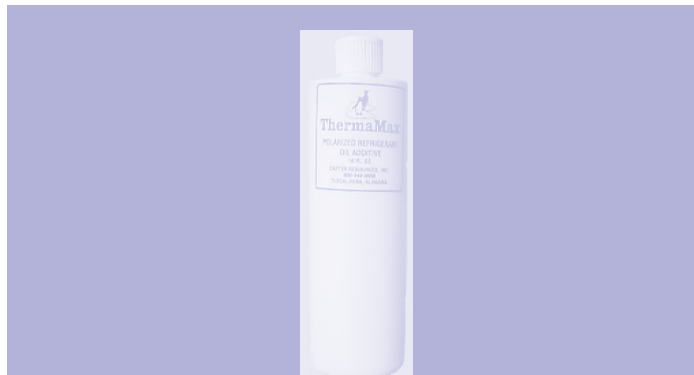


SMITH ENVIRONMENTAL PRODUCTS

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THERMAMAX

Polarized Refrigerant Oil Additive



Solving Problems, Saving Money!

ThermaMax

By Chiller Services

ThermaMax is a chlorine-free, covalent polarized refrigerant oil additive that can be used in all types of cooling equipment including air conditioning, heat pumps, chillers, freezers, coolers and refrigerated trucking. ThermaMax contains no halogens or other potential acid forming elements or compounds.

ThermaMax is a unique blend of natural and synthetic oils. It uses advanced anti-friction compounding and viscosity index enhancing technology to condition metal and primary lubricants to protect against heat, wear and corrosion resulting from friction between two surfaces rubbing against each other and extreme operating conditions that may be encountered during compressor operation. ThermaMax is a film strength builder and conditioner that blends perfectly with any non-silicon compressor oil.

The extreme pressure capabilities that ThermaMax adds to compressor oils further decreases wear. ThermaMax contains a thermal stabilizer that allows fluids to perform in compressors operating between ambient temperatures of -40 degrees F to +300 degrees F.

As normal air conditioning compressor loads or temperatures increase or as loads change from steady to irregular the protective lubricant film becomes increasingly thin. Eventually there will be occasional surface-to-surface contact. This brings about a condition of "mixed film" lubrication. Under these conditions, friction increases resulting in abnormal wear, unless the high performance anti wear oil additive ThermaMax is used. ThermaMax will increase the film strength of the compressor oil.

The finest polished machined surfaces exposes pits, valleys and jagged peaks under the electron microscope. These irregularities are called asperities. Under conditions of extreme pressures, high temperatures, shock loads or during cold and dry starts the thickness of the lubricant is minimum or the oil film is ruptured permitting surface contact and opposing asperities to interlock. As a result the peaks fracture repeatedly and shear off under the forces of compressor operation contaminating the oil. The resulting wear particles are often oxidized and become extremely abrasive, accelerating the deterioration of work surfaces, increasing friction, heat and energy consumption. When asperities interlock, energy is required to overcome the resistance. Besides wasting energy, uncontrolled friction generates excessive heat and wear. The anti-friction effect of ThermaMax virtually prevents asperity interlock.

The presence of high film strength lubrication provided by ThermaMax is retained on all metal surfaces and provides separation between the metal parts and penetrates deep into the pores of the metal. Most importantly even the asperities are protected by this oil film.

Since ThermaMax does not contain chlorides, sulfurs, plastics or heavy metals it will not contaminate compressor oil. ThermaMax will not cause an environmental problem with the disposal of waste oil.

ThermaMax contains no chlorine, sulphur or phosphate compounds; therefore, it cannot form acid. Other additives that contain halogenated hydrocarbons such as chlorinated olefins may form acidic compounds. Chlorine compounds can be unstable and drop off a chlorine atom that can combine with hydrogen to form hydrogen chloride or hydrochloric acid. Hydrochloric acid and some other acids will attack compressor parts like bearings and motor windings.

ThermaMax saves energy and decreases operating costs by:

1. Decreasing friction by increasing compressor oil lubricity
2. Shortening compressor run time
3. Lowering compressor head pressure
4. Increasing compressor life.

ThermaMax typically has a rapid payout on investment and continues to pay dividends in the form of lower operating expenses and energy savings throughout the life of the system.

The Refrigeration Cycle

A refrigeration system consists of the following components:

1. Compressor
2. Condenser
3. Metering device
4. Evaporator

Refrigerant is compressed from a low-pressure area (the evaporator) to a high-pressure area (the condenser). The condenser is a device for removing heat from the refrigeration system. The metering device controls the flow of refrigerant to the evaporator. The evaporator is a device for absorbing heat into the refrigeration system.

ThermaMax and The Refrigeration Cycle

Refrigerants carry a small amount of compressor oil, some of which adheres to the inside of the tubing of the condenser and evaporator coils. The oil acts as an insulator decreasing the heat transfer capability of the evaporator and the condenser.

The **ThermaMax** molecules are covalent and share electrons with the tubing on the inside of the condenser and evaporator coils. This allows the **ThermaMax** molecule to displace the oil barrier on the inside of the coils. The **ThermaMax** molecules are also polarized and repel one another. This results in a new coating of only one molecule in thickness on the inside of the coils. This greatly increases the ability of the system to transfer heat.

More efficient heat transfer results in lower head pressure and less work required by the compressor. More efficient heat transfer also results in colder evaporator coils, which allows for the set point to be reached quicker. This allows the compressor to run less therefore saving more energy. **ThermaMax** increases the lubricating ability of the compressor oil, which reduces friction and compressor workload.

Other **ThermaMax** Advantages

1. INCREASES HEAT TRANSFER:

Lifts oil film from inside of condenser and evaporator coils surfaces. Replaces oil film with **ThermaMax** of only one molecule in thickness.

2. INCREASES OIL LUBRICITY:

Increases fluid film strength and forms a molecular film on all moving parts.

3. EXTENDS DRIP DOWN TIME:

Forms covalent bond with metal surfaces.

4. INCREASES COMPRESSOR LIFE:

Decreases friction and operating temperature. Less run time due to more effective heat transfer.

5. DECREASES COMPRESSOR WORKLOAD:

Lowers head pressure by increasing heat transfer in the condenser.

6. PREVENTS FORMATION OF HARMFUL ACIDS:

7. NON HYGROSCOPIC:

Contains no compounds that have an affinity for moisture.

8. RESIST CORROSION AND OXIDATION:

Contains thermal and oxidation stabilizers. Covalent film on metal surfaces also helps prevent rust and corrosion.

9. DECREASES COMPRESSOR VIBRATION:

Friction reduction allows for smoother operation.

10. WILL NOT FORM OR CONTRIBUTE TO THE FORMING OF ACIDS:

Contains no halogen atoms or halogen compounds.

11. DECREASES COMPRESSOR RUN TIME:

More efficient heat exchange causes set point to be reached faster resulting in less run time.

12. DECREASES COMPRESSOR HEAD PRESSURE:

More efficient heat transfer in condenser lowers head pressure.

13. COMPATIBLE WITH ALL REFRIGERANTS AND NON-SILICON COMPRESSOR OILS:

14. OTHER **THERMAMAX** BENEFITS:

- (1) Reduces valve noise
- (2) Maintains seal pliability
- (3) Reduces scuffing, scoring and welding
- (4) Reduces oil foaming

15. INSTALLATION:

Before installing **ThermaMax** insure that the high-pressure and low-pressure safety switches are in proper working order.

Time and temperature can cause coking in most compressor oils. Coking is the precipitation of hydrocarbons from lubricants. These precipitated hydrocarbons adhere to the inside of the compressor and the inside of the tubing. This precipitation can also partially block dryers in the system. **ThermaMax** will displace these hydrocarbon deposits.

If coking is suspected to have occurred it is prudent to replace the existing dryer with a core dryer that the filter elements can be changed with out evacuating the system. A suction line dryer should be installed if the system is severely contaminated.

ThermaMax is simple and inexpensive to install. It is normally installed in the low-pressure side of a compressor system, using one fluid ounce per ton of air conditioning (12,000 BTU) in systems smaller than ten tons. Units larger than ten tons generally require about 10% of the oil capacity. If the 10% volume of **ThermaMax** additive is greater than 48 ounces, a 5% ratio should be sufficient for the total capacity of oil volume. This is dependent on the make and type of unit and must be evaluated on an individual basis. In order to expedite the action of **ThermaMax**, a portion of the recommended treatment quantity of the product can be injected safely into the high-pressure side of the system. This will reduce the time **ThermaMax** usually takes to reach the evaporator core. If adding **ThermaMax** to the high-pressure line, it is recommended to shut system down to allow pressure reduction in the system.

The oil in large commercial and industrial compressors must be changed on a periodic basis. If it becomes necessary to change the oil in your compressor, it is unnecessary to completely re-treat with [ThermaMax](#). Add only a reduced amount of the original treatment quantity, usually from 10-50% of the original volume of [ThermaMax](#) used, determined by the type of compressor. This will assure that the system will continue to have the full benefit of [ThermaMax](#) protection.

When monitoring [ThermaMax](#) benefits to prove results, it is recommended to observe amperage draw, head and suction pressures, and most importantly supply temperature at the unit both BEFORE and AFTER [ThermaMax](#) installation. Improvement may be gradual at first depending on the system, but should stabilize to maximum benefits in less than 100 hours of run time.

The system should be checked 2 – 3 times in the first 2 weeks after installation. The compressor oil level should be check especially on reciprocating compressors. The unit should be checked for proper super heat and the dryer should be checked for a temperature difference indicating a blockage.

If it becomes necessary to reclaim the refrigerant, there is no need to re-treat with [ThermaMax](#). The polarized particles bond to the interior metallic surfaces of the compressor, evaporator, and condenser.

LIMITED FIVE YEAR WARRANTY

The manufacturer warrants that its [ThermaMax](#) oil additive contains no harmful ingredients that might damage metals, seals, or gasket materials, and will not cause material damage to any mechanically sound equipment when used in compliance with the company's recommendations and instructions. When [ThermaMax](#) is properly installed, Chiller Services will repair or replace any compressor system proved to be damaged solely by the product. This warranty is limited to actual damage to treated equipment, and does not include incidental or consequential damages or damages of any other kind or character. This warranty shall not apply to any product that has been subject to misuse, abuse, mishandling, tampering, spillage, contamination during or after shipment, or any defects or damage caused by improper handling or storage.

ThermaMax vs. Chlorinated Olefin Products

	ThermaMax	Chlorinated Olefins
Chlorine Free Formulation	Yes	No
Improves Heat Transfer	Yes	Yes
Saves Energy	Yes	Yes
Performs Over Wide Temperature Range	Yes	No
Increase Lubricity	Yes	Yes
Extends Equipment Life	Yes	Yes
Reduces Noise and Vibration	Yes	Yes
Reduces Friction	Yes	Yes
Acid Formation Potential	No	Yes
Contains Acid Scavenger	Yes	Some
Rust Protection	Yes	No
Cleans and Restores Older Systems	Yes	Yes
Maintains Efficiency of New Systems	Yes	Yes
Reduces Run Time	Yes	Yes
Anti-Weld Protection	Yes	No
Contains Anti-Oxidation Agent	Yes	No
Gasket, Seal Conditioner	Yes	No
Performs with All Refrigerants	Yes	No
Inhibits Non-Ferrous Corrosion	Yes	No
Long Shelf Life	Yes	No
Hazard Waste Disposal Problem	No	Yes
Affinity for Moisture	No	Yes
Corrosive	No	Yes
Extreme Pressure Lubrication	Yes	Yes
Compatible with All Compressor Oils *	Yes	No

* Except Silicon