TIMKEN

Temperature Guidelines for Roller Bearing Installation

Maximum and minimum temperatures, as well as maximum time-at-temperature limits, have been established to prevent metallurgical transformation of steel components, and potential, detrimental physical changes in seals or non-metallic components. During the manufacturing process, bearing rings and rolling elements are heat treated to define the strength, hardness and dimensional stability for proper operation. Heating or cooling bearings or bearing components beyond these limits may affect performance.

These suggestions are merely guidelines and, as new data is developed, the values as shown may change. These guidelines do not cover all Timken® products.

Heating

- These are the maximum temperature limits.
- For elastomer or polymer seals or cages, only use hot air as a heating medium.
- Protect exposed bearing/ring surfaces after positioning on the shaft or housing, and as they normalize to ambient temperatures.

Standard Class Bearings or Rings (with metallic cages and without seals)

Includes Class 4, 2, K, N, ABEC-1 and ABEC-3

121°C (250°F) 8 Hours

Standard Class Bearings or Rings (with non-metallic cages and polymer or elastomer seals)

Special considerations may apply for phenolic cages or special fluorocarbon lip seals.

93°C (200°F) 24 Hours

Precision and Super Precision Class Bearings and Rings

Include Class 3, 0, 00, 000, C, B, A, ABEC 5, 7, 9

66°C (150°F) 24 Hours

Cooling (Freezing)

- These are the minimum temperature limits.
- To prevent corrosion:
  - Before installation remove frost from all surfaces;
  - After installation and during part warming, remove moisture condensation;
  - Wipe surfaces with clean, lint-free cloth and reapply preservative.

Freezing Standard Class Bearings and Rings

-54°C (-65°F) 1 Hour

This temperature can be obtained using dry ice in an alcohol bath.

Freezing Precision Class Outer Rings or Cups

-29°C (-20°F) 2 Hours

This temperature can be obtained by commercial freezer/refrigeration equipment.

Cone Bore Growth Expansion Rates Due to Thermal Changes

Calculations based on an ambient temperature of 21° Celsius (70° Fahrenheit)

Cone Bore	Thermometer temperature reading in degrees			Cone Bore	Thermometer temperature reading in degrees		
	65° C 150° F	90° C 200° F	120° C 250° F		65° C 150° F	90° C 200° F	120° C 250° F
mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
25.4 1	0.012 0.0005	0.020 0.0008	0.027 0.0011	482.6 19	0.231 0.0091	0.375 0.0148	0.520 0.0205
50.8 2	0.025 0.0010	0.040 0.0016	0.055 0.0022	508 20	0.243 0.0096	0.396 0.0156	0.548 0.0216
76.2 3	0.036 0.0014	0.058 0.0023	0.081 0.0032	533.4 21	0.256 0.0101	0.416 0.0164	0.576 0.0227
101.6 4	0.048 0.0019	0.078 0.0031	0.109 0.0043	558.8 22	0.269 0.0106	0.436 0.0172	0.604 0.0238
127 5	0.061 0.0024	0.099 0.0039	0.137 0.0054	584.2 23	0.279 0.0110	0.454 0.0179	0.629 0.0248
152.4 6	0.073 0.0029	0.119 0.0047	0.165 0.0065	609.6 24	0.292 0.0115	0.475 0.0187	0.657 0.0259
177.8 7	0.086 0.0034	0.139 0.0055	0.193 0.0076	635 25	0.304 0.0120	0.495 0.0195	0.685 0.0270
203.2 8	0.096 0.0038	0.157 0.0062	0.218 0.0086	660.4 26	0.317 0.0125	0.515 0.0203	0.713 0.0281
228.6 9	0.109 0.0043	0.177 0.0070	0.246 0.0097	685.8 27	0.330 0.0130	0.535 0.0211	0.741 0.0292
254 10	0.121 0.0048	0.198 0.0078	0.274 0.0108	711.2 28	0.340 0.0134	0.553 0.0218	0.767 0.0302
279.4 11	0.134 0.0053	0.218 0.0086	0.302 0.0119	736.6 29	0.353 0.0139	0.574 0.0226	0.795 0.0313
304.8 12	0.147 0.0058	0.238 0.0094	0.330 0.0130	762 30	0.365 0.0144	0.594 0.0234	0.823 0.0324
330 13	0.157 0.0062	0.256 0.0101	0.355 0.0140	787.4 31	0.378 0.0149	0.614 0.0242	0.850 0.0335
355.6 14	0.170 0.0067	0.276 0.0109	0.383 0.0151	812.8 32	0.391 0.0154	0.635 0.0250	0.878 0.0346
381 15	0.182 0.0072	0.297 0.0117	0.411 0.0162	838.2 33	0.401 0.0158	0.652 0.0257	0.904 0.0356
406.4 16	0.195 0.0077	0.317 0.0125	0.439 0.0173	863.6 34	0.414 0.0163	0.673 0.0265	0.932 0.0367
431.8 17	0.208 0.0082	0.337 0.0133	0.467 0.0184	889 35	0.426 0.0168	0.693 0.0273	0.960 0.0378
457.2 18	0.218 0.0086	0.355 0.0140	0.492 0.0194	914.4 36	0.439 0.0173	0.713 0.0281	0.988 0.0389

⚠ WARNING

Failure to observe the following warnings could create a risk of serious injury.

Proper maintenance and handling procedures are critical. Always follow installation and maintain proper lubrication.

TIMKEN

The Timken team applies their know-how to improve the reliability and performance of machinery in diverse markets worldwide. The company designs, makes and markets high-performance mechanical components, including bearings, belts, gears, chain and related mechanical power transmission products and services.

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