NSK TechTalk
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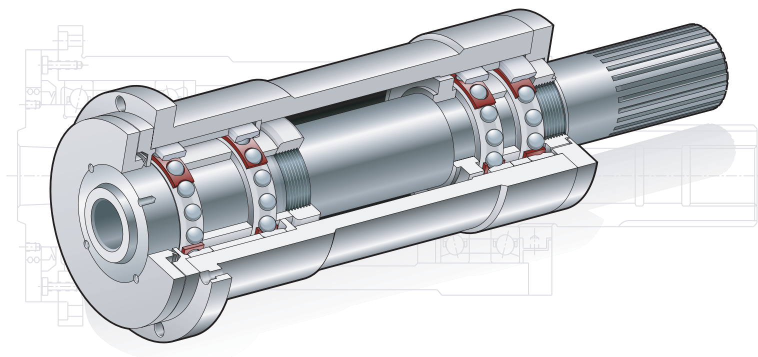
PROTECT YOUR BEARING INVESTMENT

Proper Run-In Procedures help to maximize bearing life

Following a proper run-in procedure will maximize bearing and grease life and can save you time and money in the long run. Skipping these crucial first steps can lead to catastrophic failure at start-up by missing out on early warning signs of machine faults; it can damage the bearings and shorten the grease life.



How do you know when to adopt a run-in procedure? If your operating speed exceeds 500,000 DmN or when bearings are pre-loaded, consider one of the following run-in methods. If in doubt, consult NSK before proceeding. An approximate method of calculating DmN is:

Speed * ((bearing OD mm + bearing ID mm) * 0.5)

There are three common methods of bearing run-in. The first method, called continuous run-in, gradually increases speed until the final operating speed is reached. This procedure allows the operator to detect potential problems before they cause damage and can take up to 10 hours to complete. Consider using this method for new equipment.

The second method is used for existing equipment that has previously undergone a thorough run-in. This method is called intermittent run-in and can be accomplished in half or less than half of the time.

The third method is used only when the speed cannot be varied and is referred to as high speed run-in.

Continuous Run-in Procedure, Variable Speed: This procedure is typically done in 10 stages with each stage taking up to an hour to complete. Start by dividing the final operating speed by 10. This value gives us our first stage running speed and becomes the incremental value for each new stage. **Table 1** gives an example of this. The temperature must be stabilized before graduating to the next stage. See **Monitoring Bearing Temperature** before starting the run-in procedure.

Intermittent Run-in Procedure, Variable Speed: Start this procedure by running the spindle at 10% of the final operating speed for 10 minutes (see **Table 2 Stage 1**). This first step expels any excess grease and will alert you to potential problems before they cause damage. Next, begin the process of cycling through incremental stages until full speed is reached and the temperature has stabilized.

Stages two through eight are divided into 10 cycles, each of one-minute duration. Run the spindle up to the target speed and hold for 15 seconds. Stop the spindle for the remaining 40 seconds and repeat the cycle. See **Table 2** for an example on calculating the target speed for each stage.

When 10 cycles are completed move to the next stage and start again. As you progress through the stages, the rest period between cycles will decrease. **Figure 1** illustrates the start, run, stop and rest phases of the one-minute cycle.

After completing the last stage, allow the spindle to run at operating speed for approximately one hour to ensure there are no problems. See **Monitoring Bearing Temperature** before starting run-in procedure.

Table 1 Example: Operating speed: 8,000
Starting speed and incremental value: 8,000 ÷ 10 = 800

Speed	800	1,600	2,400	3,200	4,000	4,800	5,600	6,100	7,200	8,000
Stage	1	2	3	4	5	6	7	8	9	10

Table 2 Example: Operating speed: 12,000
Starting speed and incremental value: 12,000 ÷ 8 = 1,500

Speed	1,500	3,000	4,500	6,000	7,500	9,000	10,500	12,000
Stage	1	2	3	4	5	6	7	8
Cycles	1	10	10	10	10	10	10	10
Duration of Cycles (minutes)	10	1	1	1	1	1	1	1

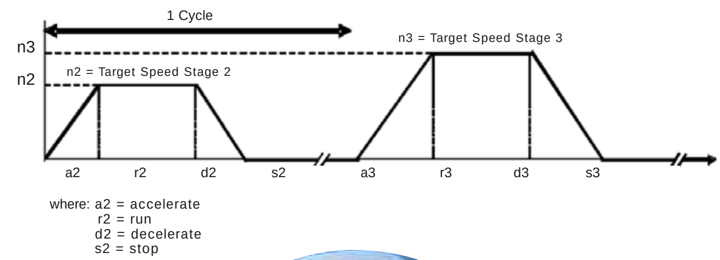
Continuous Run-in Procedure, High Speed: Use this method only when the equipment speed cannot be varied and closely monitor bearing temperature. Run at full speed for 20 seconds and stop, allowing the bearings to cool for 3-4 minutes. Repeat cycle 10 times. Next, run at full speed for 30 seconds and allow the bearings to cool for 3-4 minutes. Repeat cycle 10 times. Increase run time to 40, then 50 then 60 seconds, running through each cycle 10 times and allowing the bearings to cool 3-4 minutes after each run. See **Monitoring Bearing Temperature** before starting run-in procedure.

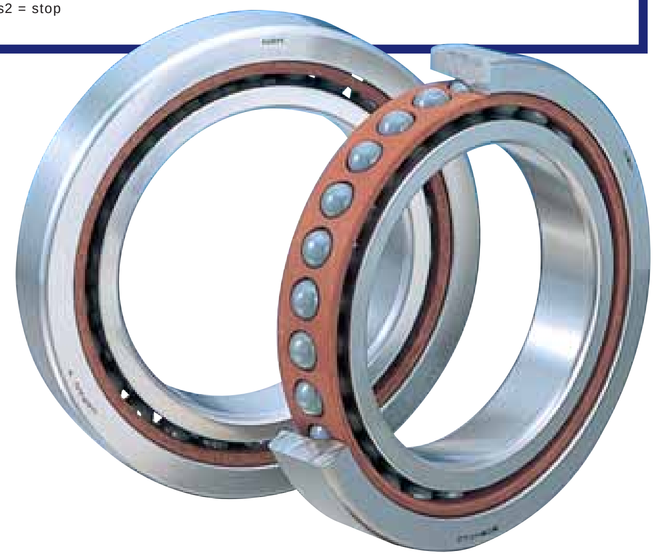
Oil Mist and Oil Air Systems: Oil lubrication is not exempt from run-in procedures. New equipment and equipment left idle for long periods can be run at 1/3 of their operating speed for 2-3 minutes before being run up to full speed. This simple procedure will get rid of any excess oil that's built up in the lines or has collected around the bearing. See **Monitoring Bearing Temperature** before starting run-in procedure.

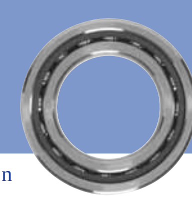
Monitoring Bearing Temperature: Stabilizing the bearing temperature at an acceptable level is critical to a successful run-in procedure. Before moving to the next stage, the temperature should be constant or dropping. If, at any time, the bearing temperature exceeds 70°C (158°F) stop the process and allow the bearing to cool to 40°C (104°F) before continuing. Temperature rise with cylindrical roller bearings is typically faster than ball bearings. Do not attempt to hurry the process by blowing air over the housing as this will cause an excessive internal preload and may damage the bearing.

When you consider how much effort and expense goes into the manufacture and setup of precision bearings and machine tool spindles, it's not surprising that a proper run-in procedure takes time. Think of it as maximizing your returns.

Figure 1







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