Bearing Selection:

Left Shaft:

For Bearing B:

1. Performance and operating condition:

|  |  |
| --- | --- |
| Radical Force () | 1700.68 [N] |
| Axial Force | 0 [N] |
| Speed | 15 [rpm] |
| Operating Condition | 50 [degree] |
| Required rating life\* | 20000 [h] |

\* Let’s say the machine operate 40 h for one week and operate 48 weeks per year. If we want it to work for 10 years, then the total life is .

1. Bearing type and arrangement:

* Locating bearing is used since the bearing B need to carry the weight of the shaft and the limit the axial displacement of the gear.
* Deep groove ball bearings are selected because they have the capability to carry both axial and radical force.

1. Bearing Size:

The inner radius of the shaft is 12 mm, thereby the inner radius of the bearing should align with it.

A diagram of a cross with red writing

Description automatically generated

For Bearing A:

1. Performance and operating condition:

|  |  |
| --- | --- |
| Radical Force () | 850.34 [N] |
| Axial Force | 0 [N] |
| Speed | 15 [rpm] |
| Operating Condition | 50 [degree] |
| Required rating life | 20000 [h] |

1. Bearing type and arrangement:

* Non-locating bearing is used since the bearing A only carry the radical load
* Needle bearing is used.

1. Bearing Size:

The inner radius of the shaft is 12 mm, thereby the inner radius of the bearing should align with it. Then, choose the HK 1210 E needle roller bearing from SKF company.

1. Technical Specification:

A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated

1. Basic rating life:

which satisfies our requirement.

1. Lubrication:

Input Values:

From SKF handbook, Table 1, Page 113,

The limit is 100000, which is greater than 210.

Grease selection criteria:

* Temperature: 50 -> M
* Speed: -> L
* Load: C/P = 5.89 -> M

From the SKF bearing grease selection chart, page 124, LGEV2 grease is selected since the bearing operates at low speed.

From SKF handbook, Diagram 2 Page 112, the relubrication intervals at operating temperatures of 70 °C is:

Since the operating temperature in this project is , based on SKF handbook, table 2, we need to adjust the interval by double it, therefore,

This satisfies the requirement.