

# YANMAR SERVICE NEWS

Title	Effects and Features of DEFRIC Coat		S/No.: 97-1-G-09-033-K Date: Feb. 2003
Eng. Model	ALL	Applications	Marin Main&Aux. Industrial
		Engine Nos.	_____

The cylinder pressure and fuel oil injection pressure are both getting higher in the diesel engines in recent years in accordance with their structural changes for compact, light-weight and high output engines. DEFRIC Coat is the solid lubricating agent, which was developed for use with these engines in order to prevent LO from running out during the start-up operations and thereby bettering their breaking in performance.

## 1. Outline of DEFRIC Coat

The development conception of DEFRIC Coat was that the high purity was not enough for the molybdenum disulfide for lubricating purposes to display an outstanding lubricating performance. Based on this conception, a unique solid lubricating agent, (named DEFRIC Coat), with the major content of molybdenum disulfide, ( $\text{MoS}_2$ ), was developed. The lubricating agent, unlike the conventional spray type to parts surfaces, features baking treatment to the parts surfaces, which gives increased surface hardness and durability. The solid lubricating agent features an extremely low friction coefficient, (below 0.04), and high friction-resistance. The DEFRIC Coat treatment is especially effective for the following parts:

- 1) The area prone to extreme pressure, where with the treatment of the regular lubricating agent scouring or seizure would develop,
- 2) The area prone to a wide range of temperature changes, from the extreme temperatures exceeding 400 to the low temperature of - 100 .
- 3) Coating thickness: approx. 20  $\mu$  (baking treatment where  $\text{MoS}_2$  fine particles are dispersed to the thermal resistant organic binder)
- 4) Coating: DEFRIC Coat aims to better breaking-in performance. The friction area wears in 1,000~2,000 hours. Pistons and other parts with eccentric treatment, prone to weak friction, last for a long time.

(Note): DEFRIC Coat, when rubbed strongly during disassembly and re-assembly, can remove partially. Note that this is no abnormality. The part with that state can be used continuously without providing repair.

## 2. Parts with DEFRIC Coat at Yanmar and Effectiveness

### 1) Coating to the Moving Face of the FCD Pistons

The friction coefficient of the moving face was lowered with the use of the coating and the thus friction heat was lowered. As a result, scouring and seizure were prevented. The coating was also instrumental in decreasing the clearance to the cylinder liner, which contributed to lower L.O.C.

### 2) Coating to Tappet's Moving Face of FO Injection Pump

The fuel cam in the fuel injection process is prone friction heat in the area receiving extreme pressure. The coating was effective enough in preventing damage or flaking off due to such friction heat.

### 3) Coating to the Moving Face of FO Injection Pump and Plunger

In the kerosene spec. engines, since the viscosity of kerosene being low, the lubricating agent used to be added for preventing scouring during engine's start up period. With Defric Coat, however, there was no need to add lubricating agent in fuel oil and no abnormality has been caused.

<b>YANMAR CO.,LTD.</b> ENGINE PRODUCT OPERATIONS DIV. LARGE ENGINES FACTRY QUALITY ASSURANCE DEPT. FAX.No.: +81-6-6488-4003	Approved	Checked	Drawing
			