EXERCISES

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Lifetime calculation

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1. In which units can the life expectancy of a bearing be measured?

a) Revolutions
b) Years
c) Newtons
d) Operating hours

2. Bearings of the same type have the same service life under the same operating conditions.

a) Correct
b) Incorrect

3. 10% of all bearings may not fulfil their stated service life in an L_{10h} service life calculation.

a) Correct
b) Incorrect

4. Which of the following formulae allows you to calculate the life of a ball bearing in 10^6 revolutions?

a) $L_{10} = \left(\frac{c}{p}\right)^{\frac{10}{3}}$

b) $L_{10} = \frac{16,6667}{n}\left(\frac{c}{p}\right)^{\frac{10}{3}}$

c) $L_{10h} = \left(\frac{c}{p}\right)^{3}$

d) $L_{10} = \left(\frac{c}{p}\right)^{3}$

5. Which of the following variables must still be calculated before the service life calculation?

a) Basic dynamic load rating C
b) Speed of the rolling bearing in the application n
c) Equivalent dynamic load P
d) Lifetime exponent p

6. When calculating the equivalent dynamic load P, the equivalent dynamic radial load is always calculated from the radial force and axial force.

a) Correct
b) Incorrect

7. Why must rolling bearings be operated with a minimum load?

a) In order to ensure optimal rolling of the rolling elements
b) To minimise sliding
c) To stop smearing
d) To reach a certain temperature in the bearing

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8. Which factors influence the service life coefficient for the operating conditions required for the extended service life calculation?

a) The lubricant film thickness
b) The nominal service life
c) The fatigue limit load
d) The service life coefficient for reliability

9. What can contamination with hard particles in the lubricant lead to?

a) Indentations on the raceway surface
b) Surface damage
c) Very loud noise development
d) Shortening of service life

10. What level of contamination does a value e_C of 0.25 describe?

a) High cleanliness
b) Heavy contamination
c) Normal cleanliness
d) Typical contamination

11. The viscosity ratio κ describes the influence of the lubricant film formation. A low viscosity can lead to solid contact, which can cause damage.

a) Correct
b) Incorrect

12. What is the reference viscosity v1 of a bearing at a speed of n = 1000 min^{-1} and a size of D_{pw} = 50 mm?

a) Approx. 50 mm^2/s
b) Approx.20 mm^2/s
c) Approx. 500 mm^2/s
d) Approx. 5 mm^2/s

Solution: 1. a, d; 2. b; 3. a; 4. d; 5. c; 6.a; 7. a, b, c; 8. a, c; 9. a, b, d, 10. d; 11. a; 12. b