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# *Performance Assessment*
# *Kaiser Permanente – 40T Unit*
# *EER Comparison*

Kaiser Permanente has undertaken a test of a proprietary refrigerant product it is using to enhance and/or refurbish the operating functionality and capacities of installed R22 systems. The purpose of this test at Kaiser Permanente is to provide a demonstration of the benefits recognized with this refrigerant, as it is a fully compliant drop-in for R22 replacement.

The system being tested is located at the Yorba Linda facility of Kaiser Permanente, is a 40 Ton Carrier system, model #50FP-044AB-600CJ, Serial Number 4398F79469 .

The process utilized during this test period was to capture operating performance data through the use a data-logging device connected to the unit. Appropriate data was collected, which provided the ability to assess the operating efficiency of the unit when running R22 and then post installation with TdX 20. The results of this comparison provide a representation of the benefits beneficial to Kaiser Permanente and its installed R22 systems.

**Amperage Savings:**

Data collected during the operating period captured the following maximum average amperage usage of the compressors when running with R22 and TdX 20.

**R-22** = Compressor #1 - 33.62 amps
Compressor #2 - 30.46 amps → 64.08 max. amps

Total of 90.78 amps

**TdX 20** = Compressor #1 - 28.28 amps
Compressor #2 - 28.42 amps → 56.70 max. amps

Total of 83.4 amps

Based on the above, the energy savings recognized in this testing shows that the differential in amperage requirements between R22 and TdX 20 provides **an 11% energy efficiency** (less amps required to meet the needs of the system).

Amperage Usage = 64.08 – 56.70 = 7.38 amp savings - [ 11%]

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**EER Calculation:**

As part of the performance analysis, a comparison of the rated EER factor was calculated based on the performance of the unit as it currently operates, the adjusted performance following installation of TdX 20 and what the units rating was at the time of initial installation. A new R22 system in 1998, the stated EER rating of the unit was 8.5 EER. Using the following formula, the EER rating was calculated for both the existing R22 performance (2014) and the post installation EER with TdX 20.

$$EER = \frac{\text{NetCap (Btuh)}}{\text{Power Input (Kw)}}$$

Utilizing the data from our testing of the R22 system, the following calculation defines the current operating efficiency of the system.

NetCap (Btuh) = 480,000
Power Input (Kw) = 62.39

$$EER = \frac{480{,}000}{62.39} \longrightarrow \textbf{EER = 7.7} \ (7.693) \ \textbf{[R22]}$$

Utilizing the same formula for performance of the R22 unit following the installation of TdX 20, the results are found to be:

NetCap (Btuh) = 480,000
Power Input (Kw) = 57.32

$$EER = \frac{480{,}000}{57.32} \longrightarrow \textbf{EER = 8.4} \ (8.374) \ \textbf{[TdX 20]}$$

Based on the above comparison and the noted initial EER rating of the unit at purchase of 8.5, we have identified and verified an increased efficiency in the installed unit that raised the EER performance factor to very close to the initial installation level of the unit.

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