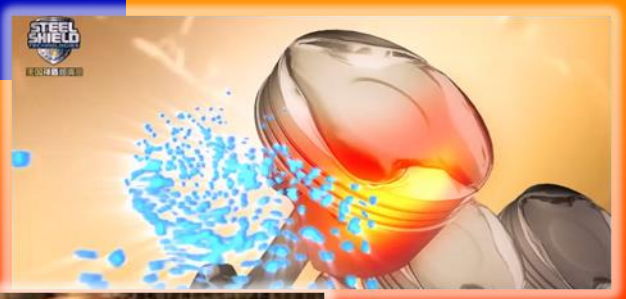
# MAJOR BREAKTHROUGHS
# IN LUBRICATION TECHNOLOGY

1. Virtual Zero Friction - RCB Ionic levitation
Faraday's Law like-charges Repel & Dipole-Dipole Reaction





2. Dynamic Heat Transfer
Lubricant accumulates at the hot spot automatically




3. Non Corrosive Cleansing
Metal sludge repelled via induction and removed

4. Metal Surface Re-hardening
From Shear Friction to Surface Lapping


5. Eliminate System Dysfunction
Not Just Oil, It's Technology


# WEAPON SHIELD
# CLEANER – LUBRICANT - PRESERVATIVE
# Improving Functional Reliability of Weapons

**WEAPON SHIELD** ™ , Lubricant, Cleaner, and Preservative for weapons and weapon systems, has proven to be the superior product of its kind to improve functional reliability and dependability of firearms even under hostile heat and adverse environmental conditions. Most feeding and extraction problems (jams) of semiautomatic and full-automatic operation are evolved from three sources; (1) excessive heat from repetitive fire (2) burnt powder accumulation through firing and (3) hostile environmental conditions such as dirt and sand. WEAPON SHIELD will address and protect against all three conditions from influencing the proper functioning of the weapon. Here's how...

## Dysfunction due to high heat

Many semiautomatic and full-automatic weapons will dysfunction after periods of fire sufficient to build up and transfer high heat to the receiver and its moving parts. This is caused by the intense heat changing the fine tolerances of the weapon through swelling and the vaporization of existing lubricants in critical areas of operation. These two factors will cause an increase in the frictional coefficients involving the slides, bolt carriers, and other moving parts. When this occurs, the spring forces, originally engineered to function under proper conditions, become stressed and will not exert the increased force needed to eject the spent casing and retrieve a new round from the magazine while delivering the bolt carrier to its full battery position. WEAPON SHIELD TM will in every case, permeate the metal surfaces of all moving parts to which it is applied and dramatically increase the lubricity by a factor of 50:1 over conventional lubes and other CLPs. Even if WEAPON SHIELD appears to "vapor off" under intense heat, the boundary film layer created by WEAPON SHIELD will still be present and continue to provide lubricity and low coefficient of friction operation. Two examples are Heckler & Koch's MP-5 submachine gun and Barrett Firearms' M92A1 .50 caliber semiautomatic. Both models have a tendency to dysfunction after sufficient heat is generated through firing while using conventional lubricants. If WEAPON SHIELD is applied, no dysfunctions associated with lubricity and tolerance change will occur. Feeding and extraction problems in the Remington 870 shotguns will also be rectified from the use of WEAPON SHIELD.



## "Reliability is our first concern...there is no room for weapon dysfunction when officers and soldiers lives are on the line."

This problem is very straight forward and can be equated to rather immediately, especially in high volume semi and full automatic fire where rapid generation of powder fouling is more evident that the norm. If WEAPON SHIELD is used as the cleaning, lubricating, and protecting product for the particular weapon, burnt powder and fouling will be rejected from the surfaces of the weapon due to WEAPON SHIELD's chemical ability to create an electrochemical boundary film that will reject positive(+) ions of burnt powder generated during the ignition process. This is also true and functional for hostile environments of dust and sand. All airborne particulates achieve a positively(+) charged electrostatic state and are attracted to objects that exhibit a more negative(-) charge (ground). For this reason, dirt and dust collect on walls and other vertical surfaces producing grit and grime. WEAPON SHIELD will create an electrochemical positive(+) surface which will reject positively charged particles. (Faradays law - like charges repel; unlike charges attract.) Please note that an excessive amount of oil of any kind will tend to attract dirt so use WEAPON SHIELD in a modest-to-light application.

### LEAD removal and copper build-up prevention with Weapon Shield

WEAPON SHIELD will remove burnt powder and lead better than any non-corrosive product in the marketplace. A thorough swabbing of the chamber and bore with a wet patch containing WEAPON SHIELD and allowed to sit and work briefly will remove all powder and leading. In severe cases of lead build-up, WEAPON SHIELD should be left in the bore from 2 hours to overnight. This allows the WEAPON SHIELD to work through and tunnel under severe accumulations, entirely removing the build-up from the bore and chamber. WEAPON SHIELD is non-acidic and is a neutral pH-7 and works by creating a surface charged boundary film described in the previous section. This same effect will prevent the accumulation or build-up of copper and gilded metals from jacketed bullets if WEAPON SHIELD is used on a regular basis to clean, lubricate, and protect the weapon.

### Stainless steel weapons and Weapon Shield

When WEAPON SHIELD is used on all, or partial stainless steel weapons, dysfunction, along with galling is eliminated. No other product can equal or outperform WEAPON SHIELD when lubricating and protecting stainless steels. All weapons will significantly benefit from the use of WEAPON SHIELD in their operation, functional reliability, resistance to fouling, and extended service life due to decreased wear through dramatically improved lubricity and reduced friction.

### PROTECT from Saltwater Contamination

The ultimate tool in the total care and maintenance of all tough tackle in both on shore and seawater equipment. Steel Shield products have been especially tested in harsh saltwater conditions and proved to be superior in its performance.

# STEEL SHIELD TECHNOLOGIES

**Product Usage for Weapons, Military Vehicles, and Equipment commonly found in Asia.**

written in 2013 by George C. Fennell, L.E.

## Weapon Shield & Weapon Shield Solvent on Small Arms

**Weapon Shield Solvent** is used to clean all parts and areas affected with burnt powder and associated residue. After removal by the Weapon Shield Solvent, **Weapon Shield** oil is then used to lubricate the weapon and protect against rust and corrosion.

**Pistols:**

CS/LP5, QSW-06, QSZ-92 –standard service sidearm, Type 80, Type 77 –People's Armed Police and Civil police, Type 64 –People's Armed Police and Civil police, Type 59 –Police and Intelligence service, Type 54 – TT1930/1933 - Standard service pistol

**Submachine Guns:**

CF-05 – SPU (Special Police Unit), QCQ-05 – Special Forces, QCW-05 –Special Forces, JS 9mm, Type 85, Type 79 –Special Forces and Airborne Forces

**Rifles :**

QBZ-95 – Standard Service Rifle, QBZ-03 – Border Guards, Type 81 – Reserve Forces, Type 56 – Limited Service

Nonlinear Line Of Sight Weapons: HD66 – 9mm, CF06 – 9mm

**Machine guns:**

CF06 – 7.62 mm general-purpose machine gun, QBB-95 – Standard service light support weapon variant of QBZ-95, QJY-88 – Replacing Type 67 general-purpose machine gun, Type 81 LMG – Light purpose machine gun variant of Type 81 Assault Rifle, Type 86 – upgraded Type 80, Type 80 – PKMS, Type 67 – Replacing Type 53 (SG43) and Type 57 (SGM) general-purpose machine guns

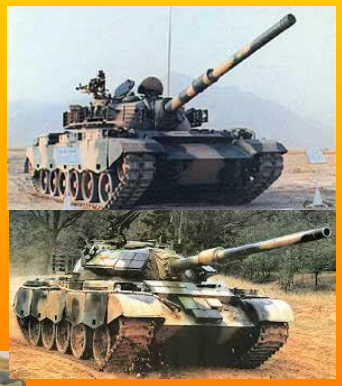
**Sniper rifles:**

QBU-09 – Anti-material sniper rifle, CS/LR5 – Anti-material sniper rifle, W03 – Anti-material sniper rifle, FY-JS – 5.8 mm sniper rifle, JS-2 – 5.8 mm sniper rifle, LR2A – Anti-material sniper rifle, AMR-2 – Anti-material sniper rifle, M06 – Anti-material sniper rifle, M99 – Anti-material sniper rifle, JS 12.7 – Anti-material sniper rifle, JS 05 – Anti-material sniper rifle, JS 7.62 – Police Sniper Division, QBU-88 – Standard service designated marksmen rifle, Type 85, Type 79 – Standard service designated marksmen rifle Dragunov SVD

## Weapon Shield Grease on Medium and Heavy Arms

Medium to heavy machine guns such as the Type 67, 67-2, W-85, and DSHK Heavy Machine Guns, a combination of Weapon Shield Solvent, Weapon Shield Oil and Weapon Shield Grease should be used. Weapon Shield Solvent and Oil should be used in the same manner as above on all parts in need of cleaning and on all surfaces in need of protecting. The **Weapon Shield Grease** should be used in critical areas of high wear and intense lubrication such as the constant working parts of the receivers that optimize weapon function.

Artillery and large bore guns like those found in Type 59/69/88/96/99 Series Tanks should use the same procedure to clean, lubricate, and protect, allowing grease to be used where specified by the original manufacturers of 125/140/155 mm smoothbore tank guns.



**Heavy machine guns:**

QJG02 – 14.5 mm, W95 – 12.7 mm, QJZ-89 – 12.7 mm, QJC-88 – 12.7 mm, W77 – 12.7 mm, W85 – 12.7 mm, Type 85 – 12.7x108 mm, Type 77 – 12.7 mm

## Other Weapons that Benefit Greatly from Weapon Shield Solvent and Weapon Shield Oil

**Shoulder fired weapons:**

PF-98 – 120 mm Anti-tank rocket launcher, PF-97 – 80 mm fuel air explosive rocket launcher, PF-89 – 80 mm Lightweight Anti-tank rocket launcher, replacing the Type 69-1 RPG, FHJ-84 – 2x62mm Rocket launcher, Type 79, Type 78 – Recoilless Gun, Type 70 – 62 mm, Type 69 RPG – 40 mm RPG launcher

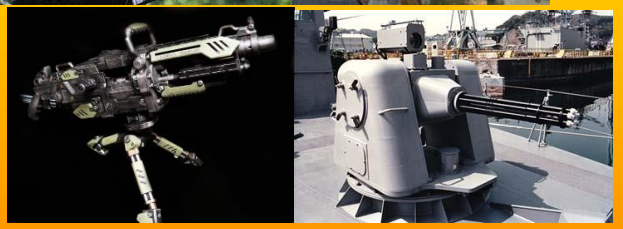
**Automatic grenade launchers:**

Type 91, QBL-06, Type 87

Mortars:
Type 67 – 82 mm, Type 87 – 82 mm

Objective individual combat weapon:
ZH-05 OIWC

Gatling type weapons:
Hua Qing Minigun – 7.62 mm, CS/LM12 – 7.62 mm, CS/LM5 – 12.7 mm, 14.5 mm – 14.5 mm



General directions for usage are as follows:

Use ***Weapon Shield Solvent*** in place of the current cleaning solvent in the same manner that it was used. All protocols of cleaning should be followed as per weapon manufacturer's instructions.

***Weapon Shield Oil*** should be used to properly lubricate and cover all surface areas to protect from rust and corrosion.

Both ***Weapon Shield Solvent*** and ***Weapon Shield Oil*** are safe for usage on all metals, polymers, and wood components. Neither product will harm any part or parts of firearms. Both are environmentally friendly, contain no harmful volatiles, are non-toxic and non-mutagenic and are safe for humans and usage around animals.

# The Ultimate Protection Against Metal-To-Metal Wear

STEEL SHIELD™ TECHNOLOGIES

WEAPON SHIELD™

SUPERIOR FUNCTIONAL RELIABILITY

WEAPON SHIELD™

## Setting The Standards In Anti-Wear & Extreme Pressure Through ABF Technology

**WEAPON SHIELD™**, the ultimate lubricant, cleaner and preservative, has been aggressively designed and formulated for the Shooting Sports Industry, Military and Law Enforcement. **WEAPON SHIELD™** cleans, removes lead, lubricates, guards against extreme pressure and wear, and protects from corrosion better than any other product to date. This distinguishes **WEAPON SHIELD™** as the ultimate tool in the total care and maintenance of all firearms and weapon systems.

ABF TECHNOLOGY™

Extensive testing and evaluation has proven **WEAPON SHIELD™** improves bore accuracy due to its **Advanced Boundary Film (ABF) Technology**, which reduces coefficients of friction between the bullet and bore surfaces assisting in the ballistic movement of the bullet and improving bullet flight.

## ATTRIBUTES

- Reduces Friction For Maximized And Efficient Operation
- Keeps Weapon Functional Under Any Conditions
- Reduces Wear On All Moving Metal Parts
- Improves Lubrication Significantly
- Shields Against Corrosion And Rust
- Optimizes Bullet Velocity
- Removes Fouling
- Removes Lead
- Repels Dirt

WEAPON SHIELD™

# WEAPON SHIELD™

ABF TECHNOLOGY™

**Steel Shield Technologies'** mechanism of operation is based upon advanced methods of Tribology that improve lubricity and load carrying capacity. This, in turn, improves surface characteristics while simultaneously creating a stable chemical **Advanced Boundary Film** on the contacting metal surfaces of whatever equipment in which it is added. The process of **Advanced Boundary Film** formation is achieved through a unique combination of long-chain halogenated hydrocarbons and other proprietary additives that are highly stable and non-corrosive to the equipment's metal parts, and pose no threat to the environment or waste oil recovery systems. **Steel Shield** reacts chemically, under thermal conditions with the contacting metal surfaces, to form a complex surface-attaching film of protection. **Steel Shield's** characteristics are "electro-negative", which causes it to seek out and affix itself to the metallic surface areas. During this process, surface smoothing is accomplished, resulting in improved spread characteristics of the surfaces themselves. The final state of the opposing metal surfaces increases the fluid film strength even more, resulting in greatly reduced wear while imparting extreme pressure (EP) properties to the opposing metal surfaces. The result is a virtual elimination of frictional wear and significant cooling of the entire lubricated area yielding higher energy savings and reduced metallic debris and acids in the oil. This is extensively proven through elemental oil analysis and Ferrography of the used oil, before and after the use of **Steel Shield's Advanced Boundary Film Technology.**

## MSDS DATA

- Flash Point : 226˚C
- Non-Hazardous
- Non-Flammable
- Synthetic Hydrocarbons

## PHYSICAL DATA

- Boiling Point : 238˚C
- Evaporation Rate : < 0.01
- Specific Gravity : 1.07
- Insoluble In Water
- Vapor Pressure : <1@25˚C
- Medium To Dark Amber

## PERFORMANCE

- Keeps Weapons Functional
- Reduces Friction
- Reduces Wear
- Increases Lubrication
- Shields And Protects
- Optimizes Velocity
- Removes Fouling
- Removes Lead
- Removes Dirt

### DIRECTIONS

Apply to metal surfaces and all moving metal parts. Coat metal surfaces lightly with soft cloth and wipe excess off. Use to clean bore, barrel and chamber as you would normally use in place of solvents. This product is a full CLEANER, LUBRICANT & PRESERVATIVE.
Contains synthetic hydrocarbons. Non-Toxic. Contains no volatiles. If swallowed, do not induce vomiting due to aspiration in lungs.

| ITEM NUMBER | ITEM UPC# | ITEM DESCRIPTION | CASE PACK | CASE DIMENSIONS | CASE CUBE | CASE WEIGHT | TI/HI |
|---|---|---|---|---|---|---|---|
| WS-OP | 8-94630-00159-5 | Weapon Shield Metal Treatment - Oiler Pen | 24 | 5.5"w x 4.5"d x 9"h | .13 | 1.2 | 63/6 |
| WS-1 | 8-94630-00131-1 | Weapon Shield Metal Treatment - 1 oz. | 24 | 6.875"w x 4.625"d x 3.875"h | .07 | 2.5 | 48/12 |
| WS-1ws | 8-94630-00158-8 | Weapon Shield MT - 1 oz. with Sprayer | 24 | 6.875"w x 4.625"d x 3.875"h | .07 | 2.5 | 48/12 |
| WS-2 | 8-94630-00132-8 | Weapon Shield Metal Treatment - 2 oz. | 12 | 4.625"w x 6"d x 5.375"h | .09 | 2.0 | 60/9 |
| WS-4 | 8-94630-00133-5 | Weapon Shield Metal Treatment - 4 oz. | 12 | 5.5"w x 7.125"d x 6.5"h | .15 | 3.8 | 40/8 |
| WS-4ws | 8-94630-00168-7 | Weapon Shield MT - 4 oz. with Sprayer | 12 | 7"w x 5.25"d x 7.25"h | .15 | 3.6 | 42/7 |
| WS-16 | 8-94630-00134-2 | Weapon Shield Metal Treatment - 16 oz. | 12 | 10.125"w x 7.625"h x 10"d | .45 | 15.2 | 16/7 |
| WS-16ws | 8-94630-00169-4 | Weapon Shield MT - 16 oz with Sprayer | 12 | 10.75"w x 8"d x 10.75"h | .53 | 15.0 | 20/5 |
| WS-128 | 8-94630-00135-9 | Weapon Shield Metal Treatment - 1 Gallon | 4 | 9.5"w x 12.5"h x 14.5"d | .99 | 33.6 | 12/4 |
| WS-5G | 8-94630-00170-0 | Weapon Shield Metal Treatment - 5 Gal | 1 | | | 43 | |

STEEL SHIELD TECHNOLOGIES, INC.
3351 Industrial Blvd.
Bethel Park, PA 15102-2543
800.390.1535
www.steelshieldtech.com

# Material Safety Data Sheet

| IDENTITY<br>**Steel Shield ™ Weapon Shield ™ Metal Treatment** | **WEAPON SHIELD ™** |
|---|---|

## Section I

| | |
|---|---|
| Manufacturer's Name<br>**Steel Shield Technologies, Inc.** | Emergency Telephone Number<br>**(412) 479-0024** |
| Address<br>**3351 Industrial Blvd.** | Telephone Number for Information<br>**(800) 390-1535** |
| **Bethel Park, PA 15102** | Date Prepared<br>**March 24, 2006** |
| | Signature of Preparer *(optional)* |

## Section II - Hazard Ingredients/Identity Information

| Hazardous Components (Specific Chemical Identity; Common Name(s)) | OSHA PEL | ACGIH TLV |
|---|---|---|
| **Synthetic Hydrocarbon Base Stock Fluid** | **500 ppm** | **5mg/m³** |
| **Synthetic Hydrocarbon Extreme Pressure Additive** | **500 ppm** | **5mg/m³** |
| **Lubricity/Anti-Scuff Additive** | **500 ppm** | **5mg/m³** |
| **Corrosion Inhibiting Additive** | **500 ppm** | **5mg/m³** |

## Section III - Physical/Chemical Characteristics

| | | | |
|---|---|---|---|
| Boiling Point | **238° C** | Specific Gravity ($H_2O$ = 1) | **1.07** |
| Vapor Pressure (mm Hg.) | **< 1 @ 25° C** | Melting Point | **NA** |
| Vapor Density (AIR = 1) | **NA** | Evaporation Rate (Butyl Acetate = 1) | **< 0.01** |
| Solubility in Water<br>**Insoluble** | | | |
| Appearance and Odor<br>**Medium to Dark Amber – Mild Oil Odor** | | | |

## Section IV – Fire and Explosion Hazard Data

| Flash Point (Method Used) | Flammable Limits | LEL | UEL |
|---|---|---|---|
| **226° C** | **NA** | **NA** | **NA** |
| Extinguishing Media<br>**Chemical , $CO_2$ , Foam , Waterfog** | | | |
| Special Fire Fighting Procedures<br>**Use Self Contained Breathing Apparatus in confined or closed areas** | | | |
| Unusual Fire and Explosion Hazards<br>**Handle and treat as oil – non-explosive and non-flammable under normal conditions** | | | |

## Section V - Reactivity Data

| | | | |
|---|---|---|---|
| Stability | **Stable** | | Conditions to Avoid<br>**Open Flames and Molten Temperatures** |
| Incompatibility *(Materials to Avoid)*<br>**Strong Oxidizers** | | | |
| Hazardous Decomposition or Byproducts<br>**Carbon dioxide, carbon monoxide, various hydrocarbons and HCl if combustion is not complete** | | | |
| Hazardous Polymerization | **Will Not Occur** | | Conditions to Avoid<br>**None Known** |

## Section VI - Health Hazard Data

| Route(s) of Entry: | Inhalation? **NO** | Skin? **NO** | Ingestion? **YES** |
|---|---|---|---|
| Health Hazards *(Acute and Chronic)*<br>**Ingestion of product may produce nausea and vomiting, but no long-term effects.** | | | |
| Carcinogenicity: | NTP? **NO** | IARC Monographs? **NO** | OSHA Regulated? **NO** |
| Signs and Symptoms of Exposure<br>**Mild irritation of eyes; the toxicity profile shows excessive inhalation of vapors can cause nasal and respiratory irritation, dizziness, fatigue, headaches and nausea.** | | | |
| Medical Conditions Generally Aggravated by Exposure<br>**None Known** | | | |
| Emergency and First Aid Procedures<br>**Eyes: Immediately flush with large quantities of water for at least 15 minutes and call a physician if irritation persists.**<br>**Skin: Wash thoroughly with soap and water.**<br>**Inhalation of combusted fumes: Remove exposed person to fresh air.**<br>**Ingestion: Call a physician. Do NOT induce vomiting.** | | | |

## Section VII - Precautions for Safe Handling and Use

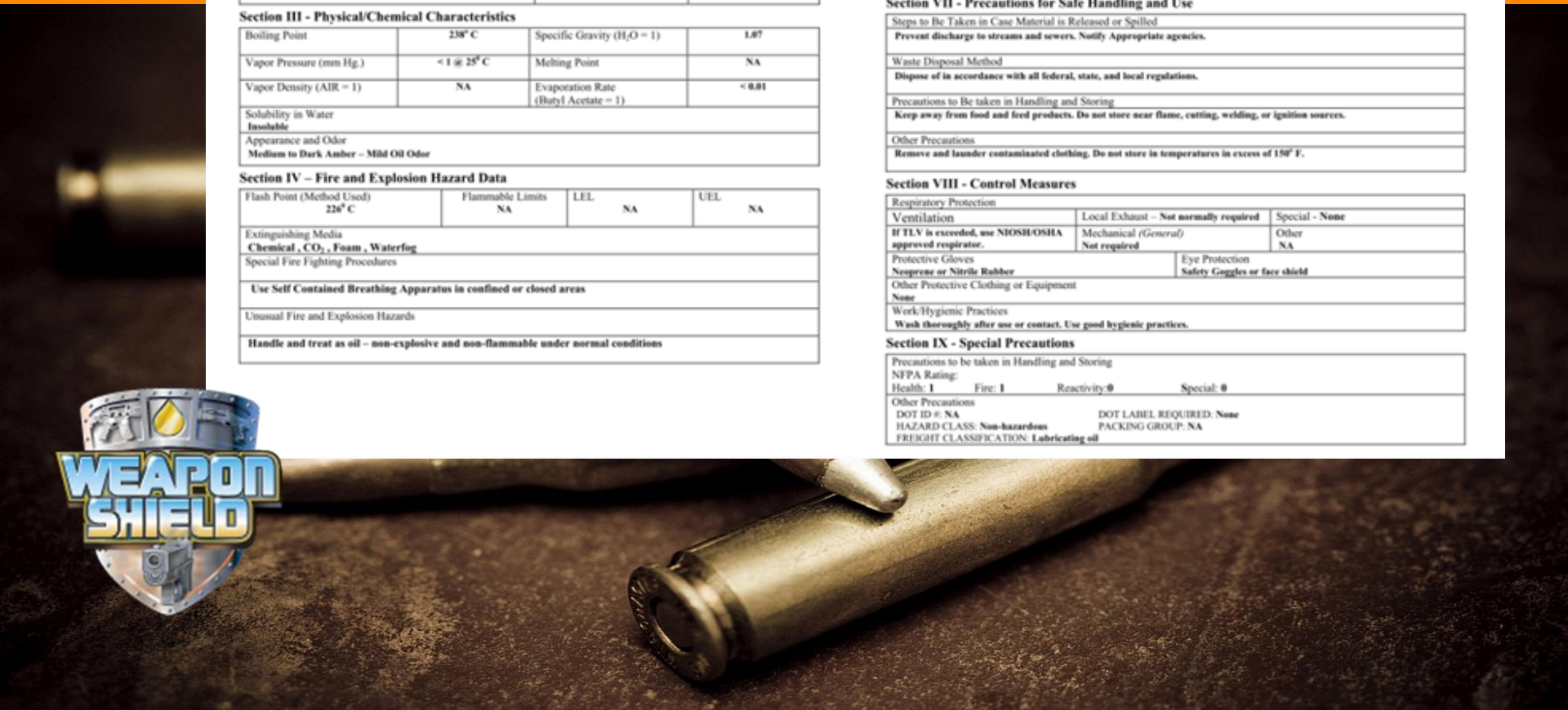
| |
|---|
| Steps to Be Taken in Case Material is Released or Spilled<br>**Prevent discharge to streams and sewers. Notify Appropriate agencies.** |
| Waste Disposal Method<br>**Dispose of in accordance with all federal, state, and local regulations.** |
| Precautions to Be taken in Handling and Storing<br>**Keep away from food and feed products. Do not store near flame, cutting, welding, or ignition sources.** |
| Other Precautions<br>**Remove and launder contaminated clothing. Do not store in temperatures in excess of 150° F.** |

## Section VIII - Control Measures

| | | |
|---|---|---|
| Respiratory Protection | | |
| Ventilation | Local Exhaust – **Not normally required** | Special - **None** |
| **If TLV is exceeded, use NIOSH/OSHA approved respirator.** | Mechanical *(General)*<br>**Not required** | Other<br>**NA** |
| Protective Gloves<br>**Neoprene or Nitrile Rubber** | | Eye Protection<br>**Safety Goggles or face shield** |
| Other Protective Clothing or Equipment<br>**None** | | |
| Work/Hygienic Practices<br>**Wash thoroughly after use or contact. Use good hygienic practices.** | | |

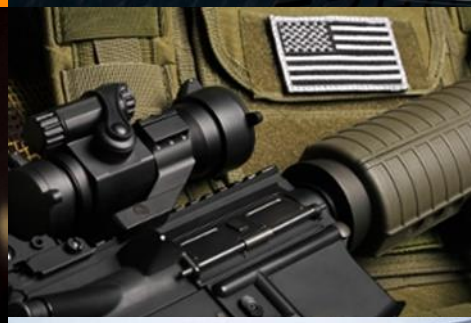
## Section IX - Special Precautions

| |
|---|
| Precautions to be taken in Handling and Storing<br>NFPA Rating:<br>Health: **1** Fire: **1** Reactivity: **0** Special: **0** |
| Other Precautions<br>DOT ID #: **NA** DOT LABEL REQUIRED: **None**<br>HAZARD CLASS: **Non-hazardous** PACKING GROUP: **NA**<br>FREIGHT CLASSIFICATION: **Lubricating oil** |

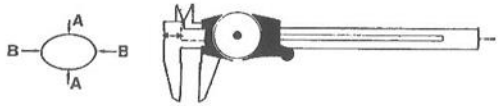


# **Weapon-Shield** product comparison – Gun Oil

Firepower FP-10 was the 1st generation formula and is now replaced by **Weapon-Shield** which is the 5th generation formula.



## WEAR TEST




## PROCEDURES & RESULTS

Under carefully controlled laboratory test conditions, this basic test was performed with a variety lubricants for a 60 second time period and under a 266.5 lb. roll to ring pressure. The method measurement devised to indicate wear consisted of measuring the length and width of a "wear mar (see drawing below) and multiplying them together and multiplying by 1,000 to get an index numb The tables below allow a comparison of index numbers (higher numbers indicating more wear) of t various lubricants used in this test.

*Magnified Examples of Wear Marks*

| PRODUCT NAME | FORCE (LBS.) | WEAR INDEX NO. | SCAR LENGTH | SCAR WIDTH |
|---|---|---|---|---|
| Super Lube jel (Bohemia, NY) PTFE | 266.5 | 102.9 | 0.4200" | 0.2450" |
| TRI-FLON (oil w/PTFE) | 266.5 | 79.6 | 0.3723" | 0.2138" |
| Kleeroil (Am. Writing Ink Co.) | 266.5 | 77.3 | 0.3738" | 0.2068" |
| Koppers/S.A. All Weather Weapons Lube | 266.5 | 73.8 | 0.3730" | 0.1979" |
| RIG +P Stainless Steel Lube | 266.5 | 72.1 | 0.3564" | 0.2024" |
| Kleenbore Formula 3 oil | 266.5 | 71.1 | 0.3649" | 0.1948" |
| Rem-oil w/Teflon (PTFE) | 266.5 | 68.3 | 0.3478" | 0.1965" |
| Hoppes lube oil | 266.5 | 67.4 | 0.3507" | 0.1922" |
| Parker-Hale Express Gun Oil | 266.5 | 65.0 | 0.3495" | 0.1859" |
| G-96 Gun Treatment (aerosol) | 266.5 | 62.8 | 0.3358" | 0.1871" |
| Military Lube oil AXS-72 (obsolete) | 266.5 | 58.8 | 0.3255" | 0.1807" |
| RNI Liquid Gunsmith | 266.5 | 56.6 | 0.3189" | 0.1775" |
| WD-40 | 266.5 | 55.2 | 0.3060" | 0.1805" |

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| PRODUCT NAME | FORCE (LBS.) | WEAR INDEX NO. | SCAR LENGTH | SCAR WIDTH |
|---|---|---|---|---|
| 3 in 1 "Plus" (aerosol) | 266.5 | 54.4 | 0.3230" | 0.1683" |
| Rusty Duck | 266.5 | 52.7 | 0.3110" | 0.1694" |
| Pro-Shot All Weather Gun Oil | 266.5 | 52.7 | 0.3115" | 0.1692" |
| Break Free LP (lube/preservative) PTFE | 266.5 | 49.9 | 0.3037" | 0.1642" |
| LSA Springfield Armory | 266.5 | 49.3 | 0.3000" | 0.1643" |
| Sports Lube Rod & Gun Oil | 266.5 | 43.6 | 0.2890" | 0.1507" |
| Kleenbore Super Lube (aerosol) | 266.5 | 48.4 | 0.2930" | 0.1652" |
| Hornaday "ONE SHOT" (aerosol) | 266.5 | 39.9 | 0.2664" | 0.1498" |
| Birchwood-Casey "Sheath" | 266.5 | 34.6 | 0.2530" | 0.1366" |
| Break Free CLP (PTFE) | 266.5 | 30.2 | 0.2495" | 0.1212" |
| TUFOIL (PTFE) | 266.5 | 27.9 | 0.2235" | 0.1249" |
| Molube-Alloy (moly disulfide) 777-1 | 266.5 | 27.8 | 0.2301" | 0.1210" |
| Blue Spectre Gun Oil (moly disulfide) | 266.5 | 24.8 | 0.2157" | 0.1148" |
| Tetra-Gun Oil (fluorocarbon synthetic) | 266.5 | 6.6 | 0.1045" | 0.0634" |
| TRI-FLOW (PTFE) | 266.5 | 6.2 | 0.1050" | 0.0590" |
| Eezox Synthetic Gun Oil | 266.5 | 2.0 | 0.0625" | 0.0325" |
| Pro-lix Dry Film Lube | 266.5 | 7.0 | 0.1061" | 0.0670" |
| Tetra Gun Grease (synthetic) | 266.5 | 2.1 | 0.0590" | 0.0359" |
| Minuteman High Tech Gun Oil | 266.5 | 3.3 | 0.0749" | 0.0443" |
| **Firepower FP-10 Lubricant Elite™** | **266.5** | **0.9** | **0.0390"** | **0.0240"** |

### INCREASED LOADS

| | | | | |
|---|---|---|---|---|
| Eezox Synthetic Gun Oil | 363 | 23.7 | 0.2036" | 0.1164" |
| Eezox Synthetic Gun Oil | 460 | 34.1 | 0.2525" | 0.1352" |
| Minuteman High Tech Gun Oil | 363 | 3.9 | 0.0790" | 0.0495" |
| Minuteman High Tech Gun Oil | 460 | 31.4 | 0.2372" | 0.1323" |
| **Firepower FP-10 Lubricant Elite™** | **363** | **1.0** | **0.0321"** | **0.0300"** |
| **Firepower FP-10 Lubricant Elite™** | **460** | **1.6** | **0.0499"** | **0.0321"** |

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**WEAPON SHIELD SOLVENT™ - is the ultimate cleaning solvent that is "not a solvent" by traditional standards. It removes burnt powder, fouling, debris, lead and copper, and contains no ammonia, butyl cellosolve, or any other hostile chemicals that can endanger your health or the components of your firearm. It is completely safe on all polymers, woods, metals and even leather.**

**WEAPON SHIELD SOLVENT™ contains WEAPON SHIELD CLP™, to provide a short term but powerful lubricating film that can provide positive protection and lubrication for "on the fly" cleaning during situations that require aggressive cleaning action and getting "back in the game". After your final cleaning with WEAPON SHIELD SOLVENT™ , follow up with complete lubrication and protection by using WEAPON SHIELD CLP™ .**

- **"ENVIRONMENTALLY FRIENDLY".**
- **"NON-MUTAGENIC".**
- ***"NO VOLATILES".***
- **"NON-TOXIC".**

**WEAPON SHIELD SOLVENT™ conforms to California's Proposition 65.**

**WEAPON SHIELD SOLVENT™ contains no SARA Title III chemicals or heavy metals in its formulation as well.**

***THIS IS AN INDUSTRY FIRST***
**A solvent that contains no harmful solvent properties, whatsoever.**
**If it's GREEN you are looking for in a cleaning solvent, look no further.**
**Available in 4 ounce with pump sprayer, 16 ounce with trigger sprayer and Gallons.**

# MATERIAL SAFETY DATA SHEET

## SECTION 1 - IDENTIFICATION

PRODUCT NAME: **Steel Shield ™ Weapon Shield Solvent ™**

MANUFACTURER: Steel Shield Technologies, Inc.
3351 Industrial Blvd.
Bethel Park, PA 15102U.S.A.

UPDATED: November 14, 2012
PREPARED BY: GC Fennell, L.E.

EMERGENCY TELEPHONE: (800) 390-1535
INFORMATION TELEPHONE: (412) 479-0024

## SECTION 2 – HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

| COMPONENTS | OSHA PEL | ACGIH TLV | %Vol | CAS NUMBER |
|---|---|---|---|---|
| Synthetic Base Stock Oil | 500 ppm | 5 mg/m$^3$ | 20-60% | 163149-29-9 |
| Synthetic Oil Additive | 500 ppm | 5 mg/m$^3$ | 20-60% | 63449-39-8 |
| Naphtha, Medium Aliphatic | 500 ppm | 5 mg/m$^3$ | 20-60% | 64742-88-7 |

Environmentally Friendly. Non-Flammable, This product does not contain any carcinogens or mutagens defined by OSHA, IARC Monographs or the National Toxicology Program. Contains no volatiles, ozone depleting substances or heavy metals. Complies with the RCRA Clean Air Act of 1991 and SARA Title II.

## SECTION 3 – PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT: > 390°F
VAPOR PRESSURE (mm Hg): < 1 @ 25°C
VAPOR DENSITY (air = 1): 5.48
SOLUBILITY IN WATER: Insoluble
APPEARANCE AND ODOR: Light amber, low viscosity liquid, mild cinnamon odor

SPECIFIC GRAVITY: 1.02
MELTING POINT: N/A
EVAPORATION RATE: < 0.07
VOLATILES: None

## SECTION 4 – FIRE AND EXPLOSION HAZARD DATA

FLASH POINT AND METHOD USED: 153°F PMCC
FLAMMABLE LIMITS: NA
EXTINGUISHING MEDIA: Foam, waterfog, chemical, $CO_2$
SPECIAL FIRE FIGHTING PROCEDURES: Pressure-demand, self-contained breathing apparatus should be provided for firefighters in confined areas where stored.
UNUSUAL FIRE AND EXPLOSION HAZARDS: Product is nonexplosive and not combustible under normal conditions. It flows freely when hot and should be treated as oil when exposed in a fire.

## SECTION 5 – REACTIVITY DATA

STABILITY: Stable under normal conditions
CONDITIONS TO AVOID: Open flames and extremely high temperatures (molten)
INCOMPATIBILITY (materials to avoid): Strong oxidizers
HAZARDOUS DECOMPOSITION/BYPRODUCTS: Carbon dioxide, carbon monoxide, halogenated hydrocarbons and other hydrocarbons if combustion is not complete
HAZARDOUS POLYMERIZATION: Will not occur
CONDITIONS TO AVOID: None known



## SECTION 6 – HEALTH HAZARD DATA

ROUTE(S) OF ENTRY: Inhalation? No. Skin? No Ingestion? Possible (deliberate)
HEALTH HAZARDS-ACUTE TOXICOLOGICAL PROPERTIES: Under normal use conditions, not expected to produce toxicity via inhalation or skin. Ingestion of product may produce nausea and vomiting, but no long-term effects.
CARCINOGENICITY: None NTP? No IARC Monographs? No OSHA Regulated? No
SIGNS & SYMPTOMS OF EXPOSURE: Mild irritation of eyes; the toxicity profile shows excessive inhalation of vapors can cause nasal and respiratory irritation, dizziness, fatigue, headaches and nausea
MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: None determined
EMERGENCY & FIRST AID PROCEDURES:
Eyes: Immediately flush with large quantities of water for at least 15 minutes and call a physician if irritation persists.
Skin: Wash thoroughly with soap and water.
Inhalation of combusted fumes: Remove exposed person to fresh air.
Ingestion: Call a physician. Do NOT induce vomiting. Never give anything by mouth to an unconscious person.

## SECTION 7 – CONTROL MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: If material is spilled, steps should be taken to contain liquids and prevent discharges to streams or sewer systems. Spills or releases should be reported to appropriate agencies.
WASTE DISPOSAL METHOD: Dispose of absorbent in accordance with all applicable Federal, State and Local regulations.
PRECAUTIONS FOR HANDLING AND STORING: Keep container closed until ready for use. Keep away from feed and food products. Store away from ignition sources. Do not use welder or cutting torch on or near container
OTHER PRECAUTIONS: Do not store in temperatures above 130°F. Remove and launder contaminated clothing.

## SECTION 8 – PRECAUTIONS FOR SAFE HANDLING AND USE

RESPIRATORY PROTECTIONS: If TLV is exceeded, use NIOSH/OSHA-approved respirator with organic filter
VENTILATION: Local exhaust - not normally required; Mechanical (general) - not required; Special - none; Other adequate ventilation - none
PROTECTIVE GLOVES: Neoprene or Buna-N
EYE PROTECTION: Chemical safety goggles and, if handled hot, full face shield
OTHER PROTECTIVE EQUIPMENT/CLOTHING: None
WORK/HYGIENIC PRACTICES: Use usual, good hygienic practices; wash thoroughly after use.

## SECTION 9 – NFPA/HMIS RATING

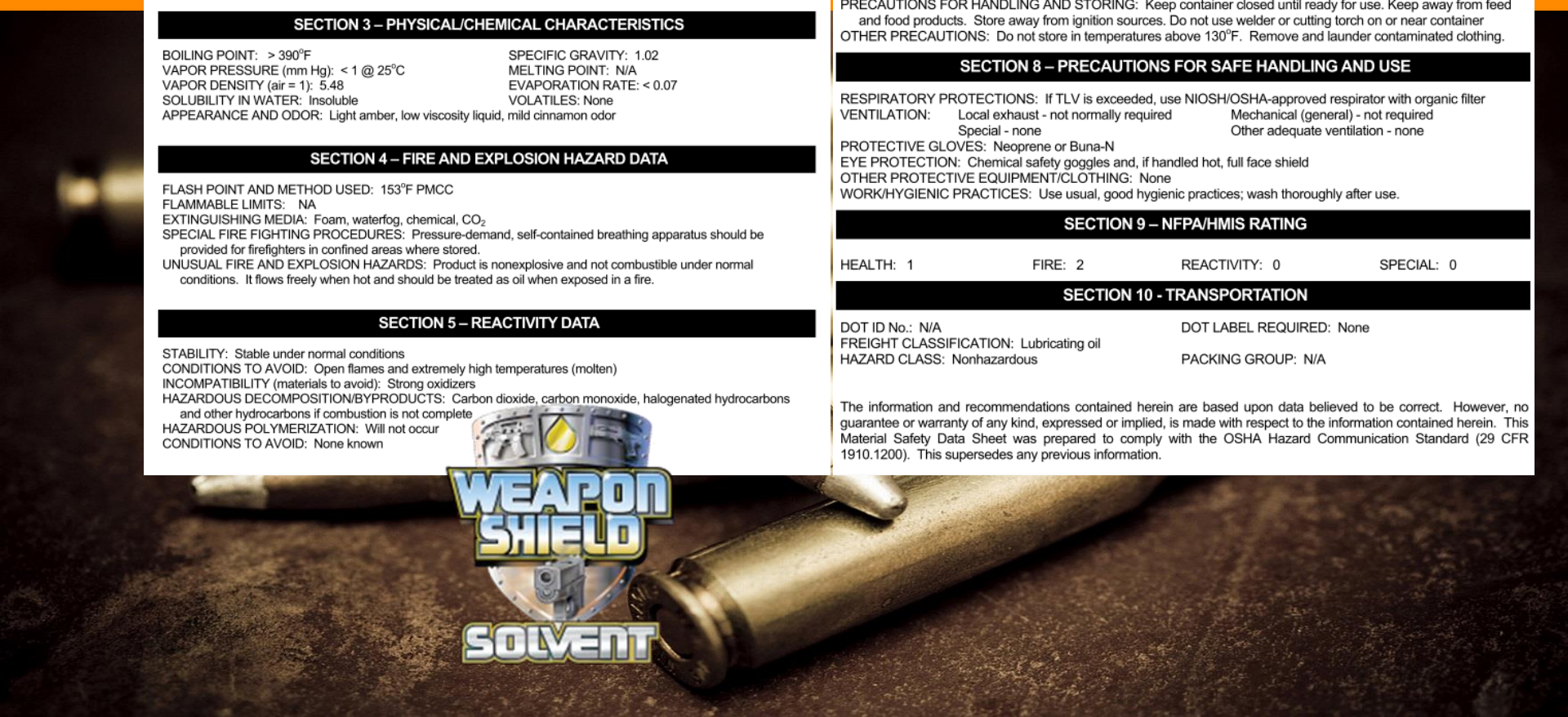
HEALTH: 1 FIRE: 2 REACTIVITY: 0 SPECIAL: 0

## SECTION 10 - TRANSPORTATION

DOT ID No.: N/A
FREIGHT CLASSIFICATION: Lubricating oil
HAZARD CLASS: Nonhazardous

DOT LABEL REQUIRED: None
PACKING GROUP: N/A

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, expressed or implied, is made with respect to the information contained herein. This Material Safety Data Sheet was prepared to comply with the OSHA Hazard Communication Standard (29 CFR 1910.1200). This supersedes any previous information.




## Weapon Shield Grease - Lithium Complex #1

**PRODUCT DATA SHEET**

**PRODUCT TYPE:** Lithi-Shield #1

**NLGI GRADE:** 1

| ASTM METHOD | | Typical Results |
|---|---|---|
| D-217 | Penetration, Worked, 60 s | 310 - 340 |
| D-217 | Penetration, Unworked | 310 - 340 |
| | Thickener Type | Lithium Complex |
| D-128 | Thickener % | 6 - 8 |
| | Color | Light Amber |
| | Texture | Smooth |
| D-2265 | Dropping Point °F, Min. | 500 |
| D-445 | Viscosity @ 40°F, cst | 220 |
| D-445 | Viscosity @ 100°F, cst | 19 |
| D-2270 | Viscosity Index | 95 |
| D-92 | Flash Point - °F | 464 |
| D-92 | Fire Point - °F | 550 |
| D-2509 | Timken OK Load – Lbs. | 60+ |
| D-1743 | Rust | Pass |
| D-4048 | Copper Corrosion | 1B |
| D-2596 | 4 Ball EP Weld, kg Min. | 800 |
| D-2266 | Four Ball Wear, mm. | 0.70 |
| D-5483 | Oxidation Induction Time at 180°C, min. | 95.0 |

US Steel Mobility Test

Mobility at 77 F, g/min:
Mobility at 60 F, g/min: 515
Mobility at 40 F, g/min: 257.1
Mobility at 20 F, g/min: 78.9
Mobility at 0 F, g/min: 5.4

# MATERIAL SAFETY DATA SHEET

ADDRESS: Steel Shield Technologies, Inc.
3351 Industrial Blvd
Bethel Park, PA 15102

**PRODUCT IDENTIFICATION**

| Product Name | Code No. |
|---|---|
| Weapon-Shield EP #1 Grease | WSG-EP1 |

Chemical Name: Lithium Hydroxy-Stearate Lubricating Grease
Synonyms: #1 EP Lithium Complex

Emergency Phone Number (s)
Business: (412) 479-0024
Other: (412) 831-3823 – Fax

Date: March 21, 2009
Chemical Family: Hydrocarbon

**INGREDIENTS**

| MATERIALS OR COMPONENTS | % W | CAS NUMBER | CARCINOGIN OSHA OR IARC |
|---|---|---|---|
| Lithium Hydroxy-Stearate (Soap) | 10 | | |
| Mineral Oil | 80 | | |
| Zinc Oxide | 5 | | |
| Steel Shield EPA | 5 | | |
| Cinnamon Scent | | | |

SHIPP INFO.: Non Restricted

**PHYSICAL PROPERTIES**

| Boiling Point / Range | Melting Point | Freezing Point | Molecular Weight (Calculated) |
|---|---|---|---|
| ºC >700 ºF | ºC N/A ºF | N/A ºC ºF | N/A |

| Specific Gravity (H2O=1) | Vapor Pressure (mm Hg) | Vapor Density (Air=1) |
|---|---|---|
| @ 0.88 / 16 ºC | N/A @ ºC ºF | N/A |

| Solubility in H2O | % Volatiles By Volume | Evaporation Rate | Other |
|---|---|---|---|
| Nil | 0 | N/A ☐ Ether=1 ☐ Water=1 ☐ Butylacetate=1 | |

Appearance and Odor: Light Amber - Bland

**FIRE AND EXPLOSION DATA**

Flash Point: ºC 464ºF Test Method: D-92
Flammable Limits **Not Established** Lower % Upper %
Autoignition Temperature/Fire Point: ºC 500ºF

EXTINGUISHING MEDIA
☐ Water-Spray ☒ Water-Fog ☐ Water-Stream ☒ CO2 ☒ Dry Chemical ☐ Alcohol Foam ☒ Foam ☒ Earth or Sand

SPECIAL FIRE FIGHTING PROCEDURES
☐ Do Not Enter Building ☐ Allow Fire To Burn ☒ Water May Cause Frothing ☐ Do Not Use Water

UNUSUAL FIRE AND EXPLOSION HAZARDS
☐ Dust Explosion Hazard ☐ Sensitive To Shock ☐ Contamination ☐ Temperature ☐ Other (Specify): None

**REACTIVITY DATA**

STABILITY: ☒ Stable ☐ Unstable
CONDITIONS CONTRIBUTING TO INSTABILITY: ☐ Thermal Decomposition ☐ Photo Degradation ☐ Polymerization ☐ Contamination

INCOMPATIBILITY – AVOID CONTACT WITH
☐ Strong Acids ☐ Strong Alkalis ☒ Strong Oxidizers ☐ Other (Specify):

HAZARDOUS DECOMPOSTION PRODUCTS – THERMAL AND OTHER (LIST)
Oxides of Carbon, Sulfur and Nitrogen if burned.

CONDITIONS TO AVOID
☐ Heat ☒ Open Flames ☐ Sparks ☐ Ignition Sources ☐ Other (Specify):

**SPILL OR LEAK**

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED
☐ Flush With Water ☒ Absorb With Sand Or Inert Material ☐ Neutralize ☒ Sweep Or Scoop Up And Remove
☐ Keep Upwind. Evacuate Enclosed Spaces ☐ Prevent Spread Or Spill ☐ Dispose of Immediately ☐ Other (Specify:

WASTE DISPOSAL METHOD – *CONSULT FEDERAL, STATE, OR LOCAL AUTHORITIES FOR PROPER DISPOSAL PROCEDURES*
Incinerate

Before using product, read and follow directions and precautions on product label and bulletins.

HMIS CONDITIONS TO AVOID: Excessive skin contact

Product Name: Weapon Shield Grease — Code No.: LS-287-1

PRIMARY ROUTES OF ENTRY
☐ INHALATION ☒ SKIN CONTACT ☐ OTHER (SPECIFY):

Products of this type have been used for years with no known ill effects. This product contains no carcinogens or mutagens as defined by OSHA or IARC. All components are listed on the TSCA, and EINECS Inventories. This Product contains no controlled substance under WHMIS.

**SARA Title III, Section 313, Reportable Quantities:**

| Compound | CAS# | % Wt. |
|---|---|---|
| None | NA | NA |

**WHMIS Ingredient Disclosure, Reportable Quantities:**

| Compound | CAS# | % Wt. |
|---|---|---|
| None | NA | NA |

**HEALTH HAZARD INFORMATION**

PERMISSIBLE EXPOSURE LIMIT (SPECIFY IF TLV/TWA OR CEILING © ) OTHER:
ACGIH 20 | OSHA 2004 None Established

**EFFECTS OF EXPOSURE**

IRRITATION
☒ SKIN ☐ SEVERE ☐ MODERATE ☒ MILD (TRANSIENT)
☒ EYE ☐ SEVERE ☐ MODERATE ☒ MILD (TRANSIENT)

CORROSIVITY
☐ SKIN ☐ 4 HRS. (DOT) ☐ 24 HRS. (CPSC)
☐ EYE ☐ MAY CAUSE BLINDNESS ☒ NOT CORROSIVE

SENSITIZATION: ☐ SKIN ☐ RESPIRATORY ☒ NONE
INHALATION EFFECTS **N/A**: ☐ NARCOTIC EFFECT ☐ CYANOSIS ☐ ASPHYXIANT

LUNG EFFECTS (SPECIFY)
N/A

OTHER (SPECIFY)
☐ REPEATED CONTACT-SKIN DEFATTER ☐ OTHER (SPECIFY): None

**EMERGENCY FIRST AID**

INGESTION
☐ INDUCE VOMITING ☒ **DO NOT** INDUCE VOMITING ☐ GIVE PLENTY OF WATER ☒ GET MEDICAL ATTENTION ☐ OTHER (SPEICFY):

DERMAL
☒ FLUSH WITH SOAP AND WATER ☐ GET MEDICAL ATTENTION ☒ CONTAMINATED CLOTHING – REMOVE AND LAUNDER
☐ CONTAMINATED SHOES – DESTROY ☐ OTHER (SPECIFY):

EYE CONTACT
☒ FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MIN. ☒ GET MEDICAL ATTENTION ☐ OTHER (SPECIFY):

INHALATION
☐ REMOVE TO FRESH AIR ☐ IF NOT BREATHING, GIVE ARTIFICAL RESPIRATION ☐ GIVE OXYGEN
☐ GET MEDICAL ATTENTION ☐ OTHER (SPECIFY): N/A

**SPECIAL PROTECTION INFORMATION**

VENTILATION REQUIREMENTS – *Always maintain exposure below permissible exposure limits*
☐ CONSULT AN INDUSTRIAL HYGIENIST OR ENVIRONMENTAL HEALTH SPECIALIST ☐ LOCAL EXHAUST
☒ USE WITH ADEQUATE VENTILATION ☐ CHECK FOR AIR CONTAMINANT AND OXYGEN DEFICIENCY ☐ OTHER (SPECIFY):

EYE: ☐ FACE SHIELD ☒ SAFETY GLASSES ☐ GOGGLES
HAND (GLOVE TYPE): ☐ BUTYL RUBBER ☒ POLYVINYL ALCOHOL ☐ OTHER (SPECIFY): ☐ POLYVINYL CHLORIDE ☒ NEOPRENE ☐ NATURAL RUBBER ☒ POLY-ETHYLENE

RESPIRATOR TYPE – *Use only NIOSH / MESA approved equipment*
☐ SELF-CONTAINED ☐ SUPPLIED AIR ☐ CAN OR CARTRIDGE GAS OR VAPOR ☐ FILTER-DUST, FUME, MIST
☐ OTHER (SPECIFY): N/A

OTHER PROTECTIVE EQUIPMENT
☐ RUBBER BOOTS ☐ APRON ☐ OTHER (SPECIFY): None

**SPECIAL PRECAUTIONS**

PRECAUTIONARY NOTES
☒ WASH THOROUGHLY AFTER HANDLING ☒ DO NOT GET IN EYES OR ON CLOTHING ☐ DO NOT BREATH DUST, VAPOR, MIST, GAS ☐ KEEP CONTAINER CLOSED ☒ KEEP AWAY FROM SPARKS, AND OPEN FLAMES ☐ STORE IN TIGHTLY CLOSED CONTAINER
☐ DO NOT STORE NEAR COMBUSTIBLES ☐ KEEP FROM CONTACT WITH CLOTHING AND OTHER COMBUSTIBLE MATERIALS ☐ EMPTY CONTAINER MAY CONTAIN HAZARDOUS RESIDUE ☐ USE EXPLOSION PROOF EQUIPMENT ☐ OTHER (SPECIFY):

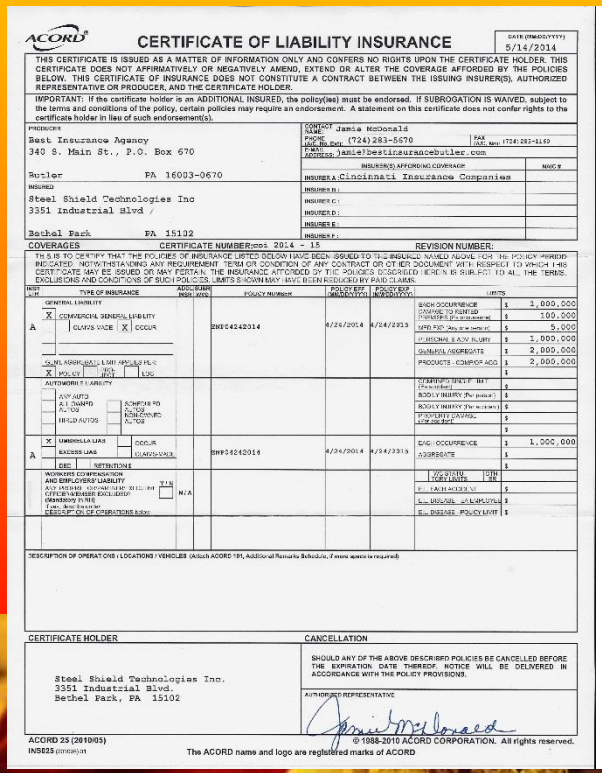
OTHER HANDLING AND STORAGE CONDITIONS None

| PREPARED BY | DATE | ADDRESS | PHONE |
|---|---|---|---|
| GCF | 3-21-2009 | 3351 Industrial Blvd. Bethel Park PA 15102 | 800-390-1535 |

PLEASE NOTE: "The above information is accurate to the best of our knowledge. However, since data, safety standards, and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control, Summit MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO THE COMPLETENESS OR CONTINUEING ACCURACY OF THE INFORMATION CONTAINED HEREIN AND DISCLAIMS ALL LIABILITY FOR RELIANCE THEREON. User should satisfy himself that he has all current data relevant to his particular use."

# Application of Steel Shield Technologies ABF Products to Military Ships, Vehicles, Aircrafts and Armored Equipment

Recommended Products to be Used: Strike Shield, Tool Shield, Steel Shield EPA, Marine Shield, Engine Shield, Transmission Shield, Truck Shield, Lithi-Shield Grease NLGI#2, Reel Shield Grease NLGI#1, others.



ACORD

**CERTIFICATE OF LIABILITY INSURANCE**

DATE (MM/DD/YYYY): 5/14/2014

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Best Insurance Agency
340 S. Main St., P.O. Box 670
Butler PA 16003-0670

CONTACT NAME: Jamie McDonald
PHONE (724) 283-5670 FAX (724) 283-1160
E-MAIL ADDRESS: jamie@bestinsurancebutler.com

INSURER(S) AFFORDING COVERAGE — NAIC #
INSURER A: Cincinnati Insurance Companies
INSURER B:
INSURER C:
INSURER D:
INSURER E:
INSURER F:

INSURED
Steel Shield Technologies Inc
3351 Industrial Blvd /
Bethel Park PA 15102

COVERAGES CERTIFICATE NUMBER: cos 2014 - 15 REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

| INSR LTR | TYPE OF INSURANCE | ADDL INSD | SUBR WVD | POLICY NUMBER | POLICY EFF (MM/DD/YYYY) | POLICY EXP (MM/DD/YYYY) | LIMITS |
|---|---|---|---|---|---|---|---|
| | GENERAL LIABILITY | | | | | | |
| | X COMMERCIAL GENERAL LIABILITY | | | | | | EACH OCCURRENCE $ 1,000,000 |
| A | CLAIMS-MADE X OCCUR | | | EHP04242014 | 4/24/2014 | 4/24/2015 | DAMAGE TO RENTED PREMISES (Ea occurrence) $ 100,000 |
| | | | | | | | MED EXP (Any one person) $ 5,000 |
| | | | | | | | PERSONAL & ADV INJURY $ 1,000,000 |
| | GEN'L AGGREGATE LIMIT APPLIES PER: | | | | | | GENERAL AGGREGATE $ 2,000,000 |
| | X POLICY PRO-JECT LOC | | | | | | PRODUCTS - COMP/OP AGG $ 2,000,000 |
| | | | | | | | $ |
| | AUTOMOBILE LIABILITY | | | | | | COMBINED SINGLE LIMIT (Ea accident) $ |
| | ANY AUTO | | | | | | BODILY INJURY (Per person) $ |
| | ALL OWNED AUTOS | SCHEDULED AUTOS | | | | | BODILY INJURY (Per accident) $ |
| | HIRED AUTOS | NON-OWNED AUTOS | | | | | PROPERTY DAMAGE (Per accident) $ |
| | | | | | | | $ |
| | X UMBRELLA LIAB | OCCUR | | | | | EACH OCCURRENCE $ 1,000,000 |
| A | EXCESS LIAB | CLAIMS-MADE | | EHP04242014 | 4/24/2014 | 4/24/2015 | AGGREGATE $ |
| | DED RETENTION $ | | | | | | $ |
| | WORKERS COMPENSATION AND EMPLOYERS' LIABILITY | | | | | | WC STATU-TORY LIMITS OTH-ER |
| | ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) | Y/N N/A | | | | | E.L. EACH ACCIDENT $ |
| | If yes, describe under DESCRIPTION OF OPERATIONS below | | | | | | E.L. DISEASE - EA EMPLOYEE $ |
| | | | | | | | E.L. DISEASE - POLICY LIMIT $ |

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

CERTIFICATE HOLDER
Steel Shield Technologies Inc.
3351 Industrial Blvd.
Bethel Park, PA 15102

CANCELLATION
SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.
AUTHORIZED REPRESENTATIVE

ACORD 25 (2010/05)
INS025 (2009/01)
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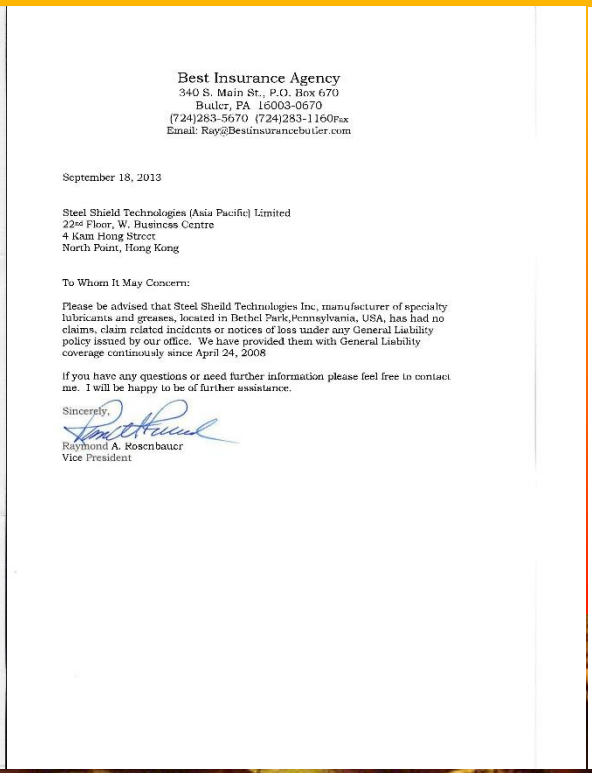


Best Insurance Agency
340 S. Main St., P.O. Box 670
Butler, PA 16003-0670
(724)283-5670 (724)283-1160Fax
Email: Ray@Bestinsurancebutler.com

September 18, 2013

Steel Shield Technologies (Asia Pacific) Limited
22nd Floor, W. Business Centre
4 Kam Hong Street
North Point, Hong Kong

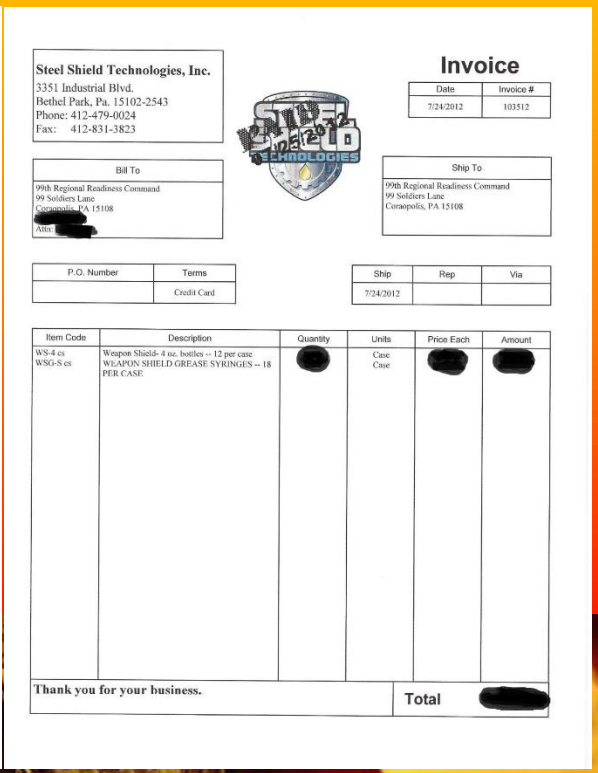
To Whom It May Concern:

Please be advised that Steel Sheild Technologies Inc, manufacturer of specialty lubricants and greases, located in Bethel Park,Pennsylvania, USA, has had no claims, claim related incidents or notices of loss under any General Liability policy issued by our office. We have provided them with General Liability coverage continously since April 24, 2008

If you have any questions or need further information please feel free to contact me. I will be happy to be of further assistance.

Sincerely,

Raymond A. Rosenbauer
Vice President



**Steel Shield Technologies, Inc.**
3351 Industrial Blvd.
Bethel Park, Pa. 15102-2543
Phone: 412-479-0024
Fax: 412-831-3823

**Invoice**

| Date | Invoice # |
|---|---|
| 7/24/2012 | 103512 |

Bill To
99th Regional Readiness Command
99 Soldiers Lane
Coraopolis, PA 15108
Attn: [redacted]

Ship To
99th Regional Readiness Command
99 Soldiers Lane
Coraopolis, PA 15108

| P.O. Number | Terms |
|---|---|
| | Credit Card |

| Ship | Rep | Via |
|---|---|---|
| 7/24/2012 | | |

| Item Code | Description | Quantity | Units | Price Each | Amount |
|---|---|---|---|---|---|
| WS-4 cs<br>WSG-S cs | Weapon Shield- 4 oz. bottles -- 12 per case<br>WEAPON SHIELD GREASE SYRINGES -- 18 PER CASE | [redacted] | Case<br>Case | [redacted] | [redacted] |

Thank you for your business.

Total [redacted]

# MSNs for the Steel Shield products added to EESOH-MIS

products for weapons, weapon systems and military equipment running under harsh conditions and environments

## US Air-Force Purchasing Items

NSN/LPN: 9150PHM00065498
MSN: 9150PHM00065498
CAGE: 4TXQ2
Trade Name: STEEL SHIELD WEAPON SHIELD METAL TREATMENT

NSN/LPN: 9150PHM00065496
MSN: 9150PHM00065496
CAGE: 4TXQ2
Trade Name: WSG-EP1, WEAPON-SHIELD EP #1 GREASE

NSN/LPN: 9150PHM00065584
MSN: 9150PHM00065584
CAGE: 4TXQ2
Trade Name: STEEL SHIELD ANTI-WEAR EP METAL TREATMENT

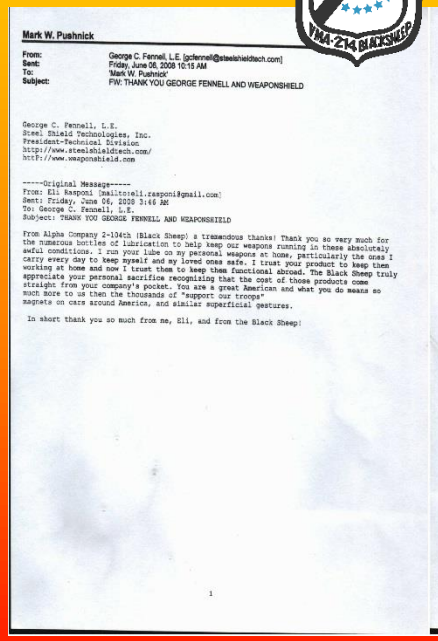
NSN/LPN: 9150PHM00065578
MSN: 9150PHM00065578
CAGE: 4TXQ2
Trade Name: LITHI-SHIELD EP #2 GREASE

NSN/LPN: 9150PHM00065587N
MSN: 9150PHM00065587
CAGE: 4TXQ2
Trade Name: STEEL SHIELD STRIKE SHIELD

SN/LPN: 9150PHM00065590
MSN: 9150PHM00065590
CAGE: 4TXQ2
Trade Name: STEEL SHIELD TOOL SHIELD

NSN/LPN: 9150PHM00065581
MSN: 9150PHM00065581
CAGE: 4TXQ2
Trade Name: STEEL SHIELD SPRAY SHIELD

# Compliments from the US Military



Mark W. Pushnick

**From:** George C. Fennell, L.E. [gcfennell@steelshieldtech.com]
**Sent:** Friday, June 06, 2008 10:15 AM
**To:** 'Mark W. Pushnick'
**Subject:** FW: THANK YOU GEORGE FENNELL AND WEAPONSHIELD

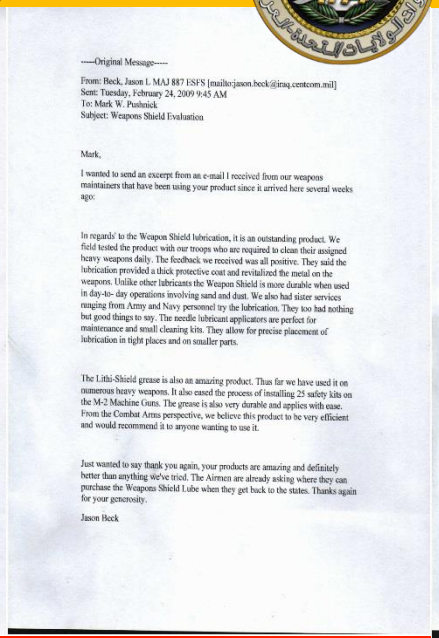
George C. Fennell, L.E.
Steel Shield Technologies, Inc.
President-Technical Division
http://www.steelshieldtech.com/
http://www.weaponshield.com

-----Original Message-----
From: Eli Rasponi [mailto:eli.rasponi@gmail.com]
Sent: Friday, June 06, 2008 3:46 AM
To: George C. Fennell, L.E.
Subject: THANK YOU GEORGE FENNELL AND WEAPONSHIELD

From Alpha Company 2-104th (Black Sheep) a tremendous thanks! Thank you so very much for the numerous bottles of lubrication to help keep our weapons running in these absolutely awful conditions. I run your lube on my personal weapons at home, particularly the ones I carry every day to keep myself and my loved ones safe. I trust your product to keep them working at home and now I trust them to keep them functional abroad. The Black Sheep truly appreciate your personal sacrifice recognizing that the cost of these products come straight from your company's pocket. You are a great American and what you do means so much more to us then the thousands of "support our troops" magnets on cars around America, and similar superficial gestures.

In short thank you so much from me, Eli, and from the Black Sheep!

1



-----Original Message-----

From: Beck, Jason I. MAJ 887 ESFS [mailto:jason.beck@iraq.centcom.mil]
Sent: Tuesday, February 24, 2009 9:45 AM
To: Mark W. Pushnick
Subject: Weapons Shield Evaluation

Mark,

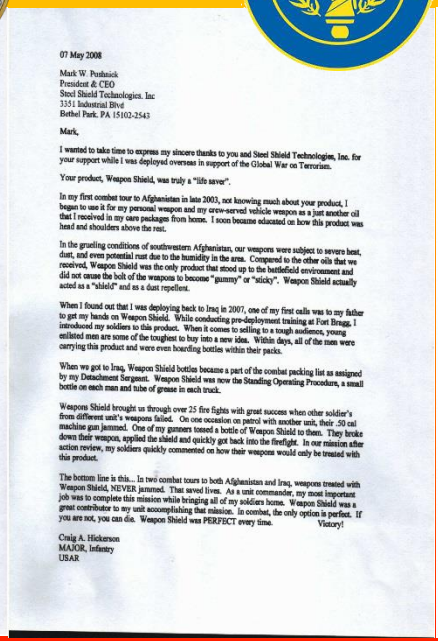
I wanted to send an excerpt from an e-mail I received from our weapons maintainers that have been using your product since it arrived here several weeks ago:

In regards' to the Weapon Shield lubrication, it is an outstanding product. We field tested the product with our troops who are required to clean their assigned heavy weapons daily. The feedback we received was all positive. They said the lubrication provided a thick protective coat and revitalized the metal on the weapons. Unlike other lubricants the Weapon Shield is more durable when used in day-to- day operations involving sand and dust. We also had sister services ranging from Army and Navy personnel try the lubrication. They too had nothing but good things to say. The needle lubricant applicators are perfect for maintenance and small cleaning kits. They allow for precise placement of lubrication in tight places and on smaller parts.

The Lithi-Shield grease is also an amazing product. Thus far we have used it on numerous heavy weapons. It also eased the process of installing 25 safety kits on the M-2 Machine Guns. The grease is also very durable and applies with ease. From the Combat Arms perspective, we believe this product to be very efficient and would recommend it to anyone wanting to use it.

Just wanted to say thank you again, your products are amazing and definitely better than anything we've tried. The Airmen are already asking where they can purchase the Weapons Shield Lube when they get back to the states. Thanks again for your generosity.

Jason Beck



07 May 2008

Mark W. Pushnick
President & CEO
Steel Shield Technologies, Inc
3351 Industrial Blvd
Bethel Park, PA 15102-2543

Mark,

I wanted to take time to express my sincere thanks to you and Steel Shield Technologies, Inc. for your support while I was deployed overseas in support of the Global War on Terrorism.

Your product, Weapon Shield, was truly a "life saver".

In my first combat tour to Afghanistan in late 2003, not knowing much about your product, I began to use it for my personal weapon and my crew-served vehicle weapon as a just another oil that I received in my care packages from home. I soon became educated on how this product was head and shoulders above the rest.

In the grueling conditions of southwestern Afghanistan, our weapons were subject to severe heat, dust, and even potential rust due to the humidity in the area. Compared to the other oils that we received, Weapon Shield was the only product that stood up to the battlefield environment and did not cause the bolt of the weapons to become "gummy" or "sticky". Weapon Shield actually acted as a "shield" and as a dust repellent.

When I found out that I was deploying back to Iraq in 2007, one of my first calls was to my father to get my hands on Weapon Shield. While conducting pre-deployment training at Fort Bragg, I introduced my soldiers to this product. When it comes to selling to a tough audience, young enlisted men are some of the toughest to buy into a new idea. Within days, all of the men were carrying this product and were even hoarding bottles within their packs.

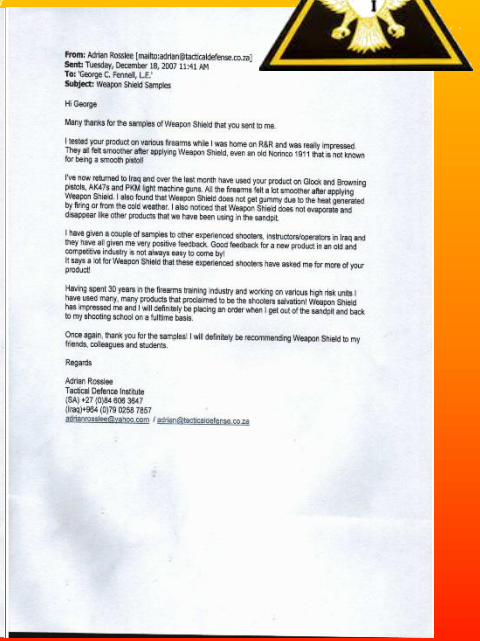
When we got to Iraq, Weapon Shield bottles became a part of the combat packing list as assigned by my Detachment Sergeant. Weapon Shield was now the Standing Operating Procedure, a small bottle on each man and tube of grease in each truck.

Weapon Shield brought us through over 25 fire fights with great success when other soldier's from different unit's weapons failed. On one occasion on patrol with another unit, their .50 cal machine gun jammed. One of my gunners tossed a bottle of Weapon Shield to them. They broke down their weapon, applied the shield and quickly got back into the firefight. In our mission after action review, my soldiers quickly commented on how their weapons would only be treated with this product.

The bottom line is this... In two combat tours to both Afghanistan and Iraq, weapons treated with Weapon Shield, NEVER jammed. That saved lives. As a unit commander, my most important job was to complete this mission while bringing all of my soldiers home. Weapon Shield was a great contributor to my unit accomplishing that mission. In combat, the only option is perfect. If you are not, you can die. Weapon Shield was PERFECT every time.

Victory!

Craig A. Hickerson
MAJOR, Infantry
USAR



**From:** Adrian Rossiee [mailto:adrian@tacticaldefense.co.za]
**Sent:** Tuesday, December 18, 2007 11:41 AM
**To:** 'George C. Fennell, L.E.'
**Subject:** Weapon Shield Samples

Hi George

Many thanks for the samples of Weapon Shield that you sent to me.

I tested your product on various firearms while I was home on R&R and was really impressed. They all felt smoother after applying Weapon Shield, even an old Norinco 1911 that is not known for being a smooth pistol!

I've now returned to Iraq and over the last month have used your product on Glock and Browning pistols, AK47's and PKM light machine guns. All the firearms felt a lot smoother after applying Weapon Shield. I also found that Weapon Shield does not get gummy due to the heat generated by firing or from the cold weather. I also noticed that Weapon Shield does not evaporate and disappear like other products that we have been using in the sandpit.

I have given a couple of samples to other experienced shooters, instructors/operators in Iraq and they have all given me very positive feedback. Good feedback for a new product in an old and competitive industry is not always easy to come by!
It says a lot for Weapon Shield that these experienced shooters have asked me for more of your product!

Having spent 30 years in the firearms training industry and working on various high risk units I have used many, many products that proclaimed to be the shooters salvation! Weapon Shield has impressed me and I will definitely be placing an order when I get out of the sandpit and back to my shooting school on a fulltime basis.

Once again, thank you for the samples! I will definitely be recommending Weapon Shield to my friends, colleagues and students.

Regards

Adrian Rossiee
Tactical Defence Institute
(SA) +27 (0)84 606 3647
(Iraq)+964 (0)79 0258 7857
adrianrossiee@yahoo.com / adrian@tacticaldefense.co.za

# Equipment and Recommended Applications

**Main Battle Tanks** - ( MBT 3000, Type 99, 98, 96, 90, 88, 85, 80, 79, 69, and Type 59, Chieftain, M48A5, M60A1, T62, 72, M113, AMX30, EE9, 11, MOWAG Roland, Waid, Leopard 2, 2A6/7, K2 Black Panther, M1A2 SEP, Challenger 2, Merkava Mk4, TK-X, Leclerc, T90, Oplot M, etc)

**Light/Amphibious Tanks** - ( ZTD-05, ZTL-05, ZBD-05, ZBD-2000, Type 63, Type 62, PT-76, MK-V, FV101, PL-01, M551 etc )

**Infantry Fighting Vehicles** - (WZ0001, ZBF-05, ZTD-05, ZTL-05, ZBD-04, ZBD-05, BK1050, Type 07, ZBD2000, ZLC2000, NGIFV, ZBD97, NVH-4, NVH-1, YW307, YW309, NFV-1, ZSL-93, Type 91 IFV, Type 90/92A/ZSL-92A, Type 92/ZSL-92, Type 90, Type 89, Type 86/WZ 501/WZ 501A/WZ 503/WZ 504, Puma, BMP-3, BMD, CV9030N, Commando MK3 APC, ATROM, M80-A, AMX-10, MLI-84, KTO, Abhay IFV, VCC-80, MIT 89 IFV etc)

**Armored Personnel Carriers** - ( 8M, CSVP4, CSVP3, WZ0001, ZTD05, ZTL-05, ZBD-04, ZBD-05, BK1050, Type 07, ZFB08, NGIFB, BK1990, Type 90, ZSD90, ZSL-93, ZSL-92, Type 89, YW309, NFV-1, Type 85, Type 81, Type 77, Type 63 )

**ATGM Carriers** - ( SW1, ZBD2000, WZ551, Type 89, WZ504, WZ550, Type 63, M1134, VBL Milan 010, 114 Hellfire etc )

**Light Armored Fighting Vehicles** - ( ZFB08, QL550, ZFB05, VN3, M95 Degman, Tiger Kader, Super Sherman, DAF M39 etc )

**All types of Naval Warships** – Aircraft Carrier, Submarines (Ballistic Missile, Nuclear-Powered Attack, Guided Missile), Surface Combatants (Cruisers, Destroyers & Frigates), Amphibious Warfare Ships, Logistics/Support and Mine Warfare Ships, Combat Ships, Maritime Prepositioning Warfare Ships,

# Products and Application


Further categories include the following: All Rocket Artillery Vehicles, Gun Artillery Vehicles, Anti-Tank Gun Vehicles, Anti-Aircraft Munitions Vehicles, Auto-cannon Vehicles, Surface-to-Air Launcher Vehicles and All Non-Combat/Combat Support Vehicles and Trucks.

**All types of Engines** - Use Engine Shield in a 2 ounce per quart ratio, added directly to engine oil. For example, if the motor contains 30 quarts of motor oil, then add 60 ounces (2 oz x 30 quarts ) of Engine Shield directly to the motor oil. No oil removal for displacement purposes is necessary.

**Transmissions/Gear Box** - Use Transmission Shield in a 1 ounce per quart ratio, added directly to the transmission. Example: if the transmission contains 30 quarts of transmission fluid, then add 30 ounces (1 oz x 30 quarts ) of Transmission Shield to the transmission, automatic and manual types alike. No oil removal for displacement purposes is necessary.

**Tank Track/Tread Rollers and Grease Fitting Bearings** - Replace standard and specialty use grease with Lithi-Shield Grease in all bearing and grease fitting applications.

**Armament and Weaponry** - See separate usage paper for Weapon Shield, Weapon Shield Solvent, and Weapon Shield Grease.

Permeate into extremely rusted metal parts

Reduce operation and maintenance costs

Lubricating, cleaning, dispersing moisture, dedusting, fully terminate rusting

Achieve highly smooth, durable and silence operations

## MSDS DATA

- Flash point: 61℃ PMCC (Pensky –Martens closed-cup test)
- Non-hazardous
- Combustible
- Synthetic hydrocarbons
- Do not store or expose above 61℃
- Do not spray near sparks or open flames
- If swallowed, do not induce vomiting and call a physician immediately
- In case of contact with eyes, flush thoroughly with water for 15 minutes
- Avoid breathing of vapor and prolonged contact with skin
- Contains petroleum aliphatic hydrocarbons

## PHYSICAL DATA

- Boiling point: 186 - 201℃
- Evaporation rate: < 0.01
- Specific gravity: 1.02
- Insoluble in water
- Vapor pressure: < 1@25℃
- Light to dark amber

## RECOMMENDED USED

- Frozen or scaled nuts and bolts
- Sticky locks
- Squeaky hinges
- Sliding doors
- Linkages
- Shafts
- Bushings
- Sliding parts and mechanisms

## APPLICATION DIRECTIONS

- Apply Strike Shield on surfaces that require penetrating and lubricating oil. Reapplication may be necessary on extremely rusted and corroded conditions.

**STRIKE SHIELD™ is the ultimate penetrant to rapidly pierce rusted and corroded metal surfaces using a distinctive spreading action to break loose frozen mechanisms while at the same time applying an advanced lubricating film to the surfaces of the metal delivering the highest quality lubrication available in penetrating oil.**

**It leaves a unique layer of film on surfaces that prevents rust and corrosion along with driving out and dispersing moisture on ignition wires, electrical contacts, circuit boards and other electrical connections to provide protection against future corrosion in extremely tough conditions**

| ITEM NO. | ITEM UPC# | ITEM DESCRIPTIONS | CASE PACK | CASE DIMENSIONS (W x H x D) | CASE CUBE | CASE WEIGHT | TI/HI |
|---|---|---|---|---|---|---|---|
| STKS-4WS | 8-94630-00104-5 | Strike Shield – 4 oz. (118 mL) | 12 | 6.625”X 7”X 5” | 4 inch³ | 0.13 lb | 56 / 7 |
| STKS-16WS | 8-94630-00105-2 | Strike Shield – 16 oz. (473 mL) | 12 | 10.125”X 10”X 7.625” | 14 inch³ | 0.44 lb | 20 / 5 |
| STKS-128 | 8-94630-00109-0 | Strike Shield – 1 Gallon (3.785 mL) | 4 | 15.625”X 11.875”X 8.125” | 33.5 inch³ | 0.17 lb | 12 / 4 |
| STKS-5G | | Strike Shield – 5 Gallon (18.93 L) | 1 | | 42.5 inch³ | | |
| STKS-15G | | Strike Shield – 15 Gallon (56.78 L) | 1 | | 126.5 inch³ | | |

Lubricating, dispersing moisture, dedusting


Protect components, fully terminate rusting

Reduce operation and maintenance costs

## MSDS DATA

- Flash Point: 226℃
- Non-flammable
- Non-hazardous
- Synthetic Hydrocarbons

## PHYSICAL DATA

- Boiling point: 238℃
- Evaporation rate: < 0.01
- Specific gravity: 1.07
- Insoluble in water
- Vapor pressure: < 1@25℃
- Medium to dark amber

## RECOMMENDED USES

- Metal mechanisms
- Metal-to-metal surfaces
- Chain drives
- Drag lines
- Bushings
- Pulleys
- Hinges
- Tools
- Sleeve bearings
- Steel cables
- Couplings
- Linkages
- Wheels
- Augers
- Rusty nuts & bolts
- Any automotive, industrial or commercial areas of lubrication that require an external heavy-duty spray lubricant for accessible and

## APPLICATION DIRECTIONS

- Apply Spray Shield to surfaces requiring lubrication. Reapplication may be necessary for extremely rusted or corroded situations.
- Contains NO volatiles or solvents.
- Contains synthetic hydrocarbons and advanced chemical additive technology.

**SPRAY SHIELD™ is the ultimate multi-purpose lubricant that also penetrates metal surfaces while maintaining highest qualities in corrosive and extreme humidity environments. It penetrates into remote areas and delivers long-lasting lubrication in many different applications.**
**SPRAY SHIELD™ works quickly to provide excellent protection and long-lasting lubrication.**

| ITEM NO. | ITEM UPC# | ITEM DESCRIPTIONS | CASE PACK | CASE DIMENSIONS (W x H x D) | CASE CUBE | CASE WEIGHT | TI/HI |
|---|---|---|---|---|---|---|---|
| SS-1 | 8-94630-00146-5 | Spray Shield – 1 oz. (29.5 mL) | 24 | 6.875” X 3.875” X 4.625” | 0.07 inch³ | 2.5 lb | 48 / 12 |
| SS-4 | 8-94630-00148-9 | Spray Shield – 4 oz. (118 mL) | 12 | 5.5” X 7” X 7.125” | 0.16 inch³ | 3.8 lb | 40 / 8 |
| SS-16 | 8-94630-00149-6 | Spray Shield – 16 oz. (473 mL) | 12 | 10.75” X 10.75” X 8” | 0.54 inch³ | 15 lb | 20 / 5 |
| SS-128 | 8-94630-00150-2 | Spray Shield – 1 Gallon (3.785 L) | 4 | 9.25” X 12.5” X 14.5” | 0.97 inch³ | 34 lb | 12 / 4 |
| SS-5G | 8-94630-00129- | Spray Shield – 5 Gallon (18.93 | 1 | | | 42 lb | |

## MSDS DATA

- Flash Point: 226℃
- Non-flammable
- Non-hazardous
- Synthetic Hydrocarbons

## PHYSICAL DATA

- Boiling point: 238℃
- Evaporation rate: < 0.01
- Specific gravity: 1.07
- Insoluble in water
- Vapor pressure: < 1@25℃
- Medium to dark amber

## RECOMMENDED USES

- Rotary-type air tools
- Piston-types air tools
- Impact wrenches
- Air ratchets
- Air sanders
- Air drills
- Air cutting tools
- Air grinders
- Air nailers
- Air staplers
- Automatic oilers
- Hand tools

## APPLICATION DIRECTIONS

- Use in accordance with tool manufacturers' instructions.
- Tools may need to be lubricated daily, or several times a day, depending on the frequency and prolonged use of the tool.
- Contains NO volatiles or solvents.
- Contains synthetic hydrocarbons and advanced chemical additive technology. Non-toxic and environmentally friendly.

Greatly increase the metal surface hardness

Reduce friction, lower temperature, prevent oxidation of metal


Increase efficiencies of tools; Reduced maintenance cost

Achieve highly smooth, durable and silence operations

**TOOL SHIELD™ is the ultimate protection for the moving metal parts for automotive and industrial tools. It protects moving metal parts from heat, friction & wear due to boundary conditions of frictional abrasion, extreme pressure torque, air line moisture and internal dirt. It works in all piston and rotary type air tools, stationary and hand-held power tools and many hand tools.**
**Increased power and performance and greatly reduced wear while removing dirt from tool are the results.**

| ITEM NO. | ITEM UPC# | ITEM DESCRIPTIONS | CASE PACK | CASE DIMENSIONS (W x H x D) | CASE CUBE | CASE WEIGHT | TI / HI |
|---|---|---|---|---|---|---|---|
| TS-1 | 8-94630-00141-0 | Tool Shield – 1 oz. (29.5 mL) | 24 | 6.875”X 3.875”X 4.625” | 0.07 inch³ | 2.5 lb | 48 / 12 |
| TS-4 | 8-94630-00143-4 | Tool Shield – 4 oz. (118 mL) | 12 | 5.5”X 6.5”X 7.125” | 0.16 inch³ | 3.8 lb | 40 / 8 |
| TS-16 | 8-94630-00144-1 | Tool Shield – 16 oz. (473 mL) | 12 | 10.75 X 10.75 X 8 | 0.54 inch³ | 15 lb | 20 / 5 |
| TS-128 | 8-94630-00145-8 | Tool Shield – 1 Gallon (3.785 L) | 4 | 9.25 X 12.5 X 14.5 | 0.97 inch³ | 34 lb | 12 / 4 |
| TS-5G | 8-94630-00126-7 | Tool Shield – 5 Gallon (18.93 L) | 1 | | | 42 lb | |
| TS-15G | 8-94630-00127-4 | Tool Shield – 1 Gallon (56.78 L) | 1 | | | 125 lb | |

## MSDS DATA

- Flash Point: 226℃
- Non-flammable
- Non-hazardous
- Synthetic Hydrocarbons

## PHYSICAL DATA

- Boiling point: 238℃
- Evaporation rate: < 0.01
- Specific gravity: 1.07
- Insoluble in water
- Vapor pressure: < 1@25℃
- Medium to dark amber

## RECOMMENDED USES

- Direct cutting lube / coolant
- Additive to improve performance of insoluble oils
- Drilling
- Taping
- Machining
- Milling
- CNC
- Broaching
- Sharpening
- Wet grinding

## APPLICATION DIRECTIONS

- Drill & Tap Shield™ can be used as a direct replacement for currently used cutting fluids and lubrication / coolants in a 100% undiluted application.
  NOTE: Drill & Tap Shield™ is not compatible with water glycol compounds or triphenol butylated phosphate oils.
- Contains NO volatiles or solvents.
- Contains synthetic hydrocarbons and advanced chemical additive


## Engineering REBUILDING & MAINTENANCE:

DRILL & TAP SHIELD™ in Axle Grinder / Finisher – Axle-End Thread Tapping:

When used as the lubricant / coolant for axle grinding and finishing machines, DRILL & TAP SHIELD will provide improved final finishes of the axles, threads and holes to well within specified tolerances, which in some cases, were unachievable otherwise.

| ITEM NO. | ITEM UPC# | ITEM DESCRIPTIONS | CASE PACK | CASE DIMENSIONS (W x H x D) | CASE CUBE | CASE WEIGHT | TI/HI |
|---|---|---|---|---|---|---|---|
| DTS-1 | 8-94630-00171-7 | Drill & Tap Shield – 1 oz. (29.5 mL) | 24 | 6.875”X 3.875”X 4.625” | 0.07 inch³ | 2.5 lb | 48 / 12 |
| DTS-4 | 8-94630-00172-4 | Drill & Tap Shield – 4 oz. (118 mL) | 12 | 5.5”X 7”X 7.125” | 0.16 inch³ | 3.8 lb | 40 / 8 |
| DTS-16 | 8-94630-00173-1 | Drill & Tap Shield – 16 oz. (473 mL) | 12 | 10.75”X 10.75”X 8” | 0.54 inch³ | 15 lb | 20 / 5 |
| DTS-128 | 8-94630-00174-8 | Drill & Tap Shield – 1 Gallon (3.785 L) | 4 | 9.25”X 12.5”X 14.5” | 0.97 inch³ | 34 lb | 12 / 4 |
| DTS-5G | 8-94630-00175- | Drill & Tap Shield – 5 Gallon | 1 | | | 42 lb | |

# MARINE SHIELD

## The Ultimate Protection Against Metal-To-Metal Wear

STEEL SHIELD™ TECHNOLOGIES

MARINE SHIELD™


MARINE SHIELD™

### Setting The Standards In Anti-Wear & Extreme Pressure Through ABF Technology

**MARINE SHIELD™** is the ultimate protection for the moving metal parts in your engine and transmission. Utilizing the most Advanced Boundary Film (ABF) Technology, it protects moving metal parts from wear and damage due to boundary conditions of frictional abrasion, extreme pressure torque, dry startup and engine shutdown. Other benefits include increased fuel savings due to reduced friction and increased oil flow, reduced maintenance and downtime, extended engine parts longevity and reduced operating temperatures an average of 30 to 50 Fahrenheit degrees.

ABF TECHNOLOGY™

### ATTRIBUTES

- Protects Moving Metal Parts
- Extends Engine And Transmission Life
- Dramatically Reduces Wear
- Improves Fuel Mileage
- Increases Horsepower
- Improves Lubrication
- Reduces Maintenance
- Reduces Friction
- Improves Oil Flow
- Protects Gasoline or Diesel Engines

MARINE SHIELD™


MARINE SHIELD™

Greatly increase the metal surface hardness

Reduce friction, lower temperature, prevent oxidation of metal

Achieve highly smooth, durable and silence operations

Reduce operation and maintenance costs; Increase power and save energy

## MSDS DATA

- Flash Point: 226℃
- Non-flammable
- Non-hazardous
- Synthetic Hydrocarbons

## PHYSICAL DATA

- Boiling point: 238℃
- Evaporation rate: < 0.01
- Specific gravity: 1.07
- Insoluble in water
- Vapor pressure: < 1@25℃
- Medium to dark amber

## PERFORMANCE DATA

- Reduced wear
- Increased horsepower
- Reduces costly repairs
- Reduces operating temperature
- Increases fuel savings
- Reduces friction
- Improves oil flow
- Reduces maintenance
- Increased engine and transmission life
- Reduces metal debris in oil
- Smoother shifting

## APPLICATION DIRECTIONS

- Turn off the engine. Remove the oil filler and add 16:1 Marine Shield. Use at every oil change for maximum performance.
- Add 32:1 Marine Shield to the transmission system.
- Contains NO volatiles or solvents.
- Contains synthetic hydrocarbons and advanced chemical additive technology. Non-toxic and environmentally friendly.

MARINE SHIELD™ is the ultimate protection for the moving metal parts in engines, turbines, compressors, transmission etc on naval & seagoing ships.

Fuel saves due to 70% reduction of frictions and damages in cold starts, high pressure and high torque applications. Maintenance, downtime reduced, increase oil flow and efficiency, extended engine parts longevity and reduced operating temperatures on average by 30 ~ 50°F.

| ITEM NO. | ITEM UPC# | ITEM DESCRIPTIONS | CASE PACK | CASE DIMENSIONS (W x H x D) | CASE CUBE | CASE WEIGHT | TI / HI |
|---|---|---|---|---|---|---|---|
| MS-MT-8 | 8-94630-00121-2 | Marine Shield – 8 oz. (236 mL) | 12 | 8.75”X 8”X 8” | 0.33 inch³ | 7.5 lb | 25 / 7 |
| MS-MT-32 | 8-94630-00122-9 | Marine Shield – 32 oz. (946 mL) | 12 | 9”X 9.5”X 14.375” | 0.71 inch³ | 28.8 lb | 12 / 5 |
| MS-MT-128 | 8-94630-00123-6 | Marine Shield – 1 Gallon (3.785 L) | 4 | 9.5”X 12.5”X 14.5” | 0.99 inch³ | 33.6 lb | 12 / 4 |


## Lithi-Shield Lithium Complex Grease #2

**PRODUCT DATA SHEET**

**PRODUCT TYPE:** Lithi-Shield #2

**NLGI GRADE:** 2

| ASTM METHOD | | Typical Results |
|---|---|---|
| D-217 | Penetration, Worked, 60 s | 265 - 295 |
| D-217 | Penetration, Unworked | 265 - 295 |
| | Thickener Type | Lithium Complex |
| D-128 | Thickener % | 8 - 11 |
| | Color | Light Amber |
| | Texture | Smooth |
| D-2265 | Dropping Point °F, Min. | 500 |
| D-445 | Viscosity @ 40°F, cst | 220 |
| D-445 | Viscosity @ 100°F, cst | 19 |
| D-2270 | Viscosity Index | 95 |
| D-92 | Flash Point - °F | 464 |
| D-92 | Fire Point - °F | 550 |
| D-2509 | Timken OK Load – Lbs. | 60 |
| D-1743 | Rust | Pass |
| D-4048 | Copper Corrosion | 1B |
| D-2596 | 4 Ball EP Weld, kg Min. | 800 |
| D-2266 | Four Ball Wear, mm. | 0.68 |
| D-5483 | Oxidation Induction Time at 210°C, min. | 11.47 |

US Steel Mobility Test

Mobility at 77 F, g/min: 576
Mobility at 60 F, g/min: 275.4
Mobility at 40 F, g/min: 86.6
Mobility at 20 F, g/min: 15.3
Mobility at 0 F, g/min: 1.6

## PRODUCT SPECIFICATIONS

- NLGI Grade: No. 2
- Color: Light amber
- Thickener type: Lithium complex
- Anti-wear metal treatment: Steel Shield EPA

## ASTM TESTS

| | | |
|---|---|---|
| • D-2265 | Dropping point | 556°F |
| • D-2266 | 4-Ball wear test | 0.66mm |
| • D-2596 | 4-Ball weld test | 800Kg / Pass |
| • D-2509 | Timken OK load (lbs) | 60 |
| • D-5483 | Oxidation Resistance, Induction time @210℃, min | 11.47 |
| • D-1264 | Water washout @ 79℃ | 2.7 % |

## RECOMMENDED USED

- All extreme pressure applications
- Universal joints
- Rotating machinery
- Heavy equipment
- Railroad equipment
- Boat trailers and marine applications
- Conveyors
- Bearings
- Chassis fittings
- Pumps
- CV joints
- Axies

Greatly increase the metal surface hardness

Reduce friction, temperature, prevent oxidation of metal


Achieve highly smooth, durable and silence operations

Reduce operation and maintenance costs

LITHI-SHIELD™ is the ultimate in extreme pressure anti-wear lithium complex grease. It exceeds all other lithium complex greases due to the addition of Advanced Boundary Film (ABF) Technology, extreme pressure and antifriction additives added to its formula.

LITHI-SHIELD™ treats, seals and smooths metal surfaces to dramatically reduce friction, and as well as friction related heat and wear, and prevents oxidations. It's unique formulation allows it to exceed the performance of other greases while using smaller quantities.

| ITEM NO. | ITEM UPC# | ITEM DESCRIPTIONS | CASE PACK | CASE DIMENSIONS (W x H x D) | CASE CUBE | CASE WEIGHT | TI / HI |
|---|---|---|---|---|---|---|---|
| LS-T | 8-94630-00181-6 | Lithi-Shield Lithium Complex Grease – 59.14 mL/Case | 24 | 9.25"X 6.5"X 4.75" | 0.16 inch³ | 1.9 lb | 40 / 8 |
| LS-C | 8-94630-00182-3 | Lithi-Shield Lithium Complex Grease – 414 mL/Case | 40 | 12"X 10.75"X 19.5" | 1.45 inch³ | 42 lb | 6 / 5 |
| LS-LB | 8-94630-00183-0 | Lithi-Shield Lithium Complex Grease – 473 mL/Case | 12 | 13.5"X 6.25"X 3.5" | 0.17 inch³ | 15.2 lb | 36 / 8 |
| LS-5LB | 8-94630-00184-7 | Lithi-Shield Lithium Complex Grease – 2.365 L/Case | 4 | 14.125"X 6.75"X 9.5" | 0.53 inch³ | 23.4 lb | 12 / 8 |
| LS-P | 8-94630-00185-4 | Lithi-Shield Lithium Complex Grease – 16.5 | 1 | | | 38 lb | |

CONFIDENTIAL

# MATERIAL SAFETY DATA SHEET


ADDRESS: Steel Shield Technologies, Inc.
3351 Industrial Blvd
Bethel Park, PA 15102


## PRODUCT IDENTIFICATION

| Product Name | Code No. |
|---|---|
| Lithi-Shield EP #2 Grease | LSG-EP2 |

Emergency Phone Number (s)
Business: (412) 479-0024
Other: (412) 831-3823 – Fax

Chemical Name: Lithium Hydroxy-Stearate Lubricating Grease

Date: November 16, 2006

Synonyms: #2 EP Lithium Complex

Chemical Family: Hydrocarbon

## INGREDIENTS

| MATERIALS OR COMPONENTS | % W | CAS NUMBER | CARCINOGIN OSHA OR IARC |
|---|---|---|---|
| Lithium Hydroxy-Stearate (Soap) | 10 | | |
| Mineral Oil | 80 | | |
| Zinc Oxide | 5 | | |
| Steel Shield EPA | 5 | | |

SUPP INFO.: Non Restricted

## PHYSICAL PROPERTIES

| Boiling Point / Range | Melting Point | Freezing Point | Molecular Weight (Calculated) |
|---|---|---|---|
| °C >700 °F | °C N/A °F | N/A °C °F | N/A |

| Specific Gravity (H2O=1) | Vapor Pressure (mm Hg) | Vapor Density (Air=1) |
|---|---|---|
| @ 0.88 / 16 °C | N/A @ °C °F | N/A |

| Solubility in H2O | % Volatiles By Volume | Evaporation Rate | Appearance and Odor | Other |
|---|---|---|---|---|
| Nil | 0 | N/A ☐ Ether=1 ☐ Water=1 ☐ Butylacetate=1 | Light Amber - Bland | |

## FIRE AND EXPLOSION DATA

| Flash Point | Test Method | Flammable Limits | Autoignition Temperature/Fire Point |
|---|---|---|---|
| °C 495°F | D-92 | **Not Established** Lower % Upper % | °C 550°F |

EXTINGUISHING MEDIA
☐ Water-Spray ☒ Water-Fog ☐ Water-Stream ☒ CO2 ☒ Dry Chemical ☐ Alcohol Foam ☒ Foam ☒ Earth or Sand

SPECIAL FIRE FIGHTING PROCEDURES
☐ Do Not Enter Building ☐ Allow Fire To Burn ☒ Water May Cause Frothing ☐ Do Not Use Water

UNUSUAL FIRE AND EXPLOSION HAZARDS
☐ Dust Explosion Hazard ☐ Sensitive To Shock ☐ Contamination ☐ Temperature ☐ Other (Specify): None

## REACTIVITY DATA

STABILITY
☒ Stable ☐ Unstable

CONDITIONS CONTRIBUTING TO INSTABILITY
☐ Thermal Decomposition ☐ Photo Degradation ☐ Polymerization ☐ Contamination

INCOMPATIBILITY – AVOID CONTACT WITH
☐ Strong Acids ☐ Strong Alkalis ☒ Strong Oxidizers ☐ Other (Specify):

HAZARDOUS DECOMPOSTION PRODUCTS – THERMAL AND OTHER (LIST)
Oxides of Carbon, Sulfur and Nitrogen if burned.

CONDITIONS TO AVOID
☐ Heat ☒ Open Flames ☐ Sparks ☐ Ignition Sources ☐ Other (Specify):

## SPILL OR LEAK

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED
☐ Flush With Water ☒ Absorb With Sand Or Inert Material ☐ Neutralize ☒ Sweep Or Scoop Up And Remove
☐ Keep Upwind. Evacuate Enclosed Spaces ☐ Prevent Spread Or Spill ☐ Dispose of Immediately ☐ Other (Specify:

WASTE DISPOSAL METHOD – *CONSULT FEDERAL, STATE, OR LOCAL AUTHORITIES FOR PROPER DISPOSAL PROCEDURES*
Incinerate

Before using product, read and follow directions and precautions on product label and bulletins.

Product Name: #2 EP Lithium Complex — Code No.: LS-973

## TOXICITY

CONDITIONS TO AVOID Excessive skin contact

PRIMARY ROUTES OF ENTRY
☐ INHALATION ☒ SKIN CONTACT ☐ OTHER (SPECIFY):

Products of this type have been used for years with no known ill effects. This product contains no carcinogens or mutagens as defined by OSHA or IARC. All components are listed on the TSCA, and EINECS Inventories. This Product contains no controlled substance under WHMIS.

**SARA Title III, Section 313, Reportable Quantities:**

| Compound | CAS# | % Wt. |
|---|---|---|

**WHMIS Ingredient Disclosure, Reportable Quantities:**

| Compound | CAS# | % Wt. |
|---|---|---|

## HEALTH HAZARD INFORMATION

### EFFECTS OF EXPOSURE

PERMISSIBLE EXPOSURE LIMIT (SPECIFY IF TLV/TWA OR CEILING © ) OTHER:
ACGIH 20 hrs. TWA | OSHA 2004 None Established |

IRRITATION
☒ SKIN ☐ SEVERE ☐ MODERATE ☒ MILD (TRANSIENT)
☒ EYE ☐ SEVERE ☐ MODERATE ☒ MILD (TRANSIENT)

CORROSIVITY
☐ SKIN ☐ 4 HRS. (DOT) ☐ 24 HRS. (CPSC)
☐ EYE ☐ MAY CAUSE BLINDNESS ☒ NOT CORROSIVE

SENSITIZATION
☐ SKIN ☐ RESPIRATORY ☒ NONE

INHALATION EFFECTS **N/A**
☐ NARCOTIC EFFECT ☐ CYANOSIS ☐ ASPHYXIANT

LUNG EFFECTS (SPECIFY)
N/A

OTHER (SPECIFY)
☐ REPEATED CONTACT-SKIN DEFATTER ☐ OTHER (SPECIFY): None

### EMERGENCY FIRST AID

INGESTION
☐ INDUCE VOMITING ☒ **DO NOT** INDUCE VOMITING ☐ GIVE PLENTY OF WATER ☒ GET MEDICAL ATTENTION ☐ OTHER (SPEICFY):

DERMAL
☒ FLUSH WITH SOAP AND WATER ☐ GET MEDICAL ATTENTION ☒ CONTAMINATED CLOTHING – REMOVE AND LAUNDER
☐ CONTAMINATED SHOES – DESTROY ☐ OTHER (SPECIFY):

EYE CONTACT
☒ FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MIN. ☒ GET MEDICAL ATTENTION ☐ OTHER (SPECIFY):

INHALATION
☐ REMOVE TO FRESH AIR ☐ IF NOT BREATHING, GIVE ARTIFICAL RESPIRATION ☐ GIVE OXYGEN
☐ GET MEDICAL ATTENTION ☐ OTHER (SPECIFY): N/A

## SPECIAL PROTECTION INFORMATION

VENTILATION REQUIREMENTS – *Always maintain exposure below permissible exposure limits*
☐ CONSULT AN INDUSTRIAL HYGIENIST OR ENVIRONMENTAL HEALTH SPECIALIST ☐ LOCAL EXHAUST
☒ USE WITH ADEQUATE VENTILATION ☐ CHECK FOR AIR CONTAMINANT AND OXYGEN DEFICIENCY ☐ OTHER (SPECIFY):

EYE SHIELD
☐ FACE SHIELD
☒ SAFETY GLASSES ☐ GOGGLES

HAND (GLOVE TYPE)
☐ BUTYL RUBBER ☒ POLYVINYL ALCOHOL ☐ OTHER (SPECIFY):
☐ POLYVINYL CHLORIDE ☒ NEOPRENE ☐ NATURAL RUBBER ☒ POLY-ETHYLENE

RESPIRATOR TYPE – *Use only NIOSH / MESA approved equipment*
☐ SELF-CONTAINED ☐ SUPPLIED AIR ☐ CAN OR CARTRIDGE GAS OR VAPOR ☐ FILTER-DUST, FUME, MIST
☐ OTHER (SPECIFY): N/A

OTHER PROTECTIVE EQUIPMENT
☐ RUBBER BOOTS ☐ APRON ☐ OTHER (SPECIFY): None

## SPECIAL PRECAUTIONS

PRECAUTIONARY NOTES
☒ WASH THOROUGHLY AFTER HANDLING ☒ DO NOT GET IN EYES OR ON CLOTHING ☐ DO NOT BREATH DUST, VAPOR, MIST, GAS ☐ KEEP CONTAINER CLOSED ☒ KEEP AWAY FROM SPARKS, AND OPEN FLAMES ☐ STORE IN TIGHTLY CLOSED CONTAINER
☐ DO NOT STORE NEAR COMBUSTIBLES ☐ KEEP FROM CONTACT WITH CLOTHING AND OTHER COMBUSTIBLE MATERIALS ☐ EMPTY CONTAINER MAY CONTAIN HAZARDOUS RESIDUE ☐ USE EXPLOSION PROOF EQUIPMENT ☐ OTHER (SPECIFY):

OTHER HANDLING AND STORAGE CONDITIONS None

| PREPARED BY | DATE | ADDRESS | PHONE |
|---|---|---|---|

PLEASE NOTE: "The above information is accurate to the best of our knowledge. However, since data, safety standards, and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control, Summit MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO THE COMPLETENESS OR CONTINUEING ACCURACY OF THE INFORMATION CONTAINED HEREIN AND DISCLAIMS ALL LIABILITY FOR RELIANCE THEREON. User should satisfy himself that he has all current data relevant to his particular use."

ENGINE SHIELD

# The Ultimate Protection Against Metal-To-Metal Wear

STEEL SHIELD TECHNOLOGIES

ENGINE SHIELD™


ENGINE SHIELD™

## Setting The Standards In Anti-Wear & Extreme Pressure Through ABF Technology

**ENGINE SHIELD™** is the ultimate protection for the moving metal parts in your engine. Utilizing the most Advanced Boundary Film (ABF) Technology, it protects moving metal parts from wear and damage due to boundary conditions of frictional abrasion, extreme pressure torque, dry startup and engine shutdown. Other benefits include increased fuel savings due to reduced friction and increased oil flow, reduced maintenance and downtime, extended engine parts longevity and reduced operating temperatures an average of 30 to 50 Fahrenheit degrees.

ABF TECHNOLOGY

## ATTRIBUTES

- Protects Moving Metal Parts
- Extends Engine And Parts Life
- Dramatically Reduces Wear
- Improves Fuel Mileage
- Increases Horsepower
- Improves Lubrication
- Reduces Maintenance
- Reduces Friction
- Improves Oil Flow
- Protects Gasoline or Diesel Engines.

ENGINE SHIELD™

ENGINE SHIELD™

ABF TECHNOLOGY

**Steel Shield Technologies'** mechanism of operation is based upon advanced methods of Tribology that improve lubricity and load carrying capacity. This, in turn, improves surface characteristics while simultaneously creating a stable chemical **Advanced Boundary Film** on the contacting metal surfaces of whatever equipment in which it is added. The process of **Advanced Boundary Film** formation is achieved through a unique combination of long-chain halogenated hydrocarbons and other proprietary additives that are highly stable and non-corrosive to the equipment's metal parts, and pose no threat to the environment or waste oil recovery systems. **Steel Shield** reacts chemically, under thermal conditions with the contacting metal surfaces, to form a complex surface-attaching film of protection. **Steel Shield's** characteristics are "electro-negative", which causes it to seek out and affix itself to the metallic surface areas. During this process, surface smoothing is accomplished, resulting in improved spread characteristics of the surfaces themselves. The final state of the opposing metal surfaces increases the fluid film strength even more, resulting in greatly reduced wear while imparting extreme pressure (EP) properties to the opposing metal surfaces. The result is a virtual elimination of frictional wear and significant cooling of the entire lubricated area yielding higher energy savings and reduced metallic debris and acids in the oil. This is extensively proven through elemental oil analysis and Ferrography of the used oil, before and after the use of **Steel Shield's Advanced Boundary Film Technology.**

## MSDS DATA

- Flash Point : 226˚C
- Non-Hazardous
- Non-Flammable
- Synthetic Hydrocarbons

## PHYSICAL DATA

- Boiling Point : 238˚C
- Evaporation Rate : < 0.01
- Specific Gravity : 1.07
- Insoluble In Water
- Vapor Pressure : <1@25˚C
- Medium To Dark Amber

## PERFORMANCE

- Reduces Wear
- Increases Horsepower
- Reduces Costly Repairs
- Reduces Operating Temperatures
- Increases Fuel Savings
- Reduces Friction
- Improves Oil Flow
- Reduces Maintenance
- Increases Engine Life
- Reduces Metal Debris In Oil

DIRECTIONS

Remove the oil filler cap and add one 8 ounce bottle of Engine Shield™ to engine while running. For larger engines, add 2 ounces of Engine Shield™ per quart of oil. Use at every oil change for maximum performance.
Contains no volatiles or solvents. Contains synthetic hydrocarbons and advanced chemical additive technology. Non-toxic and environmentally friendly.

| ITEM NUMBER | ITEM UPC# | ITEM DESCRIPTION | CASE PACK | CASE DIMENSIONS | CASE CUBE | CASE WEIGHT | TI/HI |
|---|---|---|---|---|---|---|---|
| ES-MT-8 | 8-94630-00101-4 | Engine Shield Metal Treatment - 8 oz. | 12 | 8.75"w x 8"H x 8"D | .33 | 7.50 | 25/7 |

# TRANSMISSION SHIELD

## The Ultimate Protection Against Metal-To-Metal Wear

STEEL SHIELD™ TECHNOLOGIES


TRANSMISSION SHIELD™

### Setting The Standards In Anti-Wear & Extreme Pressure Through ABF Technology

**TRANSMISSION SHIELD™** is the ultimate protection for the moving metal parts in your automatic and manual transmission. Utilizing the most Advanced Boundary Film (ABF) Technology, it protects moving metal parts from wear and damage due to boundary conditions of frictional abrasion, extreme pressure torque, dry startup and abrasive shutdown. Other benefits include smoother shifting, reduced friction and increased oil flow, reduced maintenance and downtime, extended transmission parts longevity and reduced operating temperatures an average of 30 to 50 Fahrenheit degrees.

### ATTRIBUTES

- Protects Moving Metal Parts
- Extends Parts Life
- Dramatically Reduces Wear
- Smoother Shifting
- Reduces Temperatures An Average Of 30 Fahrenheit Degrees
- Improves Lubrication
- Reduces Maintenance
- Reduces Friction
- Improves Oil Flow
- For Automatic And Manual Transmissions

TRANSMISSION SHIELD™

# TRANSMISSION SHIELD

**Steel Shield Technologies'** mechanism of operation is based upon advanced methods of Tribology that improve lubricity and load carrying capacity. This, in turn, improves surface characteristics while simultaneously creating a stable chemical **Advanced Boundary Film** on the contacting metal surfaces of whatever equipment in which it is added. The process of **Advanced Boundary Film** formation is achieved through a unique combination of long-chain halogenated hydrocarbons and other proprietary additives that are highly stable and non-corrosive to the equipment's metal parts, and pose no threat to the environment or waste oil recovery systems. **Steel Shield** reacts chemically, under thermal conditions with the contacting metal surfaces, to form a complex surface-attaching film of protection. **Steel Shield's** characteristics are "electro-negative", which causes it to seek out and affix itself to the metallic surface areas. During this process, surface smoothing is accomplished, resulting in improved spread characteristics of the surfaces themselves. The final state of the opposing metal surfaces increases the fluid film strength even more, resulting in greatly reduced wear while imparting extreme pressure (EP) properties to the opposing metal surfaces. The result is a virtual elimination of frictional wear and significant cooling of the entire lubricated area yielding higher energy savings and reduced metallic debris and acids in the oil. This is extensively proven through elemental oil analysis and Ferrography of the used oil, before and after the use of **Steel Shield's Advanced Boundary Film Technology.**

### MSDS DATA

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- Non-Hazardous
- Non-Flammable
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### PHYSICAL DATA

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- Specific Gravity : 1.07
- Insoluble In Water
- Vapor Pressure : <1@25˚C
- Medium To Dark Amber

### PERFORMANCE

- Reduces Wear
- Increases Horsepower
- Reduces Costly Repairs
- Smoother Shifting
- Reduces Operating Temperatures
- Increases Fuel Savings
- Reduces Friction
- Improves Oil Flow
- Reduces Maintenance
- Increases Transmission Life
- Reduces Metal Debris In Oil
- Reduces Chain Stretching

DIRECTIONS

Remove the dip stick and add one 8 ounce bottle of Transmission Shield™ through the fill tube. For larger transmissions, add 1 ounce per quart. For manual transmissions and differentials, add 2 ounces per quart for gear lube / oil. Use at every oil change for maximum performance. Contains no volatiles or solvents. Contains synthetic hydrocarbons and advanced chemical additive technology. Non-toxic and environmentally friendly.

| ITEM NUMBER | ITEM UPC# | ITEM DESCRIPTION | CASE PACK | CASE DIMENSIONS | CASE CUBE | CASE WEIGHT | TI/HI |
|---|---|---|---|---|---|---|---|
| TMS-MT-8 | 8-94630-00106-9 | Transmission Shield Metal Treatment - 8 oz. | 12 | 8.75"w x 8"l x 8"h | .33 | 7.50 | 25/7 |

STEEL SHIELD EPA™

# The Ultimate Protection Against Metal-To-Metal Wear

STEEL SHIELD™ TECHNOLOGIES


## ATTRIBUTES

- Protects Moving Metal Parts
- Extends Parts Life And Component Reliability
- Dramatically Reduces Wear
- Smoother Operation
- Improves Lubrication
- Reduces Maintenance And Downtime
- Reduces Friction
- Reduces Operating Temperatures

## Setting The Standards In Anti-Wear & Extreme Pressure Through ABF Technology

**STEEL SHIELD Extreme Pressure Anti-Wear (EPA)™** is the ultimate protection for the moving metal parts for industry. Utilizing the most Advanced Boundary Film (ABF) Technology, it protects moving metal parts from heat, friction and wear in engines, transmissions, differentials, transfer cases, hydraulic pumps and motors, gear boxes, and other enclosed lubrication systems, due to boundary conditions of frictional abrasion, extreme pressure torque, dry startup and shutdown. Increased performance and greatly reduced maintenance and downtime are the results. These performance goals are achieved through **ABF Technology** by lowering the operating temperatures, extending the life of component parts and increasing reliability.

ABF TECHNOLOGY™

STEEL SHIELD™ E-PA

**Steel Shield Technologies'** mechanism of operation is based upon advanced methods of Tribology that improve lubricity and load carrying capacity. This, in turn, improves surface characteristics while simultaneously creating a stable chemical **Advanced Boundary Film** on the contacting metal surfaces of whatever equipment in which it is added. The process of **Advanced Boundary Film** formation is achieved through a unique combination of long-chain halogenated hydrocarbons and other proprietary additives that are highly stable and non-corrosive to the equipment's metal parts, and pose no threat to the environment or waste oil recovery systems. **Steel Shield** reacts chemically, under thermal conditions with the contacting metal surfaces, to form a complex surface-attaching film of protection. **Steel Shield's** characteristics are "electro-negative", which causes it to seek out and affix itself to the metallic surface areas. During this process, surface smoothing is accomplished, resulting in improved spread characteristics of the surfaces themselves. The final state of the opposing metal surfaces increases the fluid film strength even more, resulting in greatly reduced wear while imparting extreme pressure (EP) properties to the opposing metal surfaces. The result is a virtual elimination of frictional wear and significant cooling of the entire lubricated area yielding higher energy savings and reduced metallic debris and acids in the oil. This is extensively proven through elemental oil analysis and Ferrography of the used oil, before and after the use of **Steel Shield's Advanced Boundary Film Technology.**

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- Flash Point : 226˚C
- Non-Hazardous
- Non-Flammable
- Synthetic Hydrocarbons

## PHYSICAL DATA

- Boiling Point : 238˚C
- Evaporation Rate : < 0.01
- Specific Gravity : 1.07
- Insoluble In Water
- Vapor Pressure : <1@25˚C
- Medium To Dark Amber

## RECOMMENDED USES

- Engines
- Transmissions
- Differentials
- Hydraulic Systems
- Open Gears
- Gear Boxes
- Gear Reducers
- Gear Couplings
- Electric Motors
- Heavy Machinery
- Weaponry Systems

STEEL SHIELD EPA™

DIRECTIONS

*Gasoline And Diesel Engines:* Add 2 oz. per quart of oil.
*Auto Transmissions:* Add 1 oz. per quart of fluid.
*Manual Transmissions & Differentials:* Add 2 oz. per quart of gear lube/oil.
*Gear Boxes:* Add 2-3 oz. per quart. *Hydraulics:* Add 1 oz. per quart of fluid.
Contains no volatiles or solvents. Contains synthetic hydrocarbons and advanced chemical additive technology. Non-toxic and environmentally friendly.

| ITEM NUMBER | ITEM UPC# | ITEM DESCRIPTION | CASE PACK | CASE DIMENSIONS | CASE CUBE | CASE WEIGHT | TI/HI |
|---|---|---|---|---|---|---|---|
| EPA-MT-16 | 8-94630-00161-8 | Steel Shield EPA - Metal Treatment - 16 Oz. | 12 | 8.75"w x 8"l x 8"h | .33 | 7.50 | 25/7 |
| EPA-MT-32 | 8-94630-00162-5 | Steel Shield EPA - Metal Treatment - 32Oz. | 12 | 9.75"w x 9.5"l x 13.25"h | .71 | 28.80 | 12/5 |
| EPA-MT-128 | 8-94630-00163-2 | Steel Shield EPA - Metal Treatment - 1 Gallon | 4 | 9.5"w x 12.5"l x 14.5"h | .99 | 33.60 | 12/4 |
| EPA-MT-5G | 8-94630-00164-9 | Steel Shield EPA - Metal Treatment - 5 Gallons | 1 | | | 45.00 | |
| EPA-MT-15G | 8-94630-00165-6 | Steel Shield EPA - Metal Treatment - 15 Gallons | 1 | | | 133.00 | |
| EPA-MT-55G | 8-94630-00166-3 | Steel Shield EPA - Metal Treatment - 55 Gallons | 1 | | | 485.00 | |
| EPA-MT-300G | 8-94630-00167-0 | Steel Shield EPA - Metal Treatment - 300 Gallons | 1 | | | | |

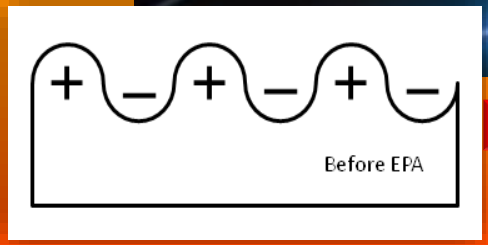
Ionize metal surface

Re-harden metal surfaces & charged with positive ions

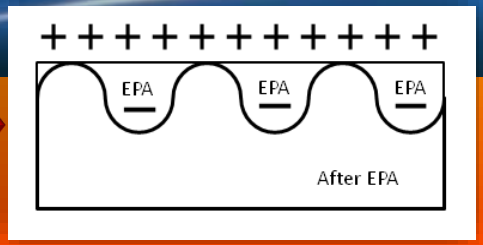
Farady's Law Like-Charge repel causing ionic levitation

Eject dirt, metallic debris, etc.

Greatly reduce friction; improve productivity




A series of sharp peaks and valleys of metal surface: Peaks are positively charged while the valleys are negatively charged




Applying EPA will effect a change of cation when the metal surface will be positively polarized:

- Surface lapping instead of chip-away endowing new hardness to the metal surface
- Ring opening, oxirane acid scavenging and corrosion inhibition
- Improved surface smoothness and rolling out of asperities

STEEL SHIELD Extreme Pressure Anti-Wear (EPA)™ is made by the latest and the most innovative technology which does not contain any solid additives. Utilizing the most Advanced Boundary Film (ABF) Technology, it protects moving metal parts from heat, friction and wear in engines, transmissions, differentials, transfer cases, hydraulic pumps and motors, gear boxes, and other enclosed lubrication systems, due to boundary conditions of frictional abrasion, extreme pressure torque, dry startup and shutdown.

Enhanced performance will greatly reduce maintenance and downtime, and effect significant energy savings through ABF Technology by lowering the operating temperatures, extending the life of component parts and increasing reliability and efficiency.

# TRUCK SHIELD

## The Ultimate Protection Against Metal-To-Metal Wear

STEEL SHIELD™ TECHNOLOGIES

TRUCK SHIELD™

REDUCES FUEL CONSUMPTION

TRUCK SHIELD™


### ATTRIBUTES

- Lower Fuel Consumption
- Practical Elimination of Metal-To-Metal Wear (Dry-Start Prevention)
- Reduces Maintenance and Downtime
- Smoother and Quieter Operation
- Reduces Operating Temperatures
- Extends Parts Life and Truck Component Reliability

### Setting The Standards In Extreme Pressure & Anti-Wear Through ABF Technology

**TRUCK SHIELD™** is the ultimate protection for the moving metal parts for trucks. Utilizing the Advanced Boundary Film (ABF)Technology, it protects moving metal parts from wear and damage due to boundary conditions of frictional abrasion and extreme pressure. Other benefits are increased fuel savings, increased performance, reduced maintenance costs and downtime due to lowering operating temperatures that extends component life from light trucks to heavy trucks and equipment.

ABF™ TECHNOLOGY

**www.steelshieldtech.com**

# TRUCK SHIELD™

**Steel Shield Technologies'** mechanism of operation is based upon advanced methods of Tribology that improve lubricity and load carrying capacity. This, in turn, improves surface characteristics while simultaneously creating a stable chemical **Advanced Boundary Film** on the contacting metal surfaces of whatever equipment in which it is added. The process of **Advanced Boundary Film** formation is achieved through a unique combination of long-chain halogenated hydrocarbons and other proprietary additives that are highly stable and non-corrosive to the equipment's metal parts, and pose no threat to the environment or waste oil recovery systems. **Steel Shield** reacts chemically, under thermal conditions with the contacting metal surfaces, to form a complex surface-attaching film of protection. **Steel Shield's** characteristics are "electro-negative", which causes it to seek out and affix itself to the metallic surface areas. During this process, surface smoothing is accomplished, resulting in improved spread characteristics of the surfaces themselves. The final state of the opposing metal surfaces increases the fluid film strength even more, resulting in greatly reduced wear while imparting extreme pressure (EP) properties to the opposing metal surfaces. The result is a virtual elimination of frictional wear and significant cooling of the entire lubricated area yielding higher energy savings and reduced metallic debris and acids in the oil. This is extensively proven through elemental oil analysis and Ferrography of the used oil, before and after the use of **Steel Shield's Advanced Boundary Film Technology.**

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- Specific Gravity : 1.07
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- Vapor Pressure : <1@25˚C
- Medium To Dark Amber

### PERFORMANCE

- Reduces Wear
- Increases Horsepower
- Reduces Costly Repairs
- Reduces Operating Temperatures
- Increases Fuel Savings
- Reduces Friction
- Improves Oil Flow
- Reduces Maintenance
- Increases Engine Life
- Reduces Metal Debris In Oil

### DIRECTIONS

*Diesel and Gasoline Engines:* Add 2 oz. per quart of oil initially; 1 - 2 oz. per quart of oil every oil change.
*Automatic Transmissions:* Add 1 oz. per quart automatic transmission fluid
*Manual Transmissions & Differentials:* Add 2 oz. per quart of gear lube / fluid.
*Hydraulics:* Add 1 oz. per quart of fluid.
*Power Steering:* Add 1 oz. per quart of fluid.
Contains synthetic hydrocarbons and advanced chemical additive technology. Non-toxic and environmentally friendly.

| ITEM NUMBER | ITEM UPC# | ITEM DESCRIPTION | CASE PACK | CASE DIMENSIONS | CASE CUBE | CASE WEIGHT | TI/HI |
|---|---|---|---|---|---|---|---|
| TRK-MT-32 | 8-94630-00168-7 | Truck Shield Metal Treatment - 32 oz. | 12 | 9.75"w x 9.5"h x 13.25"d | .71 | 28.80 | 12/5 |
| TRK-MT-128 | 8-94630-00169-4 | Truck Shield Metal Treatment - 1 Gallon | 4 | 9.5"w x 12.5"h x 14.5"d | .99 | 33.60 | 12/4 |
| TRK-MT-5G | 8-94630-00170-0 | Truck Shield Metal Treatment - 5 Gallon | 1 | | | 45.00 | |
| TRK-MT-15G | 8-94630-00119-9 | Truck Shield Metal Treatment - 15 Gallon | 1 | | | 133.00 | |
| TRK-MT-55G | 8-94630-00158-8 | Truck Shield Metal Treatment - 55 Gallon | 1 | | | 485.00 | |

# Reel-Shield Grease NLGI#1

## The Ultimate Protection Against Metal-To-Metal Wear


The ultimate lubricant, cleaner, penetrant, and saltwater protectant, has been aggressively designed and formulated for the Sport Fishing Industry. Reel Shield™ lubricates and protects against extreme pressure and wear in all moving metal-to-metal parts, in all types of fishing reel and drag systems. Reel Shield™ penetrates to the internal moving parts and shields against corrosion in extreme saltwater environments better than any other product to date. This distinguishes Reel Shield™ as the ultimate tool in the total care and maintenance of all fishing tackle in both fresh and saltwater fishing. Reel Shield™ has been tournament tested in harsh saltwater conditions and proved to be superior in its performance.

Additional testing has proven Reel Shield™ improves casting distances due to its Advanced Boundary Film (ABF) Technology, which reduces coefficients of friction between the gears and other moving metal parts in the reel and roller guides of the rod allowing for smoother casting and overall performance and operation.

## Reel Shield Grease - Lithium Complex #1

**PRODUCT DATA SHEET**

**PRODUCT TYPE:** Reel-Shield #1

**NLGI GRADE:** 1

| ASTM METHOD | | Typical Results |
|---|---|---|
| D-217 | Penetration, Worked, 60 s | 310 - 340 |
| D-217 | Penetration, Unworked | 310 - 340 |
| | Thickener Type | Lithium Complex |
| D-128 | Thickener % | 6 - 8 |
| | Color | Light Amber |
| | Texture | Smooth |
| D-2265 | Dropping Point °F, Min. | 500 |
| D-445 | Viscosity @ 40°F, cst | 220 |
| D-445 | Viscosity @ 100°F, cst | 19 |
| D-2270 | Viscosity Index | 95 |
| D-92 | Flash Point - °F | 464 |
| D-92 | Fire Point - °F | 550 |
| D-2509 | Timken OK Load – Lbs. | 60+ |
| D-1743 | Rust | Pass |
| D-4048 | Copper Corrosion | 1B |
| D-2596 | 4 Ball EP Weld, kg Min. | 800 |
| D-2266 | Four Ball Wear, mm. | 0.70 |
| D-5483 | Oxidation Induction Time at 180°C, min. | 95.0 |

US Steel Mobility Test

Mobility at 77 F, g/min:
Mobility at 60 F, g/min: 515
Mobility at 40 F, g/min: 257.1
Mobility at 20 F, g/min: 78.9
Mobility at 0 F, g/min: 5.4

# SALT WATER PROTECTION

# MATERIAL SAFETY DATA SHEET

**PRODUCT IDENTIFICATION**

| | |
|---|---|
| Product Name: Reel-Shield EP #1 Grease | Code No.: RSG-EP1 |
| Chemical Name: Lithium Hydroxy-Stearate Lubricating Grease | |
| Synonyms: #1 EP Lithium Complex | |

ADDRESS: Steel Shield Technologies, Inc.
3351 Industrial Blvd
Bethel Park, PA 15102

Emergency Phone Number(s)
Business: (412) 479-0024
Other: (412) 831-3823 – Fax

Date: March 21, 2009

Chemical Family: Hydrocarbon

**INGREDIENTS**

| MATERIALS OR COMPONENTS | % W | CAS NUMBER | CARCINOGEN OSHA OR IARC |
|---|---|---|---|
| Lithium Hydroxy-Stearate (Soap) | 10 | 4885-12-5 | NA |
| Mineral Oil | 80 | 8012-95-1 | NA |
| Zinc Oxide | 5 | 8051-03-4 | NA |
| Steel Shield EPA | 5 | NA Proprietary Blend | NA |
| Cinnamon Scent | | | |
| | | | |
| | | | |
| The items listed above are compliant with the "right-to-know" law which is legislated in several states. | | | |
| | | | |
| Weapon Shield Grease is non-hazardous, non-toxic, and Non-mutagenic. It is environmentally friendly. | | | |

**SHIPPING** Non Restricted

**PHYSICAL PROPERTIES**

| | | | |
|---|---|---|---|
| Boiling Point / Range: °C >700 °F | Melting Point: °C N/A °F | Freezing Point: N/A °C °F | Molecular Weight (Calculated): N/A |
| Specific Gravity (H2O=1): @ 0.88 / 16 °C | Vapor Pressure (mm Hg): N/A @ °C °F | Vapor Density (Air=1): N/A | |
| Solubility in H2O: Nil | % Volatiles By Volume: 0 | Evaporation Rate: N/A ☐ Ether=1 ☐ Water=1 ☐ Butylacetate=1 | |
| Appearance and Odor: Light Amber - Bland | | Other | |

**FIRE AND EXPLOSION DATA**

Flash Point: °C 464°F Test Method: D-92
Flammable Limits: **Not Established** Lower % Upper %
Autoignition Temperature/FirePoint: °C 500°F

EXTINGUISHING MEDIA
☐ Water-Spray ☒ Water-Fog ☐ Water-Stream ☒ CO2 ☒ Dry Chemical ☐ Alcohol Foam ☒ Foam ☒ Earth or Sand

SPECIAL FIRE FIGHTING PROCEDURES
☐ Do Not Enter Building ☐ Allow Fire To Burn ☒ Water May Cause Frothing ☐ Do Not Use Water

UNUSUAL FIRE AND EXPLOSION HAZARDS
☐ Dust Explosion Hazard ☐ Sensitive To Shock ☐ Contamination ☐ Temperature ☐ Other (Specify): None

**REACTIVITY DATA**

STABILITY: ☒ Stable ☐ Unstable
CONDITIONS CONTRIBUTING TO INSTABILITY: ☐ Thermal Decomposition ☐ Photo Degradation ☐ Polymerization ☐ Contamination

INCOMPATIBILITY – AVOID CONTACT WITH
☐ Strong Acids ☐ Strong Alkalis ☒ Strong Oxidizers ☐ Other (Specify):

HAZARDOUS DECOMPOSITION PRODUCTS – THERMAL AND OTHER (LIST)
Oxides of Carbon, Sulfur and Nitrogen if burned.

CONDITIONS TO AVOID
☐ Heat ☒ Open Flames ☐ Sparks ☐ Ignition Sources ☐ Other (Specify):

**SPILL OR LEAK**

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED
☐ Flush With Water ☒ Absorb With Sand Or Inert Material ☐ Neutralize ☒ Sweep Or Scoop Up And Remove
☐ Keep Upwind. Evacuate Enclosed Spaces ☐ Prevent Spread Or Spill ☐ Dispose of Immediately ☐ Other (Specify:

WASTE DISPOSAL METHOD – *CONSULT FEDERAL, STATE, OR LOCAL AUTHORITIES FOR PROPER DISPOSAL PROCEDURES*
Incinerate

Before using product, read and follow directions and precautions on product label and bulletins.

**EXCEL** CONDITIONS TO AVOID Excessive skin contact

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Product Name: Reel Shield Grease — Code No.: LS-287-1

PRIMARY ROUTES OF ENTRY
☐ INHALATION ☒ SKIN CONTACT ☐ OTHER (SPECIFY):

Products of this type have been used for years with no known ill effects. This product contains no carcinogens or mutagens as defined by OSHA or IARC. All components are listed on the TSCA, and EINECS Inventories. This Product contains no controlled substance under WHMIS.

**SARA Title III, Section 313, Reportable Quantities:**

| Compound | CAS# | % Wt. |
|---|---|---|
| None | NA | NA |

**WHMIS Ingredient Disclosure, Reportable Quantities:**

| Compound | CAS# | % Wt. |
|---|---|---|
| None | NA | NA |

**HEALTH HAZARD INFORMATION**

**EFFECTS OF EXPOSURE**

PERMISSIBLE EXPOSURE LIMIT (SPECIFY IF TLV/TWA OR CEILING (C).) OTHER:
ACGIH 20 | OSHA 2004 None Established

IRRITATION
☒ SKIN ☐ SEVERE ☐ MODERATE ☒ MILD (TRANSIENT)
☒ EYE ☐ SEVERE ☐ MODERATE ☒ MILD (TRANSIENT)

CORROSIVITY
☐ SKIN ☐ 4 HRS. (DOT) ☐ 24 HRS. (CPSC)
☐ EYE ☐ MAY CAUSE BLINDNESS ☒ NOT CORROSIVE

SENSITIZATION
☐ SKIN ☐ RESPIRATORY ☒ NONE

INHALATION EFFECTS N/A
☐ NARCOTIC EFFECT ☐ CYANOSIS ☐ ASPHYXIANT

LUNG EFFECTS (SPECIFY)
N/A

OTHER (SPECIFY)
☐ REPEATED CONTACT-SKIN DEFATTER ☐ OTHER (SPECIFY): None

**EMERGENCY FIRST AID**

INGESTION
☐ INDUCE VOMITING ☒ DO NOT INDUCE VOMITING ☐ GIVE PLENTY OF WATER ☒ GET MEDICAL ATTENTION ☐ OTHER (SPECIFY):

DERMAL
☒ FLUSH WITH SOAP AND WATER ☐ GET MEDICAL ATTENTION ☒ CONTAMINATED CLOTHING – REMOVE AND LAUNDER
☐ CONTAMINATED SHOES – DESTROY OTHER (SPECIFY):

EYE CONTACT
☒ FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MIN. ☒ GET MEDICAL ATTENTION ☐ OTHER (SPECIFY)

INHALATION
☐ REMOVE TO FRESH AIR ☐ IF NOT BREATHING, GIVE ARTIFICAL RESPIRATION ☐ GIVE OXYGEN
☐ GET MEDICAL ATTENTION OTHER (SPECIFY): N/A

**SPECIAL PROTECTION INFORMATION**

VENTILATION REQUIREMENTS – *Always maintain exposure below permissible exposure limits*
☐ CONSULT AN INDUSTRIAL HYGIENIST OR ENVIRONMENTAL HEALTH SPECIALIST ☐ LOCAL EXHAUST
☒ USE WITH ADEQUATE VENTILATION ☐ CHECK FOR AIR CONTAMINANT AND OXYGEN DEFICIENCY ☐ OTHER (SPECIFY):

EYE
☐ FACE SHIELD
☒ SAFETY GLASSES ☐ GOGGLES

HAND (GLOVE TYPE) ☐ BUTYL RUBBER ☒ POLYVINYL ALCOHOL ☐ OTHER (SPECIFY):
☐ POLYVINYL CHLORIDE ☒ NEOPRENE ☐ NATURAL RUBBER ☒ POLY-ETHYLENE

RESPIRATOR TYPE – *Use only NIOSH / MESA approved equipment*
☐ SELF-CONTAINED ☐ SUPPLIED AIR ☐ CAN OR CARTRIDGE GAS OR VAPOR ☐ FILTER-DUST, FUME, MIST
☐ OTHER (SPECIFY): N/A

OTHER PROTECTIVE EQUIPMENT
☐ RUBBER BOOTS ☐ APRON ☐ OTHER (SPECIFY): None

**SPECIAL PRECAUTIONS**

PRECAUTIONARY NOTES
☒ WASH THOROUGHLY AFTER HANDLING ☒ DO NOT GET IN EYES OR ON CLOTHING ☐ DO NOT BREATH DUST, VAPOR, MIST, GAS ☐ KEEP CONTAINER CLOSED ☒ KEEP AWAY FROM SPARKS, AND OPEN FLAMES ☐ STORE IN TIGHTLY CLOSED CONTAINER
☐ DO NOT STORE NEAR COMBUSTIBLES ☐ KEEP FROM CONTACT WITH CLOTHING AND OTHER COMBUSTIBLE MATERIALS ☐ EMPTY CONTAINER MAY CONTAIN HAZARDOUS RESIDUE ☐ USE EXPLOSION PROOF EQUIPMENT ☐ OTHER (SPECIFY):

OTHER HANDLING AND STORAGE CONDITIONS None

| PREPARED BY | DATE | ADDRESS | PHONE |
|---|---|---|---|
| GCF | 3-21-2009 | 3351 Industrial Blvd. Bethel Park PA 15102 | 800-390-1535 |

PLEASE NOTE: "The above information is accurate to the best of our knowledge. However, since data, safety standards, and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control, Summit MAKES NO WARRANTY, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO THE COMPLETENESS OR CONTINUING ACCURACY OF THE INFORMATION CONTAINED HEREIN AND DISCLAIMS ALL LIABILITY FOR RELIANCE THEREON. User should satisfy himself that he has all current data relevant to his particular use."

# SALT WATER PROTECTION

# Lithi Shield & Reel Shield Grease Compatibility Chart

| | Aluminum Complex | Barium Complex | Calcium Stearate | Calcium 12-Hydroxy | Calcium Complex | Calcium Sulfonate Complex | Clay (Non-Soap) | Lithium Stearate | Lithium 12-Hydroxy | Lithium Complex | Polyurea (Conventional) | Polyurea Shear (Stable) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum Complex | - | I | I | C | I | B | I | I | I | C | I | C |
| Barium Complex | I | - | I | C | I | C | I | I | I | I | I | B |
| Calcium Stearate | I | I | - | C | I | C | C | C | B | C | I | C |
| Calcium 12-Hydroxy | C | C | C | - | B | B | C | C | C | C | I | C |
| Calcium Complex | I | I | I | B | - | I | I | I | I | C | C | C |
| Calcium Sulfonate Complex | B | C | C | B | I | - | I | B | B | C | I | C |
| Clay (Non-Soap) | I | I | C | C | I | I | - | I | I | I | I | B |
| Lithium Stearate | I | I | C | C | I | B | I | - | C | C | I | C |
| Lithium 12-Hydroxy | I | I | B | C | I | B | I | C | - | C | I | C |
| Lithium Complex | C | I | C | C | C | C | I | C | C | - | I | C |
| Polyurea (Conventional) | I | I | I | I | C | I | I | I | I | I | - | C |
| Polyurea (Shear Stable) | C | B | C | C | C | C | B | C | C | C | C | - |


**Relative Compatibility Rating**

**B = Borderline C = Compatible I = Incompatible**

**Note: This chart is a general guide to compatibility. Specific properties of greases can dictate compatibility. Testing should be done to determine if greases are compatible.**

# STEEL SHIELD PRODUCT COMPATIBILITY

▶In order to help you further understand and determine compatibility issues, we are publishing this three-part test to assist you in determining if oils or fluids are compatible with Steel Shield EPA (SST EPA) and other Steel Shield (SST) products while in the field. Doing these three steps can identify a compatibility issue within 95% accuracy.

▶First: Examine the material safety data sheet for the oil to which the SST EPA is to be added. Look for key words in Section 2, Hazardous Ingredients/Identity Information, which may indicate either product compatibility or incompatibility. Standard petroleum oils are usually referred to as “severely hydrotreated naphthenes” or “paraffinic base stocks”. Other key words are “contains mineral oil” or “synthetic hydrocarbons”. All of these oils have the characteristics of petroleum oil and are compatible with SST products.

▶Key words such as “alky-(compound), alkynol, glycol, alkanolamine, esters, mono esters, polyol or amines” are direct indications of additives and base fluids that are NOT compatible with SST products. For these chemicals, we will provide special SST products that is compatible but only upon request.

▶Second: A good test for compatibility is to mix equal amounts of the base oil in question and SST products. After both are thoroughly blended, allow the mixture to stand for 10 to 15 minutes. If no separation occurs, the likelihood of compatibility is very good. An occurrence of a radical separation indicates the oils are incompatible, and do not mix properly because of chemical differences.

▶Third: After the test above is completed to your satisfaction, the final phase is to perform a lubricity test. Run the base oil in question first to determine its lubricity and load carrying characteristics. Then, mix a proper ratio of SST product with the base oil and run the mixture on the Falex machine. Note the result. If a full-scale reading can be achieved without grinding or damaging the bearing, then you can safely assume the oil and SST product are compatible. However, if only a slight to moderate increase in lubricity can be achieved over the base oil by itself, it must be assumed that there is something present that is inhibiting the formation of the boundary film, which would indicate the base oil and SST product are NOT compatible.

▶When these steps are followed, compatibility issues can be solved in nearly every situation. However, if you have followed through with these steps and still are not able to make a definite decision on compatibility, please do not hesitate to contact our Technical Department to research and verify compatibility issues.

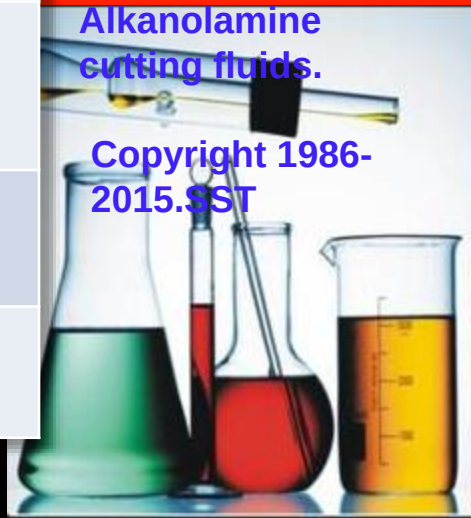
# STEEL SHIELD EPA COMPATBILITY

| Item | Base Oil | Compatible with SST-EPA ? | SST Product to Use |
|---|---|---|---|
| 1 | Petroleum, Mineral Oil | • Yes | • SST-EPA |
| 2 | SHC (Synthetic Hydrocarbon)<br>A. Alkylated Aromatics<br>B. Olefin Oligomers<br>e.g. Amsoil, Mobil 1, Castrol Syntec | • Yes | • SST-EPA |
| 3 | Halogenated Hydrocarbons<br>A. Chlorotrifluoroethylene, Polytetrafluoroethylene, (PTFE).<br>e.g. Insoluble cutting oil, radiation resistant oil, some heavy duty gear oil, load carrying oils. | • Yes | • SST-EPA |
| 4 | Glycol Synthetic Esters<br>A. Alkanolamines<br>B. Polyol Glycols<br>e.g. Fire proof hydraulic fluids, cutting fluids, R-134A Refrigerant Oils, etc. | • No | • On Request |
| 5 | Organic Ester Synthetics<br>A. VME - Vegetable Methyl Ester<br>e.g. Some food grade oils, specialty biodegradable oils | • No | • On Request |
| 6 | Phosphate Esters<br>A. Triphenol Butylated Phosphate<br>B. Trisecyl Phosphate<br>C. Tricresyl Phosphate<br>e.g.Turbine Oils | • No | • On Request |
| 7 | Silicone Oils<br>A. Methyl Silicone<br>B. Phenyl Methyl Silicone<br>C. Silicate Ester/Disiloxane | • No | • None |
| 8 | Synthetic Ether<br>A. Polyphenyl Ether<br>B. Chlorinated Diphenyl Ether<br>C. Perfluorinated polyether | • No | • On Request |

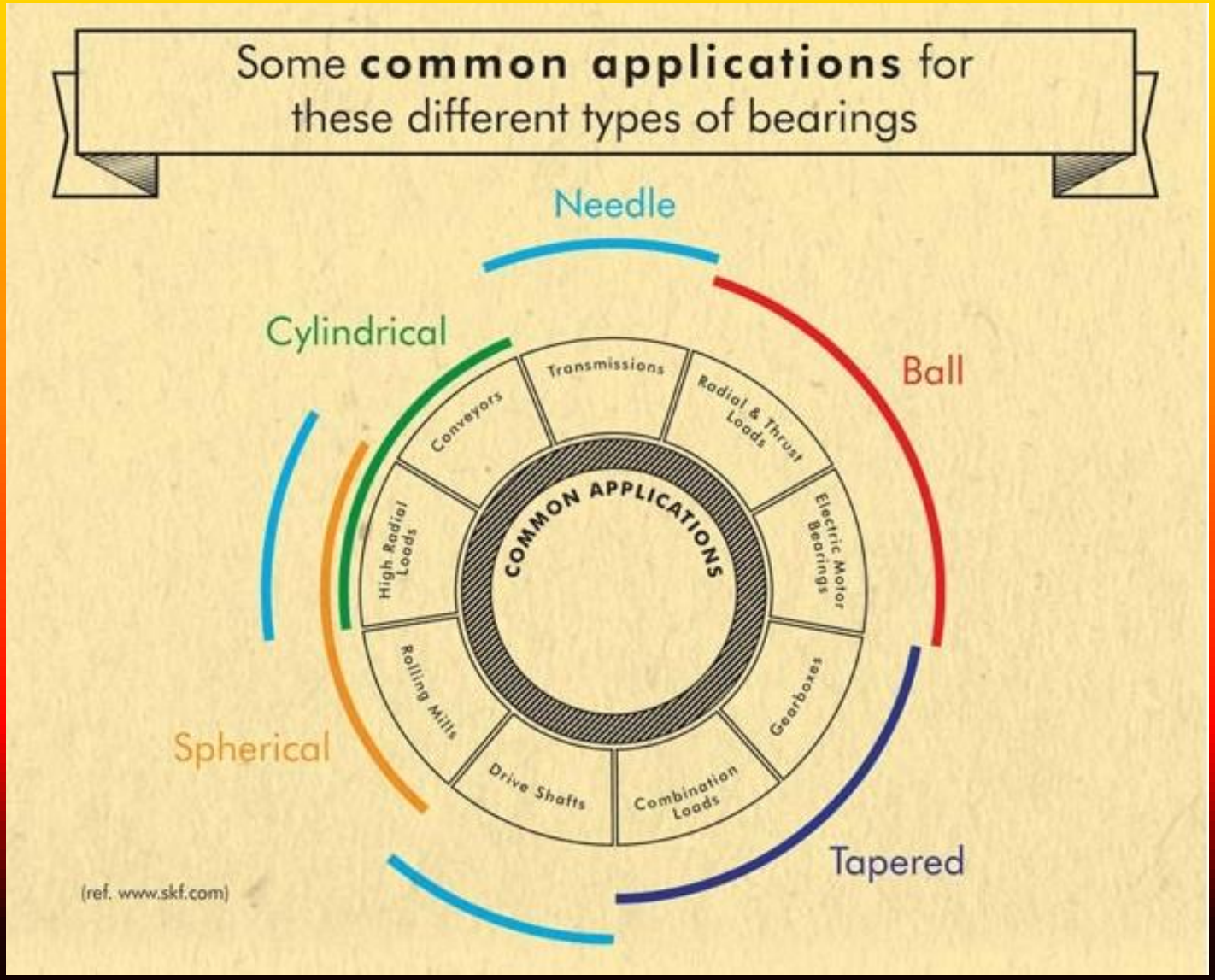
**Keywords to look for on MSDS or Product Description or Technical Sheets**

**"Glycol" "Alkanolamine"**
**"Ether" "Ester" "VME"**
**"Phenyl/Phenol" "Silicate"**
**"Boron Oxide" "Phosphate"**

**Boron Oxide is a common additive to Alkanolamine cutting fluids.**



# GREASE APPLICATIONS OF BEARINGS



# GREASE APPLICATIONS OF BEARINGS

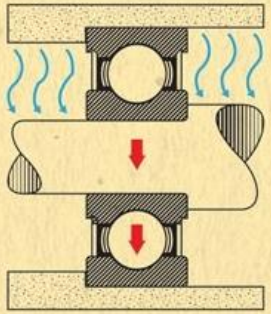
## *Remember*, bearing type affects **grease life**.

Larger bearings and high-speed bearings translate to short grease life. High DN grease is required.

| BEARING TYPE | RELATIVE TYPE OF GREASE |
|---|---|
| Deep-groove, single-row ball bearing | 1 |
| Angular contact, single-row ball bearing | 0.625 |
| Self-aligning ball bearing | 0.77 - 0.625 |
| Thrust ball bearing | 0.2 - 0.17 |
| Cylindrical, single-row roller bearing | 0.625 - 0.43 |
| Needle roller bearing | 0.3 |
| Tapered roller bearing | 0.25 |
| Spherical roller bearing | 0.14 - 0.08 |

(ref. Booser, Bloch, ML)

## Bearings also work under different kinds of **loads**.



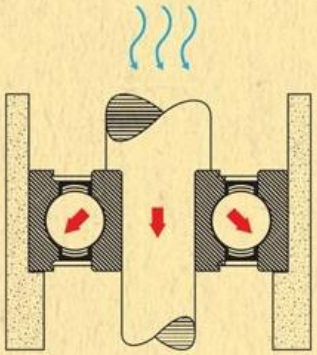
**RADIAL LOAD**

When the load is perpendicular to the shaft due to

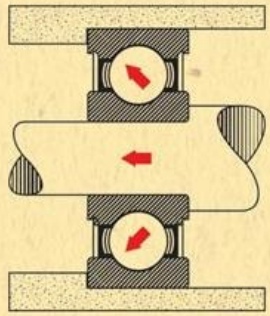
GRAVITY

**AXIAL OR THRUST LOAD**

(When the load is parallel to the shaft)



Axial load in a vertical pump or electric motor due to gravity



Axial load in a horizontal pump

(ref. www.skf.com)

# GREASE APPLICATIONS OF BEARINGS

## HOW TO CHOOSE THE RIGHT GREASE?

A common OEM grease specification might be to use an NLGI No. 2 lithium grease of good quality. Using this information alone, one could select the right consistency and thickener type. Other considerations include thickener concentration, consistency, dropping point and operating temperature range, worked stability, oxidation stability, wear resistance, etc.

### Base Oil Viscosity

A common mistake when selecting a grease is to confuse the grease consistency with the base oil viscosity. Because the majority of grease-lubricated applications are element bearings, one should consider viscosity selection for those applications. While most would not use an EP 220 gear oil for an oil-lubricated electric motor bearing, many people will use a grease containing that same oil for an identical grease-lubricated bearing. To determine minimum and optimum viscosity requirements for element bearings, one may use speed factors, commonly denoted as DN or NDm. Speed factors account for the surface speed of the bearing elements and are determined by the following formulas:

DN = (rpm) X (bearing bore)

NDm = rpm X (( bearing bore + outside diameter) / 2)

The NDm value uses pitch diameter rather than bore diameter because not all bearings of a given bore have the same element diameter, and thus have different surface speeds. Knowing the speed factor value and likely operating temperature, the minimum viscosity requirement can be read directly from charts like Figure 1.

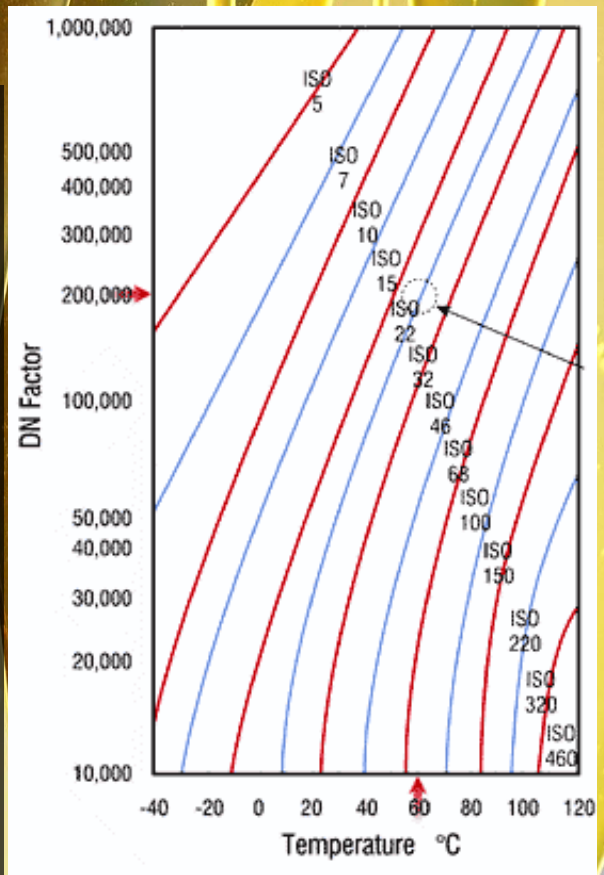



Figure 1

# GREASE APPLICATIONS OF BEARINGS

## HOW TO CHOOSE THE RIGHT GREASE?

Figure 1 assumes the base oils' viscosity index. To be more precise, one would need to use a chart that identifies the viscosity at operating temperature, then determine the viscosity grade from a viscosity / temperature chart for a given lubricant.

### Additives and Base Oil Type

Figure 2 shows some common additive requirements by application. Most greases are formulated using API Group I and II mineral oil base stocks, which are appropriate for most applications. However, there are applications that might benefit from the use of a synthetic base oil. Such applications include high or low operating temperatures, a wide ambient temperature range, or any application where extended re-lubrication intervals are desired.

| Additive | Journal Bearings | Ball Bearings | Thrust Bearings | Roller Bearings | Needle Bearings |
|---|---|---|---|---|---|
| Antioxidants | • | • | • | • | • |
| Antifoam Agents | • | • | • | • | • |
| Antiwear/EP | | • | • | • | • |
| Rust Inhibitors | • | • | • | • | - |
| Extreme Pressure | | | - | - | |
| Demulsibility | • | • | • | • | - |
| VI Improvers | - | - | - | - | • |
| Corrosion Inhibitors | • | • | • | • | • |
| • Required, - Depends on application | | | | | |

Figure 2

# GREASE APPLICATIONS OF BEARINGS

## HOW TO CHOOSE THE RIGHT GREASE?

### Grease Consistency and Thickener Type

The NLGI has established a scale to indicate grease consistency which ranges from grades 000 (semifluid) to 6 (block grease). The most common NLGI grade is two and is recommended for most applications.

For bearings, speed factor and operating temperature can be used to determine the best consistency or NLGI grade for a given application. It may seem counterintuitive, but higher speed factors require higher consistency greases. Table 1 provides a general guide to selecting NLGI grade based on speed factor and operating temperature.

Numerous types of grease thickeners are currently in use, the most common types are simple lithium soaps, lithium complex and polyurea. Simple lithium soaps are often used in general-purpose greases and perform relatively well in most performance categories at moderate temperatures. Complex greases such as lithium complex provide improved performance particularly at higher operating temperatures. A common upper operating temperature limit for a simple lithium grease might be 250˚F, while that for a lithium complex grease might be 350˚F. Another thickener type that is becoming more popular is polyurea. Like lithium complex, polyurea has good high-temperature performance as well as high oxidation stability and bleed resistance. Thickener type should be selected based on performance requirements as well as compatibility when considering changing product types.

| Operating Temperature | DN (Speed Factor) | NLGI No.* |
|---|---|---|
| -30 to 100°F | 0 - 75,000<br>75,00 - 150,000<br>150,000 - 300,000 | 1<br>2<br>2 |
| 0 to 150°F | 0 - 75,000<br>75,00 - 150,000<br>150,000 - 300,000 | 2<br>2<br>3 |
| 100 to 275°F | 0 - 75,000<br>75,00 - 150,000<br>150,000 - 300,000 | 2<br>3<br>3 |

***Depends on other factors as well, including bearing type, thickener type, base oil viscosity and base oil type**

# GREASE APPLICATIONS OF BEARINGS

## HOW TO CHOOSE THE RIGHT GREASE?

### Performance Properties

If an application operates continuously at room temperature, properties like dropping and upper operating temperature limits are not as important. If an application operates under heavy loads at low speeds, load carrying tests such as four-ball EP or Timken OK load should be considered. It is also important to review these specifications on a periodic basis to guard against specification creep. While improving a lubrication program can be a tough job, lubricant specification is relatively easy. Armed with a little bit of knowledge and a few widely available tools, it is possible to rest easier knowing that the right grease is being used.

With Steel Shield ABF Technology, the performance in stability, lubricity and interval of grease can be enhanced and improved to a much higher level.

# SOUTHWEST RESEARCH INSTITUTE TEST REPORTS

## STEEL SHIELD LARGELY OUTPERFORMS REPUTED GREASES MADE BY YAMAMOTO AND ATLAS

**Petroleum Products Research Department**
Test Summary Report
Steel Shield Technologies
Purchase Order # 114
October 25, 2013

| SwRI Code: | Sample ID: Sample Identification: | | 20003 Litho Shield | 20004 Yamamoto EP grease |
|---|---|---|---|---|
| D1264 | Water Washout of Grease | | | |
| | Avg. Grease Washed Out | Wt % | 1.32 | 0.66 |
| | Test Temp. | °C | 79 | 79 |
| | Dry Temp. | °C | 77 | 77 |
| D1742 | Oil Separation from Lubricating Grease | mass % | 2.04 | * Note |
| D2265 | Dropping Point | °C | 258 | 307 |
| | Oven Temp. | °C | 288 | 316 |
| D2266 | Wear Characteristics (Four-Ball Method) | | | |
| | Scar Diameter | kgf | 0.75 | 0.47 |
| D2596 | Four-Ball Extreme Pressure Properties | | | |
| | Corrected Load | kgf | 851.1 | 501.68 |
| | Load-Wear Index | kgf | 92.27 | 66.73 |
| | Weld Point | kgf | 800 | 315 |
| | LNSL | kgf | 80 | 63 |

* No oil separation occurred for grease sample "Ya… …ease", therefore, sample is co…dered "outside the scope of the method".

WIN

**Petroleum Products Research Department**
Test Summary Report
Steel Shield Technologies
Purchase Order # 114
October 25, 2013

| SwRI Code: | Sample ID: Sample Identification: | | 20005 Atlas Chisel lube |
|---|---|---|---|
| D1264 | Water Washout of Grease | | |
| | Avg. Grease Washed Out | Wt % | 1.11 |
| | Test Temp. | °C | 79 |
| | Dry Temp. | °C | 77 |
| D1742 | Oil Separation from Lubricating Grease | mass % | ** Note |
| D2265 | Dropping Point | °C | 302 |
| | Oven Temp. | °C | 316 |
| D2266 | Wear Characteristics (Four-Ball Method) | | |
| | Scar Diameter | kgf | 0.71 |
| D2596 | Four-Ball Extreme Pressure Properties | | |
| | Corrected Load | kgf | 302.79 |
| | Load-Wear Index | kgf | 41.23 |
| | Weld Point | kgf | 315 |
| | | | 50 |

** No oil separation occurred for grease sample "Atlas Chisel Lube", therefore, sample is considered "outside the scope of the method".

| TEST ITEMS | Four-Ball Extreme Pressure Properties | Steel Shield Lithi Shield | Yamamoto EP Grease | Atlas Chisel Lube |
|---|---|---|---|---|
| Loading Ability | Corrected Load | 851.1 | 501.68 | 302.79 |
| Anti-Wear Ability | Load Wear Index | 92.27 | 66.73 | 41.23 |
| High Temperature Loading | Weld Point | 800 | 315 | 315 |
| High Pressure | LNSL | 80 | 63 | 50 |



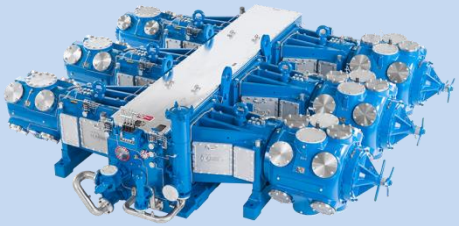
# SOUTHWEST RESEARCH INSTITUTE TEST REPORTS

## STEEL SHIELD GAS ENGINE OILS AND COMPRESSOR OILS ASTM D2782 TIMKEN TESTS

THE TEST REPORT FROM SOUTHWEST RESEARCH INSTITUTE – Timken ASTM D2782

Test Report
2014 / 11 / 20
Steel Shield Technologies

| SwRI Lab No. | 24564 | 23728 | 25252 | 23727 | 25250 | 25251 |
|---|---|---|---|---|---|---|
| ASTM D2782 Measurement of Extreme-Pressure Properties of Lubricating Fluids (Timken Method) | SST Gas Engine Oil SAE 40 Ashless Without EPA | Steel Shield Gas Engine Oil GECAT SAE40 Low Ash With EPA | Steel Shield EPA | Steel Shield Compressor Oil ISO #100 / 150 | Mobil Pegasus 805 SAE 40 Gas Engine Oil | Mobil Pegasus 801 SAE 40 Gas Engine Oil |
| Volume (Gallon) | 1 | 1 | 1 | 1 | 1 | 1 |
| OK Load (lbs) | 40 | 40 | 75 | 55 | 9 | 9 |
| Score Load (lbs) | 45 | 45 | 80 | 60 | 12 | 12 |
| Temperature (℃) | 38 | 38 | 38 | 38 | 38 | 38 |



Products of the same class

Results

**Steel Shield Wins :**
**Steel Shield outperforms Mobil in OK LOAD parameter by 444 % and in SCORE LOAD by 375 %.**

The SwRI Timken Test report clearly testified Steel Shield products are FAR Superior than Mobil products of the same classes

# SOUTHWEST RESEARCH INSTITUTE TEST REPORTS

## STEEL SHIELD GAS ENGINE OILS AND COMPRESSOR OILS ASTM D2783 FOUR BALLS TESTS

THE TEST REPORT FROM SOUTHWEST RESEARCH INSTITUTE – 4-Ball ASTM D2783

Test Report
2014 / 11 / 20
Steel Shield Technologies

| SwRI Lab No. | 24564 | 23728 | 25252 | 23727 | 25250 | 25251 |
|---|---|---|---|---|---|---|
| ASTM D2783 Measurement of Extreme-Pressure Properties of Lubricating Fluids (4-Ball Method) | SST Gas Engine Oil SAE 40 Ashless Without EPA | Steel Shield Gas Engine Oil GECAT SAE 40 Low Ash With EPA | Steel Shield EPA | Steel Shield Compressor Oil ISO #100 / 150 | Mobil Pegasus 805 SAE 40 Gas Engine Oil | Mobil Pegasus 801 SAE 40 Gas Engine Oil |
| Corrected Load (kgf) | 70 | 109 | NA | 1 | 136 | 74 |
| Load Wear Index (kgf) | 35 | 46 | NA | 48 | 34 | 35 |
| Weld Point (kg) | 200 | 250 | >800 | 250 | 200 | 200 |
| Last Non Seizure Load (kg) | 80 | 100 | 80 | 100 | 63 | 80 |

Products of the same class

Results

**Steel Shield Wins :**
**Steel Shield outperforms Mobil in the Weld Point (oil strength in resistant to EP) parameter by 129 % and in the Last Non Seizure Load (wear performance in respect to load) by 159 %.**
*****Remarks: 4-ball test is normally for heavy weight oil and grease.**

The SwRI 4-Balls Test testified Steel Shield products are superior than Mobil products of the same classes

# SwRI Original TEST REPORTS

SOUTHWEST RESEARCH INSTITUTE®

6220 CULEBRA ROAD 78238-5166 • P.O. DRAWER 28510 78228-0510 • SAN ANTONIO, TEXAS, USA • (210) 684-5111 • WWW.SWRI.ORG

November 20th, 2014

George Fennell
Steel Shield Technologies
3351 Industrial Blvd
Bethel Park, PA 15102-2543
Phone: 1-800-390-1535
Email:

Re: Fuel Analysis Results
SwRI WO# 71111
PO# 120

Dear Mr. Fennell:

Analyses have been completed on your samples in accordance with the tests requested. Twelve samples were received in good condition between July 21st, 2014 and October 7th 2014 in good condition. Eleven samples were received in one gallon plastic containers and one sample was received in a one quart plastic bottle. Sample Identification and testing requesting is shown in the table on the following page. Testing took place between October 13th and November 11th 2014. Test results and sample identifications are shown in the table attached.

Analyses were performed according to the listed ASTM test procedures with no modifications or deviations. Precision should be consistent with those stated in the ASTM test procedures. Sample aliquots were taken in accordance with the various ASTM test procedures. The analyses above pertain only to the sample received by Southwest Research Institute and represent only that sampling lot. This report shall not be reproduced except in full without the express written permission of Southwest Research Institute.

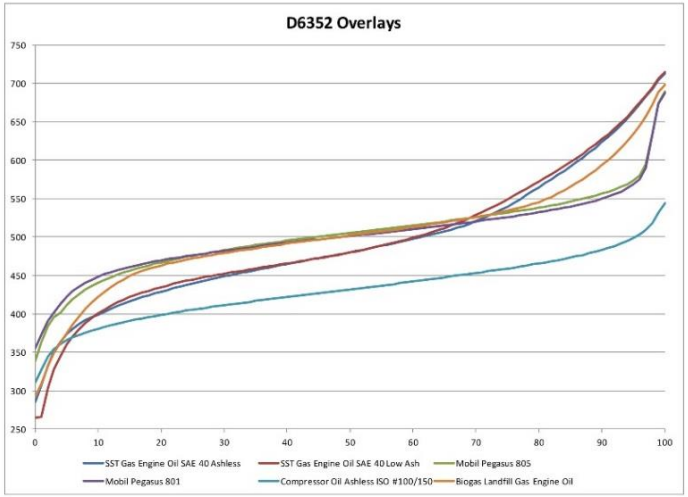
If there are any questions concerning these analyses, or if you need any additional testing on the samples, please contact me at (210) 522-2071. We appreciate the opportunity to be of service to your firm.

Sincerely,

Robert R. Legg
Fuels Laboratory Manager
Fuels & Lubricants Research Department
Office of Automotive Engineering

Benefiting government, industry and the public through innovative science and techn

**Test Summary Report**
November 20th, 2014
Steel Shield Technologies




In comparing the curves and D6352 chromatography, it is observed that samples SST Gas Engine oil SAE 40 Ashless and SST Gas Engine Oil SAE 40 Low Ash ar very similar with the exception that the Low Ash oil appears to have an added component that is somewhat lighter than the rest of the oil. The bulk of this oil is lighter than the others; however it does have a larger proportion of heavier compounds. In general it has broader array of hydrocarbons than the other oils. The Mobil Pegasus 801 and Mobil Pegasus 805 are essentially the same oil with the same boiling distribution. They both are a narrower cut reducing the amount of lighter and heavier hydrocarbon species. The Biogas Landfill Gas Engine Oil has a distribution in between the SST Gas Engine Oils and the Mobil Pegasus Oils. The Ashless Compressor oil is a significantly lighter oil than the rest of the samples.

# SwRI Original TEST REPORTS

**Test Summary Report**
November 20th, 2014
Steel Shield Technologies

*SwRI Lab# 24564*

SST Gas Engine Oil
5AE 40 Ashless
1 Gallon Plastic Jug

ASTM D2782 Measurement of Extreme-Pressure Properties of Lubricating Fluids (Timken Method)

| | |
|---|---|
| Okay Load, lbs | 40 |
| Score Load, lbs | 45 |
| Temperature, °C | 38 |

ASTM D2783 Measurement of Extreme-Pressure Properties of Lubricating Fluids (4-Ball Method)

| | |
|---|---|
| Corrected Load, kgf | 70 |
| Load Wear Index, kgf | 35 |
| Weld Point, kg | 200 |
| Last Non Seizure Load, kg | 80 |

ASTM D6352 Boiling Range Distribution of Petroleum Distillates from 174 to 700 °C by GC

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| IBP | 285.3 | 20% | 428.8 | 40% | 464.8 | 60% | 497.5 | 80% | 564.9 |
| 1% | 306.2 | 21% | 431.1 | 41% | 466.4 | 61% | 499.2 | 81% | 570.0 |
| 2% | 333.2 | 22% | 433.3 | 42% | 467.9 | 62% | 501.1 | 82% | 575.1 |
| 3% | 351.6 | 23% | 435.4 | 43% | 469.4 | 63% | 503.0 | 83% | 580.6 |
| 4% | 364.1 | 24% | 437.2 | 44% | 470.9 | 64% | 505.0 | 84% | 586.2 |
| 5% | 373.5 | 25% | 439.2 | 45% | 472.4 | 65% | 507.1 | 85% | 591.8 |
| 6% | 380.5 | 26% | 441.2 | 46% | 474.0 | 66% | 509.3 | 86% | 597.5 |
| 7% | 386.7 | 27% | 443.1 | 47% | 475.6 | 67% | 511.8 | 87% | 603.5 |
| 8% | 391.9 | 28% | 444.9 | 48% | 477.1 | 68% | 514.5 | 88% | 609.8 |
| 9% | 396.0 | 29% | 446.7 | 49% | 478.6 | 69% | 517.3 | 89% | 616.3 |
| 10% | 399.1 | 30% | 448.6 | 50% | 480.2 | 70% | 520.4 | 90% | 623.3 |
| 11% | 403.0 | 31% | 450.5 | 51% | 481.8 | 71% | 523.7 | 91% | 630.3 |
| 12% | 406.6 | 32% | 452.1 | 52% | 483.4 | 72% | 527.3 | 92% | 637.6 |
| 13% | 410.2 | 33% | 453.7 | 53% | 485.1 | 73% | 531.2 | 93% | 645.6 |
| 14% | 413.5 | 34% | 455.2 | 54% | 486.8 | 74% | 535.3 | 94% | 653.8 |
| 15% | 416.5 | 35% | 456.9 | 55% | 488.5 | 75% | 539.6 | 95% | 662.7 |
| 16% | 419.1 | 36% | 458.5 | 56% | 490.2 | 76% | 544.2 | 96% | 672.9 |
| 17% | 421.8 | 37% | 460.1 | 57% | 492.0 | 77% | 549.2 | 97% | 682.4 |
| 18% | 424.3 | 38% | 461.7 | 58% | 493.8 | 78% | 554.5 | 98% | 692.4 |
| 19% | 426.5 | 39% | 463.2 | 59% | 495.7 | 79% | 559.7 | 99% | 704.3 |
| | | | | | | | | FBP | 713.1 |



**Test Summary Report**
November 20th, 2014
Steel Shield Technologies

*SwRI Lab# 23728*

Biogas Landfill Gas Engine Oil
SAE 40 (Gecat SAE 40 Low Ash)
1 Gallon Plastic Jug

ASTM D2782 Measurement of Extreme-Pressure Properties of Lubricating Fluids (Timken Method)

| | |
|---|---|
| Okay Load, lbs | 40 |
| Score Load, lbs | 45 |
| Temperature, °C | 38 |

ASTM D2783 Measurement of Extreme-Pressure Properties of Lubricating Fluids (4-Ball Method)

| | |
|---|---|
| Corrected Load, kgf | 109 |
| Load Wear Index, kgf | 46 |
| Weld Point, kg | 250 |
| Last Non Seizure Load, kg | 100 |

ASTM D6352 Boiling Range Distribution of Petroleum Distillates from 174 to 700 °C by GC

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| IBP | 291.8 | 20% | 462.9 | 40% | 491.3 | 60% | 512.8 | 80% | 545.5 |
| 1% | 308.9 | 21% | 465.1 | 41% | 492.4 | 61% | 514.0 | 81% | 548.7 |
| 2% | 331.8 | 22% | 467.0 | 42% | 493.5 | 62% | 515.2 | 82% | 552.3 |
| 3% | 349.1 | 23% | 468.8 | 43% | 494.7 | 63% | 516.5 | 83% | 556.3 |
| 4% | 362.7 | 24% | 470.4 | 44% | 495.8 | 64% | 517.8 | 84% | 560.5 |
| 5% | 374.7 | 25% | 472.0 | 45% | 496.9 | 65% | 519.1 | 85% | 565.1 |
| 6% | 385.9 | 26% | 473.6 | 46% | 497.9 | 66% | 520.4 | 86% | 569.9 |
| 7% | 396.5 | 27% | 475.1 | 47% | 498.9 | 67% | 521.8 | 87% | 575.0 |
| 8% | 406.2 | 28% | 476.5 | 48% | 499.9 | 68% | 523.1 | 88% | 580.8 |
| 9% | 415.0 | 29% | 477.8 | 49% | 500.9 | 69% | 524.5 | 89% | 586.8 |
| 10% | 422.4 | 30% | 479.1 | 50% | 502.0 | 70% | 526.0 | 90% | 593.2 |
| 11% | 429.0 | 31% | 480.4 | 51% | 503.0 | 71% | 527.5 | 91% | 599.9 |
| 12% | 434.9 | 32% | 481.6 | 52% | 504.0 | 72% | 529.0 | 92% | 607.5 |
| 13% | 440.2 | 33% | 482.9 | 53% | 505.1 | 73% | 530.7 | 93% | 615.4 |
| 14% | 444.7 | 34% | 484.2 | 54% | 506.1 | 74% | 532.4 | 94% | 624.3 |
| 15% | 449.2 | 35% | 485.4 | 55% | 507.2 | 75% | 534.2 | 95% | 633.7 |
| 16% | 452.5 | 36% | 486.6 | 56% | 508.2 | 76% | 536.1 | 96% | 644.5 |
| 17% | 455.4 | 37% | 487.8 | 57% | 509.3 | 77% | 538.1 | 97% | 656.4 |
| 18% | 458.3 | 38% | 489.0 | 58% | 510.5 | 78% | 540.4 | 98% | 671.9 |
| 19% | 460.7 | 39% | 490.1 | 59% | 511.7 | 79% | 542.8 | 99% | 688.2 |
| | | | | | | | | FBP | 697.9 |

# SwRI Original TEST REPORTS

**Test Summary Report**
November 20th, 2014
Steel Shield Technologies

*SwRI Lab# 25252*

SST-EPA

1 Gallon Plastic Jug

ASTM D2782 Measurement of Extreme-Pressure Properties of Lubricating Fluids (Timken Method)

| | |
|---|---|
| Okay Load, lbs | 75 |
| Score Load, lbs | 80 |
| Temperature, °C | 38 |

ASTM D2783 Measurement of Extreme-Pressure Properties of Lubricating Fluids (4-Ball Method)

| | |
|---|---|
| Corrected Load, kgf | |
| Load Wear Index, kgf | |
| Weld Point, kg | >800 |
| Last Non Seizure Load, kg | 80 |





**Test Summary Report**
November 20th, 2014
Steel Shield Technologies

*SwRI Lab# 23727*

Compressor Oil Ashless
ISO #100/150
1 Gallon Plastic Jug

ASTM D2782 Measurement of Extreme-Pressure Properties of Lubricating Fluids (Timken Method)

| | |
|---|---|
| Okay Load, lbs | 55 |
| Score Load, lbs | 60 |
| Temperature, °C | 38 |

ASTM D2783 Measurement of Extreme-Pressure Properties of Lubricating Fluids (4-Ball Method)

| | |
|---|---|
| Corrected Load, kgf | 133 |
| Load Wear Index, kgf | 48 |
| Weld Point, kg | 250 |
| Last Non Seizure Load, kg | 100 |

ASTM D6352 Boiling Range Distribution of Petroleum Distillates from 174 to 700 °C by GC

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| IBP | 310.0 | 20% | 398.6 | 40% | 421.7 | 60% | 442.0 | 80% | 465.5 |
| 1% | 326.9 | 21% | 400.0 | 41% | 422.7 | 61% | 443.1 | 81% | 466.9 |
| 2% | 344.5 | 22% | 401.4 | 42% | 423.6 | 62% | 444.1 | 82% | 468.4 |
| 3% | 354.0 | 23% | 402.7 | 43% | 424.6 | 63% | 445.3 | 83% | 469.9 |
| 4% | 360.6 | 24% | 404.0 | 44% | 425.6 | 64% | 446.4 | 84% | 471.5 |
| 5% | 365.4 | 25% | 405.2 | 45% | 426.6 | 65% | 447.5 | 85% | 473.2 |
| 6% | 369.2 | 26% | 406.4 | 46% | 427.6 | 66% | 448.7 | 86% | 474.9 |
| 7% | 372.5 | 27% | 407.7 | 47% | 428.6 | 67% | 449.8 | 87% | 476.7 |
| 8% | 375.5 | 28% | 408.9 | 48% | 429.6 | 68% | 450.9 | 88% | 478.7 |
| 9% | 378.2 | 29% | 410.1 | 49% | 430.6 | 69% | 452.0 | 89% | 480.7 |
| 10% | 380.6 | 30% | 411.2 | 50% | 431.6 | 70% | 453.1 | 90% | 483.0 |
| 11% | 382.8 | 31% | 412.4 | 51% | 432.6 | 71% | 454.2 | 91% | 485.6 |
| 12% | 384.9 | 32% | 413.4 | 52% | 433.6 | 72% | 455.4 | 92% | 488.3 |
| 13% | 386.9 | 33% | 414.5 | 53% | 434.6 | 73% | 456.6 | 93% | 491.4 |
| 14% | 388.9 | 34% | 415.5 | 54% | 435.7 | 74% | 457.8 | 94% | 494.9 |
| 15% | 390.7 | 35% | 416.6 | 55% | 436.7 | 75% | 459.0 | 95% | 498.8 |
| 16% | 392.4 | 36% | 417.7 | 56% | 437.7 | 76% | 460.2 | 96% | 503.3 |
| 17% | 394.0 | 37% | 418.7 | 57% | 438.8 | 77% | 461.5 | 97% | 509.1 |
| 18% | 395.6 | 38% | 419.7 | 58% | 439.9 | 78% | 462.8 | 98% | 517.6 |
| 19% | 397.1 | 39% | 420.7 | 59% | 440.9 | 79% | 464.1 | 99% | 531.3 |
| | | | | | | | | FBP | 544.3 |

# SwRI Original TEST REPORTS

**Test Summary Report**
November 20th, 2014
Steel Shield Technologies

*SwRI Lab# 25250*

Mobil Pegasus
805
1 Gallon Plastic Jug

ASTM D2782 Measurement of Extreme-Pressure Properties of Lubricating Fluids (Timken Method)

| | |
|---|---|
| Okay Load, lbs | 9 |
| Score Load, lbs | 12 |
| Temperature, °C | 38 |

ASTM D2783 Measurement of Extreme-Pressure Properties of Lubricating Fluids (4-Ball Method)

| | |
|---|---|
| Corrected Load, kgf | 136 |
| Load Wear Index, kgf | 34 |
| Weld Point, kg | 200 |
| Last Non Seizure Load, kg | 63 |

ASTM D6352 Boiling Range Distribution of Petroleum Distillates from 174 to 700 °C by GC

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| IBP | 338.1 | 20% | 467.0 | 40% | 495.3 | 60% | 515.0 | 80% | 538.2 |
| 1% | 363.1 | 21% | 468.9 | 41% | 496.4 | 61% | 516.1 | 81% | 539.6 |
| 2% | 384.2 | 22% | 470.6 | 42% | 497.4 | 62% | 517.1 | 82% | 541.0 |
| 3% | 396.2 | 23% | 472.3 | 43% | 498.3 | 63% | 518.1 | 83% | 542.6 |
| 4% | 401.9 | 24% | 474.0 | 44% | 499.3 | 64% | 519.2 | 84% | 544.2 |
| 5% | 410.8 | 25% | 475.6 | 45% | 500.3 | 65% | 520.3 | 85% | 545.9 |
| 6% | 419.2 | 26% | 477.1 | 46% | 501.3 | 66% | 521.4 | 86% | 547.7 |
| 7% | 426.0 | 27% | 478.6 | 47% | 502.2 | 67% | 522.5 | 87% | 549.7 |
| 8% | 431.6 | 28% | 480.0 | 48% | 503.2 | 68% | 523.6 | 88% | 551.8 |
| 9% | 436.1 | 29% | 481.5 | 49% | 504.1 | 69% | 524.7 | 89% | 554.1 |
| 10% | 440.5 | 30% | 482.9 | 50% | 505.1 | 70% | 525.8 | 90% | 556.5 |
| 11% | 444.1 | 31% | 484.2 | 51% | 506.0 | 71% | 526.9 | 91% | 558.9 |
| 12% | 447.6 | 32% | 485.6 | 52% | 506.9 | 72% | 528.1 | 92% | 561.8 |
| 13% | 450.8 | 33% | 486.9 | 53% | 507.9 | 73% | 529.3 | 93% | 565.0 |
| 14% | 453.5 | 34% | 488.2 | 54% | 508.9 | 74% | 530.5 | 94% | 568.7 |
| 15% | 456.1 | 35% | 489.4 | 55% | 509.9 | 75% | 531.7 | 95% | 573.2 |
| 16% | 458.5 | 36% | 490.6 | 56% | 510.9 | 76% | 533.0 | 96% | 580.2 |
| 17% | 460.8 | 37% | 491.8 | 57% | 511.9 | 77% | 534.2 | 97% | 594.4 |
| 18% | 463.0 | 38% | 493.0 | 58% | 512.9 | 78% | 535.5 | 98% | 634.2 |
| 19% | 465.1 | 39% | 494.1 | 59% | 514.0 | 79% | 536.8 | 99% | 674.3 |
| | | | | | | | | FBP | 689.6 |



**Test Summary Report**
November 20th, 2014
Steel Shield Technologies

*SwRI Lab# 25251*

Mobil Pegasus
801
1 Gallon Plastic Jug

ASTM D2782 Measurement of Extreme-Pressure Properties of Lubricating Fluids (Timken Method)

| | |
|---|---|
| Okay Load, lbs | 9 |
| Score Load, lbs | 12 |
| Temperature, °C | 38 |

ASTM D2783 Measurement of Extreme-Pressure Properties of Lubricating Fluids (4-Ball Method)

| | |
|---|---|
| Corrected Load, kgf | 74 |
| Load Wear Index, kgf | 35 |
| Weld Point, kg | 200 |
| Last Non Seizure Load, kg | 80 |

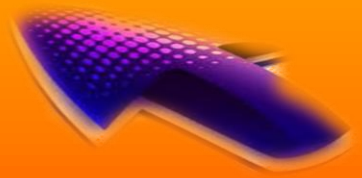
ASTM D6352 Boiling Range Distribution of Petroleum Distillates from 174 to 700 °C by GC

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| IBP | 355.5 | 20% | 469.5 | 40% | 492.3 | 60% | 510.0 | 80% | 532.2 |
| 1% | 372.7 | 21% | 470.9 | 41% | 493.3 | 61% | 511.0 | 81% | 533.6 |
| 2% | 391.1 | 22% | 472.3 | 42% | 494.3 | 62% | 511.9 | 82% | 535.1 |
| 3% | 401.9 | 23% | 473.7 | 43% | 495.2 | 63% | 512.9 | 83% | 536.5 |
| 4% | 413.3 | 24% | 475.0 | 44% | 496.2 | 64% | 513.9 | 84% | 538.1 |
| 5% | 422.1 | 25% | 476.2 | 45% | 497.0 | 65% | 514.9 | 85% | 539.7 |
| 6% | 429.3 | 26% | 477.4 | 46% | 497.8 | 66% | 516.0 | 86% | 541.4 |
| 7% | 435.4 | 27% | 478.5 | 47% | 498.7 | 67% | 517.0 | 87% | 543.2 |
| 8% | 440.6 | 28% | 479.7 | 48% | 499.5 | 68% | 518.0 | 88% | 545.2 |
| 9% | 444.6 | 29% | 480.8 | 49% | 500.4 | 69% | 519.1 | 89% | 547.4 |
| 10% | 448.3 | 30% | 481.9 | 50% | 501.2 | 70% | 520.2 | 90% | 549.9 |
| 11% | 451.6 | 31% | 483.1 | 51% | 502.1 | 71% | 521.3 | 91% | 552.7 |
| 12% | 454.2 | 32% | 484.2 | 52% | 503.0 | 72% | 522.4 | 92% | 555.8 |
| 13% | 456.7 | 33% | 485.2 | 53% | 503.8 | 73% | 523.5 | 93% | 559.1 |
| 14% | 459.0 | 34% | 486.3 | 54% | 504.7 | 74% | 524.7 | 94% | 563.1 |
| 15% | 461.0 | 35% | 487.3 | 55% | 505.5 | 75% | 525.9 | 95% | 568.2 |
| 16% | 462.9 | 36% | 488.4 | 56% | 506.4 | 76% | 527.1 | 96% | 575.2 |
| 17% | 464.7 | 37% | 489.4 | 57% | 507.2 | 77% | 528.3 | 97% | 590.1 |
| 18% | 466.5 | 38% | 490.3 | 58% | 508.1 | 78% | 529.6 | 98% | 633.5 |
| | | 39% | 491.3 | 59% | 509.0 | 79% | 530.9 | 99% | 673.0 |
| | | | | | | | | FBP | 687.9 |

# Video Demonstrations

- Steel Shield ABF Technology – How it works?
- Steel Shield ABF Technology – Timken Demonstration.
- Weapon Shield – TDS Bench.
- Weapon Shield – Gun oil Review.
- Weapon Shield – Customer Review #1.
- Weapon Shield - Customer Thoughts.
- Weapon Shield – Frog Lube vs Weapon Shield.
- Weapon Shield – CLP Review.
- Weapon Shield – CLP on S&W M19.
- Weapon Shield – CLP Oil Review.
- Weapon Shield – Customer Review #2.
- Weapon Shield – US Combat Forces.
- Weapon Shield – Cleansing Test Part.1.
- Weapon Shield – Cleansing Test Part.2.
- Weapon Shield – FP10 (Old Formula) OEM for US Shooter's Choice Part.1.
- Weapon Shield – FP10 (Old Formula) OEM for US Shooter's Choice Part.2.

- Steel Shield Technology Demo



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