Use of Suntec Fuel Units at Low Temperatures

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Purpose

This document is intended as a guideline for using Suntec fuel units at low temperatures.

General

Suntec fuel units are designed for indoor use, though it is known that some customers use them in more severe applications such as outdoor boost pump assemblies, aircraft deicing equipment and portable space heaters.

Low Temperature Limitations

Standard Suntec model A and B fuel units are qualified by laboratory tests for use down to +32 degF. They are UL certified for use down to +50 degF. Applications at lower temperatures are at the user's risk and must be qualified by the equipment manufacturer to encompass product specific parameters, such as vibration, that may influence shaft seal leakage.

Plumbing

Recommendation: A one pipe hook-up with minimal lift is highly recommended for cold ambient applications for the reasons discussed below!

One Pipe Hook-Up: Typically, only ~10% of the fuel unit gear flow is required at the nozzle. The other ~90% of the flow is re-circulated internally back to the fuel unit gear set, absorbing heat in the process. The heating of the fuel greatly improves fluid flow characteristics and the pliability and function of seal materials. The ~90% inlet flow reduction with one pipe also reduces the inlet vacuum and may eliminate perceived air problems caused by fuel degassing.

Two Pipe Hook-Up: This hook-up is not recommended below +32 degF! The ~90% excess gear flow not used at the nozzle is returned to the tank. Hence, the return flow must be replaced by new cold fuel from the tank. The inlet flow becomes 100% of the gear capacity, ensuring that all fuel flowing through the pump is cold oil from the tank! The high inlet flow also increases inlet line losses and vacuum.
ALTERNATIVE: A de-aeration device such as a Tiger Loop, where return line oil is sent through the device and back to inlet, rather than back to the tank, is a second choice to one pipe for heating the fuel.
NOTE: In the event two pipe operation is absolutely needed, it is extremely important to minimize return line restrictions that may cause pressure build-up at the shaft seal. At least 1/2" O.D. copper tubing should be used and there must be no valves, bends or other restrictions in the line.

Extreme Applications

In extreme applications such as those below +32 degF, those having vibration, etc., it is possible to have minor shaft seal leakage on cold start-up, then to have the leakage stop as the unit and shaft seal warm up. It is strongly recommended that such installations:

A. Use one pipe hook-ups, which tremendously aid warming of the fuel oil, and
B. Use fuel units that have Nitrile/Buna-N shaft seals versus Viton shaft seals.