



Stud Type Cam Followers

General Description

Needle roller cam followers are designed for specific use as cam or track rollers. The outer ring has a large radial cross-section to withstand heavy rolling and shock loads on cam-controlled or track type equipment.

Nomenclature

CF Type – inch dimensioned, full complement needle roller

KR Type – metric dimensioned, caged needle roller bearing

KRV Type – metric dimensioned, two rows of full complement rollers

The above types are available with various options for seals, crowned tire OD, and finishes.

Materials

The components of the stud type cam followers are made from several different materials. Some components are produced from high quality bearing steel (52100 or equivalent). Other high quality steels are also used to achieve a combination of component strength and hardness.

Tolerances

The basic tolerances for the stud type cam followers are:

Tire OD = (+0.000"/-0.001") or (+0.000mm/-0.025mm)

Stud diameter = (+0.001"/-0.000") or (+0.025mm/-0.000mm)

Tire width = (+0.000"/-0.005") or (+0.000mm/-0.13mm)

Mounting

Types CF, KR, KRV and NUKR stud type cam followers are designed for cantilever mounting. A screwdriver slot or a hexagonal hole in the head of the stud facilitates mounting. The surface of the hole in the machine element which supports the cam follower stud or the mounting shaft and must not deform under the expected load and the support should be sufficiently rigid to resist bending loads. Deformation and bending will cause uneven loading of the bearing outer ring. In mounting stud types cam followers, the end washer must be firmly backed up by a flat shoulder which is square with the stud center line. The shoulder diameter must be as large as, or larger than, the washer on the cam follower. The maximum inherent strength of the stud is obtained when the cam follower is supported as close as possible to the end washer which minimizes the bending moment. The hole in the housing which supports the stud shank should be kept as sharp as practical, but free from burrs.

The recommended mounting for stud type cam followers is to have the stud shank mounted with a transition fit to minimize deflection. The installation force should be applied to the center portion of the head end of the stud with an arbor press. The clamping nut should not be over tightened. A screwdriver slot or a hexagonal hole in the flanged end of the stud is provided for a tool to prevent the stud from turning when the nut is being tightened. Since the bottom of the screwdriver slot is not flat, it is helpful to put a radius on the tip of the screwdriver blade to hold the stud more securely.

Lubrication

Stud type cam followers have provisions for relubrication through either end of the stud or, through a cross-drilled hole in the stud shank. No cross hole is provided for the smaller cam followers that have no lubrication hole in the threaded end of the stud. The ends of the axial holes are counter bored to take drive-fitted fittings. The fittings are not furnished. Plugs should be used to plug unused holes. If the cross drilled hole is not used, it will be covered when the cam follower is properly installed.

Oil or grease may be used for cam followers for steady rotating conditions. Applications involving slow intermittent oscillation can have longer intervals between grease relubrication. Cam followers are normally supplied with grease.

Application Loading

The cam follower must be used within the working load limit given in the tabular data, the ductile core of the stud provides the necessary toughness and resistance to shock loads. The load ratings are based on the track capacity rating on which it rolls. When the track hardness differs from 40 HRC (or 400VHN) the load rating is lower.

Basic Life Calculation

The life expectancy (L_{10} life) in hours of a bearing can be calculated by using the following formula:

$$L_{10} = (16,666/n) \times (C/P_e)^{10/3}$$

n = Speed (RPM)

C = Load Capacity

P_e = Applied Load