

Equipment preservation procedures using Mobil™ rust preventives

Introduction

Rust is a specific type of corrosion that occurs on iron and steel surfaces when both water and oxygen are present. Free water or very thin, almost invisible films of water, common in humid atmospheres, can promote rust. Since air, the normal source of oxygen, usually contains some moisture, and ordinary water contains dissolved air, the elements required for rusting are nearly always present.

Corrosion of some metals — copper and aluminum, for example — results in the formation of a tight oxide film that protects the surfaces from further corrosion. On iron or steel, however, rust is porous, allowing water and oxygen to reach the underlying surface and penetrate deeper into the metal.

Benefits of rust prevention

Rusting of equipment costs industry several billions of dollars every year and creates safety hazards for employees. That's why Mobil™ recommends creating a rust prevention program, which can help:

- Minimize downtime
- Optimize production
- Control maintenance costs
- Promote long equipment life

Mobilarma™ and **Mobil Vaprotec™** Light products are designed specifically to help prevent rust. Proper use of these rust preventives can help greatly reduce the costs and risks of rusting.

Preservation procedures

Pumps, motors, gearboxes and other stationary equipment

Wipe accessible surfaces clean of dirt, condensation or free water. If practical, spray **Mobil Vaprotec™** **Light** on internal surfaces. If there is no oil in the sump, add an inch or two of **Mobil Vaprotec™** **Light** to the sump. If equipment is stored with oil, add 10 percent by volume **Mobil Vaprotec™** **Light** to the existing oil. Seal openings.

Periodically turn shafts 1 1/4 turn manually or store on vibration-absorbing blocks to prevent false brinnelling of bearings. Inspect every six months, and replenish **Mobil Vaprotec™** **Light** as needed, depending upon how well the equipment is sealed. Coat external surfaces with **Mobilarma™** **247**.

Prior to startup, remove all protective covers.

Equipment may be operated using **Mobil Vaprotec™** **Light**, or with the mixture, as long as oil viscosity is correct, equipment is lightly loaded and temperature is below 120°F (48.8°C) to minimize evaporation of the additive. Best practice is to drain **Mobil Vaprotec™** **Light** and replace with fresh lubricating oil.

Mobil Vaprotec™ **Light** protects surfaces that are in contact with the oil and that have been coated by the oil. It contains volatile rust inhibitors that protect surfaces above the level of the oil.

Engines

Wipe surfaces clean of dirt, condensation or free water. Drain engine oil and replace with **Mobilarma™** **524**. Change oil filter(s). Operate engine for at least one hour monthly. If engine cannot be operated, add 10 percent **Mobil Vaprotec™** **Light** to **Mobilarma™** **524**. Spray **Mobil Vaprotec™** **Light** into air inlet or turbocharger inlet, exhaust openings, flywheel, ring gear teeth and starter pinion. Remove fuel nozzles or spark plugs and add a small amount of **Mobil Vaprotec™** **Light** to each cylinder.

Preserve fuel system according to OEM guidelines. Coat external unpainted surfaces with **Mobilarma™** **247** and lubricate all grease-lubricated components. Seal with airtight, weatherproof covers. Inspect periodically and reapply rust inhibitor if necessary.

Prior to startup, remove all protective covers. Engines may be operated temporarily on **Mobilarma™** **524**; however, **Mobil Vaprotec™** **Light** should be removed from cylinders before starting the engine.

Parts and components

Wipe surfaces clean of dirt, condensation or free water. Spray with **Mobilarma™** **245** for short-term indoor storage. Spray with **Mobilarma™** **247**

for longer-term protection. Inspect quarterly and reapply as necessary. Prior to assembly, remove **Mobilarma™** with solvent if it will come in contact with lubricating oil.

All equipment

Attach a tag to each piece of equipment documenting:

- The date it was preserved
- Rust prevention procedures
- Steps needed prior to startup

At startup, drain or remove rust preventive with solvent and add fresh charge of oil. Submit oil samples to **Mobil ServSM Lubricant Analysis** lab to confirm fluid condition.

Typical physical and chemical characteristics

		Gravity API	Pour Point °C(F)	Flash Point °C(F)	cST 40°C	Water displacement
Mobilarma™ 200 Series These rust preventives are based on light-bodied solvents, a polar rust preventive, and all contain water displacement additives and fingerprint suppressants.	245	43.1	-	38 (100)	2.6	Yes
	247	35.5	-	71 (160)	2.9	Yes
Mobilarma™ 500 Series TA series of high-grade hydraulic and/or lubricating oils containing rust preventive additives. They are formulated as run-in oils for enclosed assemblies such as engines, compressors, pumps, gear sets, etc. They also can be used as high-quality, short-term lubricants.	522 SAE 10W	30.2	-23 (-10)	182 (360)	27	
	524 SAE 30W	27.5	-18 (0)	218 (425)	82	
Mobilarma™ 778 A series of oil-based products with rust preventive agents dispersed in a mineral oil carrier for ease of application.	778	30.6	-3 (27)	148 -(298)	19	
Mobilarma™ 798 Excellent protection for wire rope.	798	-	Flash Point >210C (410F) cST	N/A	23 cST @ 100°C	Yes
Mobil Vaprotec™ Light A vapor space-inhibited circulation oil and concentrate, which provides excellent corrosion protection to metal surfaces above fluid-oil level in an enclosed system through a controlled- volatility inhibitor system, as well as the oil-wet surfaces.	Vaprotec Light	30.2	-7 (20)	193 (380)	30	-

Applications and potential benefits

		Areas of application	Key benefits	How to apply	How to remove	Protection inside storage (months)
Mobilarma™ 200 Series	245	Finely finished parts between machining operations and prior to packaging of parts for storage.	Highly effective water displacement resistance to fingerprints, corrosion and etching.	Spray, brush, rolling or dip	Dip in kerosene or solvent.	3-6
	247	Indoor or outdoor protection under cover for inter-operational slushing.	Provides a soft, waxy film. Leaves a heavy, non-drying film.	Dip, slush or spray.	Dip or rinse in kerosene, solvent or caustic bath.	12+
Mobilarma™ 500 Series	522 SAE 10W 524 SAE 30W	A series of oils for run-in, calibration testing, wet sump initial fill, and seasonal lay-up of diesel and petroleum engines, air tools, compressors, gear cases, hydraulic pumps, etc.	Excellent rust and corrosion protection. Effective anti-oxidation characteristics with detergent engine oil performance. Easy to use.	Install for run-in, testing adjustment and rust prevention. Flushing with regular lube oil not required.	Drain when needed. Flushing is required only where drainage is poor, or where the rust preventive material must be completely removed such as in air compressors or steam turbines.	3-6
Mobilarma™ 778	778	Long-term protection of cold-rolled sheet stock, strip steel and coils, particularly when stored outdoors or near pickle lines.	Protection for periods of up to 12 months or longer. Maintains uniform coverage under extreme tension. Non-sticky, will not attract dirt or cause staining.	Can be uniformly sprayed at high-rolling speeds	Use petroleum solvent, emulsion or alkaline cleaner.	12 (Exterior)
Mobilarma™ 798	798	Wire rope protection.	Lubricates and protects against rust.	Swab or brush.	Petroleum solvent.	6-12
Mobil Vaprotec™ Light	Vaprotec Light	Protection for all types of equipment during test, run-in prior to storage, shipment or intermittently used machinery.	Excellent thin film, vapor and liquid phase long-term rust prevention. Superior oxidation stability and demulsibility. Wide range of application.	Install for run-in or normal operation. Protection is improved if unit is sealed.	Drain when needed.	3-6

Based on available toxicological information, these products produce no adverse effects on health when properly handled and used. Take precautions not to breathe excessive amounts of rust preventive vapors and prevent all sources of excessive heat or open flames from coming in contact with spray mist while it is being applied. No other special precautions are suggested beyond attention to good personal hygiene, including laundering oil-soaked clothing and washing skin-contact areas with soap and water. A Material Safety Data Sheet can be obtained from local distributors or via the Internet on <http://www.msds.exxonmobil.com>.
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