

**TRANE™**

## **General Service Bulletin**

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## **Subject: Model "E" Oil Pressure**

### **Introduction:**

There is a lot of confusion concerning the proper oil pressure for a Model E (2E5\*\*\*, CRHE) compressor. The purpose of this service bulletin is to clear up the confusion and state the actual minimum required oil pressure.

#### Discussion:

Over the years, there have been several design changes that have resulted in reduced measured net oil pressure for the Model E compressor. The design changes involved the crankshaft and connecting rods, which resulted in higher oil flow rates and lower oil pressures.

Compressors built prior to 1978 normally had 80 psig or above net oil pressures. Then in 1978 the Model E compressor had its first major change to the lubrication system. The bearing clearances, both connecting rods and main bearings, were increased, the oil passages in the crankshaft were enlarged and the crankshaft journals were drilled through to allow oil to flow out of the crankshaft in two locations 180 degrees apart from each other. The result of this change was a drop in oil pressure from 80 to 60 psig.

In 1982, the offset connecting rod was introduced into the Model E compressor. The clearances were again increased and the oil pressure again was reduced slightly due to the increased oil flow rate caused by the increased oil clearances.

In 1985, changes were made to the compressor to improve its ability to handle dirt and improve oil return. Included in these changes were modifications to the crankshaft. The oil passages were enlarged again and the oil feed holes increased in size, but they were not drilled through the journal.

In addition to these changes, oil bleed ports with orifices were drilled into the transfer sections of the crankshaft to act as a contamination and liquid refrigerant bleed. Again the oil flow was increased and the oil pressure reduced to the 40 to 50 psig range.

All the above changes were implemented on both the semihermetic and open compressors. The changes were all designed to improve reliability by increasing the quantity and quality of the oil being fed to the bearings.

Now the question becomes how much oil pressure is actually required to properly lubricate the compressor and operate the hydraulic unloader system.

The net oil pressure that is measured is the supply pressure of the oil to the bearings of the compressor and not the oil pressure inside the bearing. This is important to understand because the actual oil pressure that supports the shaft in the bearing is created by the hydrodynamic forces in the bearing and this pressure is in the thousands of psi. The oil pressure needs only to be high enough to supply the proper amount of oil to the bearings.

Examples of compressors with lower oil pressures are the Model R (CRHR) and the Model M (CRHM), which have normal oil pressures of 20 to 30 psig net. Hermetic compressors which use centrifugal oil pumps, such as the Model H (CRHH), Model L (CRHL), Climatuff™, the scroll compressor, have oil pressure measured in the range of 1 to 2 psi.

The minimum oil supply pressure for the Model E compressor is 25 psig net. Oil pressure is also required to actuate the hydraulic unloaders. The oil pressure required to operate the unloaders is approximately 10 to 15 psig.

Adding the minimum oil supply pressure and the minimum oil pressure to operate the unloaders yields 35 psig net oil pressure, which is the minimum allowable oil pressure for the Model E compressor to operate the unloaders and properly lubricate the compressor.

If the oil pressure is below 35 psig net oil pressure, the compressor should be disassembled and inspected for the cause of the low oil pressure. Refer to Service Bulletin HCOM-SB-39A "Diagnosis of Model E and F Compressor Low Oil Pressure and Oil Loss Problems."