



Bearing temperatures

Normal bearing temperatures after the “run-in” period are from 50 to 100° F above ambient depending on speed, airstream temperature, shaft loading, and bearing type.

Bearings on new fans will generally run hotter during the “start-up or run-in” period. This start-up condition can last from 15 minutes to a 24 hours, and for most applications will peak out at a maximum 200° F.

During start-up conditions, Phelps Fan normally wishes to review an application if the bearing temperatures do not settle out prior to reaching about 210° F. This is well below the bearing capabilities, however a review is recommended to assure that there is an expected cause for this temperature level.

Phelps Fan recommends monitoring bearing temperatures in order to provide an indication of bearing and lubrication condition. For critical machinery this is normally accomplished by installing bearing RTDs or thermocouples, which contact the outer bearing race.

Selecting alarm and shut down set points for bearing temperature monitors

Methods do not exist for predicting exact bearing temperatures that will occur during operation. While computer software does exist for the intent of estimating bearing temperatures: due to complex bearing and fan geometry, discrepancies in internal bearing clearance, machining tolerances, and loading estimates, these temperatures are at best estimates, and should only be used where required for preliminary instrument settings.

Phelps Fan recommends selecting alarm and shutdown temperatures as follows;

New fan bearings will normally go through a “run-in” period during which time temperatures will rise, then drop-off and stabilize. Following the “run-in” period, the temperatures should be recorded. Notes should include the ambient and airstream temperature, along with fan speed for future reference.

The alarm temperature should be set at 15°F above the normal bearing operating temperature. The shutdown temperature should be 15°F above alarm temperature. In no case should the shutdown temperature exceed 220°F, unless Phelps Fan engineers have reviewed all information.

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Fan Bearing Trouble Shooting Checklist

The fan unit provided has been equipped with bearings selected specifically for the speeds, loading, and air stream temperatures of the intended service.

Factory Testing: Pre-assembled units with motors mounted at the factory that are 480 Volt 250HP and smaller, are tested to insure satisfactory bearing operation, and that “filter-in” vibration velocity at the bearings does not exceed vibration limits as published in AMCA publication number 204-96 as approved by ANSI.

It is recommended that the user be highly familiar with the Fan and Bearing O&M manuals supplied with the equipment.

The following check list should provide a useful tool in determining probable causes for excessive bearing temperatures and premature bearing failures in fan equipment:

- Fan bearings still in run-in period – refer to previous page
- Bearing temperatures are normal for operation – refer to previous pages
- Excessive lubricant – This will make the bearings work harder
Remedy- Lubricate bearings according to manufacturer’s instruction.
- Insufficient lubrication - Remedy: Lubricate bearings according to manufacturer’s instruction.
- Improper lubricant viscosity – This occurs when the grease or lubricant does not provide adequate protection at the operating temperature. Remedy: Use a lubricant which provides the proper viscosity for the operating temperature and speed (typically approx. 100 sus at the operating temperature). Phelps Fan has found that Mobilith SHC 100 grease is successful in most applications for fans operating with-in the bearing manufacturer’s published speed ratings. For bearings operating above the grease limiting speed, Phelps Fan has found Mobile SHC 624 or 626 oil to be successful for most applications.
- Foreign particulate or water in the bearings - Remedy: Clean bearings and examine for damage. Even small defects found could lead to premature failure.
- Excessive V-belt drive tension - Remedy: Check V-belt tension per manufacturer’s instructions.
- Bearing mis-alignment, Bearing “soft-foot”, or “Binding or pinching” of the bearing inserts - This will “pre-load” the bearings, and could thus lead to excessive bearing load conditions and temperatures. This can occur if the base is not shimmed and grouted properly, or with damage during shipment and installation.
- Improper bearing clearance - Remedy: Check internal clearance according to manufacturer’s instructions.
- Fan Vibration – Refer to “Fan Vibration Checklist”

Every effort has been made to provide you with a quality product that will provide years of satisfactory operation. If after review of this checklist, the cause of excessive bearing temperature or premature signs of bearing failure cannot be found, in most cases, Phelps Fan will provide a qualified fan service technician to be dispatched upon receipt of a written “fault/no fault” purchase order. Start-up service can be purchased at time of order for the equipment.