

Subject:	OPERATING TEMPERATURE OF ROLLING BEARINGS	Ref.	BRT/TB4
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Rolling bearings can be expected to operate at around 10° to 30°C above the ambient (surrounding air) temperature, depending on load and speed. If a customer complains that a bearing is overheating, the questions to ask are:

- a) How hot is hot?
- b) Is the ambient temperature unusually high?

If the answer to (b) is no, then (a) should be determined; preferably by using a pyrometer; but if you do not have access at the required time the following touch test can be a guide, with obvious variations from person to person:

- * 40°C Warm but not uncomfortable.
- * 45°C Getting warmer but tolerable for most people.
- * 50°C Uncomfortable after 7 to 8 secs.
- * 55°C " " 3 to 4 secs.
- * 60°C " " 2 to 3 secs.
- * 65°C " " 1 to 2 secs.
- * 70°C + Ouch!

If the latter is the case and you want to check further, a drop of water on the bearing housing will disappear rapidly if 100°C (boiling point) is reached.

Again assuming that the answer to (b) is no, then the high temperature is a symptom of friction.

Overheating by friction is usually caused by one or more of the following phenomena:

- * Excessive reduction or removal of bearing internal clearance due to the shaft or housing fit being too tight, or adapter sleeve being over-tightened.
- * Reduction or removal of bearing internal clearance due to inner or outer ring distortion caused by the shaft or housing being outside its roundness tolerance. In the case of bearing units, check that the mounting surfaces are flat as housing distortion is carried through to outer ring of the bearing.
- * Axial or angular misalignment of non-alignable bearings, check for presence of swarf or burrs on shaft and housing abutments; both can tilt bearing rings.
- * Failure to allow axial float for one bearing of each pair, i.e. one should be fixed all others free to prevent cross loading. (Not applicable in the case of angular contact and taper roller bearings.)