

**Single-Phase Product Bulletin – 2005-002**

Date – April 13, 2005

**Subject – Problem Motors**

We have discovered that there are some types of single-phase fan motors which do not work with the Frigitek. The problem motors are the types known as “Split-Phase”, “Capacitor-Start” and “Capacitor-Start / Capacitor-Run”. These motors are sometimes used in systems where the individual fan motor size is ¼ horsepower or more.

In order to determine if these motors are being used in a prospective installation, some observations must be made. First, measure the diameter of the fan blades. If the blades are 16” or smaller, it is unlikely that the problem motors will be present, and the Frigitek may be installed. If the blades are larger than 16”, then further tests must be made.

The problem motors are designed for very high starting torque, for use in installations where there is a heavy load (such as a compressor) on the motor when it is first switched on. This means that, in a fan application, when switched on, they come up to speed very quickly – almost with a “snap”. The standard motors come up to speed more slowly, taking about a second or so to come to full speed – sometimes up to 10 seconds. Observing the fan motors start up from fully stopped condition will show which type is installed.

Another possibility is to ask the refrigeration service person. Usually the refrigeration service people will know which type of motor which is installed in the system, but it is recommended that the observations be done to confirm their information, especially if they seem not to be certain of the motors installed in the evaporator.

If a potential customer has the problem motors installed, you should recommend that they be replaced with “Capacitor-Run” motors (also called “PSC” or “Permanent Split Capacitor” motors), so the Frigitek can be installed. The lower starting torque of the “Capacitor-Run” motors is not a problem for fan installations because it is easy to start a fan spinning. The replacement cost is in the range of \$100 - \$150 per motor, depending on the size of the motor and the hourly charges of the person doing the replacement. This will, of course, add to the ROI time, but, without the replacement, they can never have the energy savings and other advantages which the Frigitek provides.

If a Frigitek is accidentally installed on an evaporator which uses the problem motors, the result will be dramatically clear. When the Frigitek switches to low speed, the motors will “stutter” and make loud noises, and may appear to even run backwards.

Another indication is that, when installation is complete, and the Frigitek switched to low speed, the fan(s) appear to be running too fast, and adjustment of the low speed pot seems to have no effect on the speed.

If either of these conditions is observed, switch off the power, or switch the Frigitek to “Bypass” IMMEDIATELY. Allowing the motor to run under this condition will damage both the motor and the Frigitek. Leave the Frigitek in “Bypass” while you resolve the situation with the customer.