COOLER UPGRADING: A TIMELY TOPIC

Do you need more air out of your air cooler or cooling tower? Do you have increased process demands? Obsolete or inefficient fans? Stricter noise specifications?

There are numerous reasons to consider air cooler and cooling tower upgrading. With everyone feeling the pinch of reduced budgets along with increased production demand, and trying to do more with less, a short discussion of cooler performance may be in order.

Much can be done to upgrade an existing cooler by changing only the fan or the fan and drive system. Upgrading is generally simple, inexpensive and requires little downtime. Several options are:

1. Replace obsolete fans:

Many fans in service were originally produced by companies that are no longer in business, and many of these older fans suffer from low efficiency as well. Replacing such a fan with a higher efficiency Moore fan may be the only requirement. Several prominent UK refineries have tried this approach and been pleased with the results. A fan can typically be installed in less than 30 minutes, resulting in a minimum of down time.

2. Meet lower noise requirements:

Many fans in the field were designed and installed when occupational noise was not an issue. With today's tougher noise standards, plant operators have shown a desire to switch to lower noise fans. Generally, it is required to change only the fan along with the drive ratio (increasing the number of blades and decreasing the RPM) to achieve this. See Tech Note #6 "Selecting a Low Noise Fan" . Even greater savings are available with "VT" blades.

Before increasing airflow, it is advisable to contact the cooler manufacturer to determine the effect of increased flow on process conditions. A larger motor may require changes in the shaft and wiring. In many cases, flow can be increased and noise reduced at the same time. For instance:

Consider a fan providing 120,000 ACFM (56.6 m3/sec) at 0.5" static pressure. A 12-ft 4-blade Series 40 fan operating at a tip speed of 12,000 FPM (61.0 m/sec) can be replaced by a 9-blade Series 60 fan operating with a tip speed of 8,290 FPM (42.1 m/sec). This would result in a 20% increase in flow to 144,000 ACFM (68.0 m3/sec) and a 40% increase in static pressure (to .72" static), while the noise level is reduced by 3 dBA.

Cooler cleaning is important, too:

Before rating a replacement fan for an air cooler, we recommend asking the cooler manufacturer for recommendations on fin cleaning. Dirty, clogged fins decrease cooling capacity in several ways.

First, dirty fins increase the resistance to air flow and may increase the static pressure well above what the fan was designed to handle, resulting in fan stall and a marked decrease in flow and cooling capacity. Dirty fins also decrease the heat transfer coefficient, requiring more airflow to dissipate the required heat load.

Regular cleaning is good practice and is an integral part of a fan retrofit.