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Design of Rolling Contact Bearing Formulas

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List of 86 Design of Rolling Contact Bearing Formulas

Design of Rolling Contact Bearing

Angular Contact Bearing

1) Axial Load for Back to Back Bearings when Fa by Fr is greater than 1.14

Open Calculator

fx $$F_a = \frac{P_b - (0.57 \cdot F_r)}{0.93}$$

ex $$2969.355\text{N} = \frac{7350\text{N} - (0.57 \cdot 8050\text{N})}{0.93}$$

2) Axial Load for Back to Back Bearings when Fa by Fr is less than or equal to 1.14

Open Calculator

fx $$F_a = \frac{P_{eq} - F_r}{0.55}$$

ex $$2909.091\text{N} = \frac{9650\text{N} - 8050\text{N}}{0.55}$$

3) Axial Load for Singly Mounted Bearings when Fa by Fr is greater than 1.14

Open Calculator

$$F_a = \frac{P_s - (0.35 \cdot F_r)}{0.57}$$

$$2951.754\text{N} = \frac{4500\text{N} - (0.35 \cdot 8050\text{N})}{0.57}$$

4) Equivalent Dynamic Load for Back to Back Bearings when Fa by Fr is greater than 1.14

Open Calculator

$$P_b = (0.57 \cdot F_r) + (0.93 \cdot F_a)$$

$$7378.5\text{N} = (0.57 \cdot 8050\text{N}) + (0.93 \cdot 3000\text{N})$$

5) Equivalent Dynamic Load for Back to Back Bearings when Fa by Fr is less than or equal to 1.14

Open Calculator

$$P_b = F_r + (0.55 \cdot F_a)$$

$$9700\text{N} = 8050\text{N} + (0.55 \cdot 3000\text{N})$$

6) Equivalent Dynamic Load for Singly Mounted Bearings when Fa by Fr is greater than 1.14

Open Calculator

$$P_s = (0.35 \cdot F_r) + (0.57 \cdot F_a)$$

$$4527.5\text{N} = (0.35 \cdot 8050\text{N}) + (0.57 \cdot 3000\text{N})$$

7) Radial Load for Back to Back Bearings when Fa by Fr greater than 1.14

Open Calculator

fx $$F_r = \frac{P_b - (0.93 \cdot F_a)}{0.57}$$

ex $$8000\text{N} = \frac{7350\text{N} - (0.93 \cdot 3000\text{N})}{0.57}$$

8) Radial Load for Back to Back Bearings when Fa by Fr less than or equal to 1.14

Open Calculator

fx $$F_r = (P_{eq} - (0.55 \cdot F_a))$$

ex $$8000\text{N} = (9650\text{N} - (0.55 \cdot 3000\text{N}))$$

9) Radial Load for Singly Mounted Bearings when Fa by Fr is greater than 1.14

Open Calculator

fx $$F_r = \frac{P_s - (0.57 \cdot F_a)}{0.35}$$

ex $$7971.429\text{N} = \frac{4500\text{N} - (0.57 \cdot 3000\text{N})}{0.35}$$

Dynamic and Equivalent Load

10) Axial Thrust Load on Bearing given Equivalent Dynamic Load

Open Calculator

fx $$F_a = \frac{P_b - (X \cdot V \cdot F_r)}{Y}$$

ex $$1293.6\text{N} = \frac{7350\text{N} - (0.56 \cdot 1.2 \cdot 8050\text{N})}{1.5}$$

11) Dynamic Load Capacity for Ball Bearing

Open Calculator

fx $$C = P_b \cdot \left(L_{10}^{\frac{1}{3}}\right)$$

ex $$38524.9\text{N} = 7350\text{N} \cdot \left((144)^{\frac{1}{3}}\right)$$

12) Dynamic Load Capacity for Bearing given Rated Bearing Life

Open Calculator

fx $$C = P_b \cdot \left(L_{10}^{\frac{1}{p}}\right)$$

ex $$38524.9\text{N} = 7350\text{N} \cdot \left((144)^{\frac{1}{3}}\right)$$

13) Dynamic Load Capacity for Roller Bearing

Open Calculator

fx $$C = P_b \cdot \left(L_{10}^{0.3}\right)$$

ex $$32643.45\text{N} = 7350\text{N} \cdot \left((144)^{0.3}\right)$$

14) Equivalent Dynamic Load for Bearing given Radial Factor

Open Calculator

$$P_b = (X \cdot F_r) + (Y \cdot F_a)$$

$$9008\text{N} = (0.56 \cdot 8050\text{N}) + (1.5 \cdot 3000\text{N})$$

15) Equivalent Dynamic Load for Back to Back Bearings

Open Calculator

$$P_b = (X \cdot V \cdot F_r) + (Y \cdot F_a)$$

$$9909.6\text{N} = (0.56 \cdot 1.2 \cdot 8050\text{N}) + (1.5 \cdot 3000\text{N})$$

16) Equivalent Dynamic Load for Back to Back Bearings when subjected to Pure Radial Load

Open Calculator

$$P_b = 1 \cdot F_r$$

$$8050\text{N} = 1 \cdot 8050\text{N}$$

17) Equivalent Dynamic Load for Back to Back Bearings when subjected to Pure Thrust Load

Open Calculator

$$P_b = 1 \cdot F_a$$

$$3000\text{N} = 1 \cdot 3000\text{N}$$

18) Equivalent Dynamic Load for Ball Bearing

Open Calculator

fx $$P_b = \frac{C}{L_{10}^{\frac{1}{3}}}$$

ex $$7030.453\text{N} = \frac{36850\text{N}}{(144)^{\frac{1}{3}}}$$

19) Equivalent Dynamic Load for Bearing given Rated Bearing Life

Open Calculator

fx $$P_b = \frac{C}{L_{10}^{\frac{1}{p}}}$$

ex $$7030.453\text{N} = \frac{36850\text{N}}{(144)^{\frac{1}{3}}}$$

20) Equivalent Dynamic Load for Roller Bearing

Open Calculator

fx $$P_b = \frac{C}{L_{10}^{0.3}}$$

ex $$8297.146\text{N} = \frac{36850\text{N}}{(144)^{0.3}}$$

21) Race Rotation Factor for Bearing given Radial Factor

Open Calculator

$$V = \frac{P_{eq} - (Y \cdot F_a)}{X \cdot F_r}$$

$$1.142413 = \frac{9650\text{N} - (1.5 \cdot 3000\text{N})}{0.56 \cdot 8050\text{N}}$$

22) Radial Factor of Bearing given Equivalent Dynamic Load

Open Calculator

$$X = \frac{P_{eq} - (Y \cdot F_a)}{V \cdot F_r}$$

$$0.533126 = \frac{9650\text{N} - (1.5 \cdot 3000\text{N})}{1.2 \cdot 8050\text{N}}$$

23) Radial Load of Bearing given Radial Factor

Open Calculator

$$F_r = \frac{P_b - (Y \cdot F_a)}{X \cdot V}$$

$$4241.071\text{N} = \frac{7350\text{N} - (1.5 \cdot 3000\text{N})}{0.56 \cdot 1.2}$$

24) Thrust Factor on Bearing given Equivalent Dynamic Load

Open Calculator

$$Y = \frac{P_{eq} - (X \cdot V \cdot F_r)}{F_a}$$

$$1.413467 = \frac{9650\text{N} - (0.56 \cdot 1.2 \cdot 8050\text{N})}{3000\text{N}}$$

Rated Bearing Life

25) Rated Bearing Life in Hours

Open Calculator

fx $$L_{10h} = L_{10} \cdot \frac{10^6}{60 \cdot N}$$

ex $$6857.143 = 144 \cdot \frac{10^6}{60 \cdot 350}$$

26) Rated Bearing Life in Million Revolutions for Ball Bearings

Open Calculator

fx $$L_{10} = \left(\frac{C}{P_b}\right)^3$$

ex $$126.0232 = \left(\frac{36850N}{7350N}\right)^3$$

27) Rated Bearing Life in Million Revolutions for Roller Bearings

Open Calculator

fx $$L_{10} = \left(\frac{C}{P_b}\right)^{\frac{10}{3}}$$

ex $$215.6919 = \left(\frac{36850N}{7350N}\right)^{\frac{10}{3}}$$

28) Rated Bearing Life in Million Revolutions given Bearing Speed

Open Calculator

fx $$L_{10} = 60 \cdot N \cdot \frac{L_{10h}}{10^6}$$

ex $$168 = 60 \cdot 350 \cdot \frac{8000}{10^6}$$

29) Rated Bearing Life in Million Revolutions given Dynamic Load Capacity

Open Calculator

fx $$L_{10} = \left(\frac{C}{P_b}\right)^p$$

ex $$126.0232 = \left(\frac{36850N}{7350N}\right)^3$$

30) Rated Bearing Life in Million Revolutions given Median Life

Open Calculator

fx $$L_{10} = \frac{L_{50}}{5}$$

ex $$144 = \frac{720}{5}$$

31) Rated Bearing Life in Million Revolutions given Nominal Life

Open Calculator

fx $$L_{10} = \left(\frac{1000}{\pi \cdot D}\right) \cdot L_{10s}$$

ex $$144.6863 = \left(\frac{1000}{\pi \cdot 880\text{mm}}\right) \cdot 0.4$$

Rolling Contact Bearing Configuration

32) Axial Thrust Load on Bearing given Race Rotation Factor

Open Calculator

fx $$F_a = \frac{P_{eq} - (X \cdot V \cdot F_r)}{Y}$$

ex $$2826.933\text{N} = \frac{9650\text{N} - (0.56 \cdot 1.2 \cdot 8050\text{N})}{1.5}$$

33) Axial Thrust Load on Bearing given Thrust Factor

Open Calculator

fx $$F_a = \frac{P_{eq} - (X \cdot F_r)}{Y}$$

ex $$3428\text{N} = \frac{9650\text{N} - (0.56 \cdot 8050\text{N})}{1.5}$$

34) Bore Diameter of Bearing

Open Calculator

fx $$d = 2 \cdot \frac{M_t}{\mu \cdot W}$$

ex $$31.00775\text{mm} = 2 \cdot \frac{120\text{N*mm}}{0.0043 \cdot 1800\text{N}}$$

35) Coefficient of Friction of Roller Contact Bearing

Open Calculator

fx $$\mu = 2 \cdot \frac{M_t}{d \cdot W}$$

ex $$0.004444 = 2 \cdot \frac{120\text{N*mm}}{30\text{mm} \cdot 1800\text{N}}$$

36) Friction Moment on Roller Contact Bearing

Open Calculator

fx $$M_t = \mu \cdot W \cdot \left(\frac{d}{2}\right)$$

ex $$116.1\text{N*mm} = 0.0043 \cdot 1800\text{N} \cdot \left(\frac{30\text{mm}}{2}\right)$$

37) Load on Bearing given Moment on bearing

Open Calculator

fx $$W = \frac{M_t}{\mu \cdot \left(\frac{d}{2}\right)}$$

ex $$1860.465\text{N} = \frac{120\text{N*mm}}{0.0043 \cdot \left(\frac{30\text{mm}}{2}\right)}$$

38) Median Life of Roller Contact Bearing

Open Calculator

fx $L_{50} = 5 \cdot L_{10}$

ex $720 = 5 \cdot 144$

39) Nominal Life of Roller Contact Bearing

Open Calculator

fx $L_{10s} = \frac{L_{10}}{\frac{1000}{\pi \cdot D}}$

ex $0.398103 = \frac{144}{\frac{1000}{\pi \cdot 880\text{mm}}}$

40) Number of Bearings required given Reliability

Open Calculator

fx $N_b = \frac{\log 10(R_s)}{\log 10(R)}$

ex $3.369878 = \frac{\log 10(0.65)}{\log 10(0.88)}$

41) Race Rotation Factor of Roller Contact Bearing

Open Calculator

fx $V = \frac{P_{eq} - (Y \cdot F_a)}{X \cdot F_r}$

ex $1.142413 = \frac{9650\text{N} - (1.5 \cdot 3000\text{N})}{0.56 \cdot 8050\text{N}}$

42) Radial Factor of Roller Contact Bearing

Open Calculator

$$X = \frac{P_{eq} - (Y \cdot F_a)}{F_r}$$

$$0.639752 = \frac{9650\text{N} - (1.5 \cdot 3000\text{N})}{8050\text{N}}$$

43) Radial Factor of Roller Contact Bearing given Race Rotation Factor

Open Calculator

$$X = \frac{P_{eq} - (Y \cdot F_a)}{V \cdot F_r}$$

$$0.533126 = \frac{9650\text{N} - (1.5 \cdot 3000\text{N})}{1.2 \cdot 8050\text{N}}$$

44) Radial Load on Bearing

Open Calculator

$$F_r = \frac{P_{eq} - (Y \cdot F_a)}{X}$$

$$9196.429\text{N} = \frac{9650\text{N} - (1.5 \cdot 3000\text{N})}{0.56}$$

45) Radial Load on Bearing given Race Rotation Factor

Open Calculator

$$F_r = \frac{P_{eq} - (Y \cdot F_a)}{X \cdot V}$$

$$7663.69\text{N} = \frac{9650\text{N} - (1.5 \cdot 3000\text{N})}{0.56 \cdot 1.2}$$

46) Reliability of Bearing

Open Calculator

fx $$R = e^{-\left(\frac{L}{a}\right)^{b}}$$

ex $$0.500037 = e^{-\left(\frac{5}{6.84}\right)^{1.17}}$$

47) Reliability of Bearing given Number of Bearings

Open Calculator

fx $$R = R_s^{\frac{1}{N_b}}$$

ex $$0.897901 = (0.65)^{\frac{1}{4}}$$

48) Reliability of Complete Bearing System

Open Calculator

fx $$R_s = R^{N}\_\{b\}$$

ex $$0.599695 = (0.88)^{4}$$

49) Speed of Rotation of Bearing

Open Calculator

fx $$N = L_{10} \cdot \frac{10^6}{60 \cdot L_{10h}}$$

ex $$300 = 144 \cdot \frac{10^6}{60 \cdot 8000}$$

50) Thrust factor of Bearing

Open Calculator

$$Y = \frac{P_{eq} - (X \cdot F_r)}{F_a}$$

$$1.714 = \frac{9650\text{N} - (0.56 \cdot 8050\text{N})}{3000\text{N}}$$

51) Thrust factor of Bearing given Race Rotation Factor

Open Calculator

$$Y = \frac{P_{eq} - (X \cdot V \cdot F_r)}{F_a}$$

$$1.413467 = \frac{9650\text{N} - (0.56 \cdot 1.2 \cdot 8050\text{N})}{3000\text{N}}$$

52) Train Wheel Diameter considering Bearing Life

Open Calculator

$$D = \left(\frac{1000}{\pi \cdot L_{10}}\right) \cdot L_{10s}$$

$$884.1941\text{mm} = \left(\frac{1000}{\pi \cdot 144}\right) \cdot 0.4$$

Self Aligning Ball Bearings

53) Axial Thrust Load on Self Aligning Ball Bearing when Fa by Fr is greater than e

Open Calculator

$$F_a = \frac{Peq_{sa} - (0.65 \cdot F_r)}{Y_2}$$

$$3341.667\text{N} = \frac{12250\text{N} - (0.65 \cdot 8050\text{N})}{2.1}$$

54) Axial Thrust Load on Self Aligning Ball Bearing when Fa by Fr is less than or equal to e

Open Calculator

$$F_a = \frac{Peq_{sa} - F_r}{Y_1}$$

$$3000\text{N} = \frac{12250\text{N} - 8050\text{N}}{1.4}$$

55) Equivalent Dynamic Load on Self Aligning Ball Bearing when Fa by Fr is greater than e

Open Calculator

$$Peq_{sa} = (0.65 \cdot F_r) + (Y_2 \cdot F_a)$$

$$11532.5\text{N} = (0.65 \cdot 8050\text{N}) + (2.1 \cdot 3000\text{N})$$

56) Equivalent Dynamic Load on Self Aligning Ball Bearing when Fa by Fr is less than or equal to e

Open Calculator

fx $$\mathrm{Peq_{sa}} = \mathrm{F_r} + (\mathrm{Y_1} \cdot \mathrm{F_a})$$

ex $$12250\mathrm{N} = 8050\mathrm{N} + (1.4 \cdot 3000\mathrm{N})$$

57) Factor Y1 of Self Aligning Ball Bearing when Fa by Fr is less than or equal to e

Open Calculator

fx $$\mathrm{Y_1} = \frac{\mathrm{Peq_{sa}} - \mathrm{F_r}}{\mathrm{F_a}}$$

ex $$1.4 = \frac{12250\mathrm{N} - 8050\mathrm{N}}{3000\mathrm{N}}$$

58) Factor Y2 of Self Aligning Ball Bearing when Fa by Fr is greater than e

Open Calculator

fx $$\mathrm{Y_2} = \frac{\mathrm{Peq_{sa}} - (0.65 \cdot \mathrm{F_r})}{\mathrm{F_a}}$$

ex $$2.339167 = \frac{12250\mathrm{N} - (0.65 \cdot 8050\mathrm{N})}{3000\mathrm{N}}$$

59) Radial Load on Self Aligning Ball Bearing when Fa by Fr greater than e

Open Calculator

fx $$F_r = \frac{Peq_{sa} - (Y_2 \cdot F_a)}{0.65}$$

ex $$9153.846N = \frac{12250N - (2.1 \cdot 3000N)}{0.65}$$

60) Radial Load on Self Aligning Ball Bearing when Fa by Fr is less than or equal to e

Open Calculator

fx $$F_r = Peq_{sa} - (Y_1 \cdot F_a)$$

ex $$8050N = 12250N - (1.4 \cdot 3000N)$$

Spherical Roller Bearing

61) Axial Thrust Load on Spherical Roller Bearing when Fa by Fr is greater than e

Open Calculator

fx $$F_a = \frac{Peq_{sp} - (0.67 \cdot F_r)}{Y_2}$$

ex $$3074.524N = \frac{11850N - (0.67 \cdot 8050N)}{2.1}$$

62) Axial Thrust Load on Spherical Roller Bearing when Fa by Fr is less than or equal to e

Open Calculator

fx $$F_a = \frac{Peq_{sp} - F_r}{Y_1}$$

ex $$2714.286N = \frac{11850N - 8050N}{1.4}$$

63) Equivalent Dynamic Load on Spherical Roller Bearing when Fa by Fr is greater than e

Open Calculator

fx $$Peq_{sp} = (0.67 \cdot F_r) + (Y_2 \cdot F_a)$$

ex $$11693.5N = (0.67 \cdot 8050N) + (2.1 \cdot 3000N)$$

64) Equivalent Dynamic Load on Spherical Roller Bearing when Fa by Fr is less than equal to e

Open Calculator

fx $$Peq_{sp} = F_r + (Y_1 \cdot F_a)$$

ex $$12250N = 8050N + (1.4 \cdot 3000N)$$

65) Factor Y1 of Spherical Roller Bearing when Fa by Fr is less than or equal to e

Open Calculator

fx $$Y_1 = \frac{Peq_{sp} - F_r}{F_a}$$

ex $$1.266667 = \frac{11850N - 8050N}{3000N}$$

66) Factor Y2 of Spherical Roller Bearing when Fa by Fr is greater than e

Open Calculator

fx $$Y_2 = \frac{Peq_{sp} - (0.67 \cdot F_r)}{F_a}$$

ex $$2.152167 = \frac{11850N - (0.67 \cdot 8050N)}{3000N}$$

67) Radial Load on Spherical Roller Bearing when Fa by Fr greater than e

Open Calculator

fx $$F_r = \frac{Peq_{sp} - (Y_2 \cdot F_a)}{0.67}$$

ex $$8283.582N = \frac{11850N - (2.1 \cdot 3000N)}{0.67}$$

68) Radial Load on Spherical Roller Bearing when Fa by Fr is less than equal to e

Open Calculator

fx $$F_r = Peq_{sp} - (Y_1 \cdot F_a)$$

ex $$7650N = 11850N - (1.4 \cdot 3000N)$$

Stribeck's Equation

69) Angle between adjacent Balls of Ball Bearing

Open Calculator

fx $$\beta = \frac{360}{z}$$

ex $$1375.099^\circ = \frac{360}{15}$$

70) Diameter of Ball of Bearing from Stribeck's Equation

Open Calculator

fx $$d_b = \sqrt{\frac{5 \cdot C_o}{k \cdot z}}$$

ex $$4.20084\text{mm} = \sqrt{\frac{5 \cdot 45000\text{N}}{850\text{N/mm}^2 \cdot 15}}$$

71) Diameter of Ball of Bearing given Force required to produce Permanent Deformation in Ball

Open Calculator

fx $$d_b = \sqrt{\frac{F}{k}}$$

ex $$4.20084\text{mm} = \sqrt{\frac{15000\text{N}}{850\text{N/mm}^2}}$$

72) Force required to produce Permanent Deformation of Balls of Ball Bearing

Open Calculator

fx $$F = k \cdot d_b^2$$

ex $$14994\text{N} = 850\text{N/mm}^2 \cdot (4.2\text{mm})^2$$

73) Force required to produce Permanent Deformation of Balls of Ball Bearing given Static Load

Open Calculator

fx $$F = 5 \cdot \frac{C_o}{z}$$

ex $$15000\text{N} = 5 \cdot \frac{45000\text{N}}{15}$$

74) K Factor for Ball Bearing from Stribeck's Equation

Open Calculator

fx $$k = 5 \cdot \frac{C_o}{d_b^2 \cdot z}$$

ex $$850.3401\text{N/mm}^2 = 5 \cdot \frac{45000\text{N}}{(4.2\text{mm})^2 \cdot 15}$$

75) K Factor for Ball Bearing given Force required to produce Permanent Deformation of Balls

Open Calculator

fx $$k = \frac{F}{d_b^2}$$

ex $$850.3401\text{N/mm}^2 = \frac{15000\text{N}}{(4.2\text{mm})^2}$$

76) Number of Balls of Ball Bearing from Stribeck's Equation

Open Calculator

fx $$z = 5 \cdot \frac{C_o}{k \cdot d_b^2}$$

ex $$15.006 = 5 \cdot \frac{45000\text{N}}{850\text{N/mm}^2 \cdot (4.2\text{mm})^2}$$

77) Number of Balls of Ball Bearing given Angle between Balls

Open Calculator

fx $$z = \frac{360}{\beta}$$

ex $$859.4367 = \frac{360}{24^\circ}$$

78) Number of Balls of Ball Bearing given Static Load

Open Calculator

fx $$z = 5 \cdot \frac{C_o}{F}$$

ex $$15 = 5 \cdot \frac{45000\text{N}}{15000\text{N}}$$

79) Static Load on Ball of Ball Bearing from Stribeck's Equation

Open Calculator

fx $$C_o = k \cdot d_b^2 \cdot \frac{z}{5}$$

ex $$44982\text{N} = 850\text{N/mm}^2 \cdot (4.2\text{mm})^2 \cdot \frac{15}{5}$$

80) Static Load on Ball of Ball Bearing given Primary force

Open Calculator

fx $$C_o = F \cdot \frac{z}{5}$$

ex $$45000\text{N} = 15000\text{N} \cdot \frac{15}{5}$$

Taper Roller Bearing

81) Axial Thrust Load on Taper Roller Bearing when Fa by Fr is greater than e

Open Calculator

$$F_a = \frac{Pb_t - (0.4 \cdot F_r)}{Y}$$

$$3000\text{N} = \frac{7720\text{N} - (0.4 \cdot 8050\text{N})}{1.5}$$

82) Equivalent Dynamic Load on Taper Roller Bearing when Fa by Fr is greater than e

Open Calculator

$$Pb_t = (0.4 \cdot F_r) + (Y \cdot F_a)$$

$$7720\text{N} = (0.4 \cdot 8050\text{N}) + (1.5 \cdot 3000\text{N})$$

83) Radial Load on Taper Roller Bearing when Fa by Fr is greater than e

Open Calculator

$$F_r = \frac{Pb_t - (Y \cdot F_a)}{0.4}$$

$$8050\text{N} = \frac{7720\text{N} - (1.5 \cdot 3000\text{N})}{0.4}$$

Thrust Ball Bearing

84) Minimum Axial Load on Thrust Ball Bearing

Open Calculator

fx $$F_{min} = A \cdot \left(\left(\frac{N}{1000} \right)^2 \right)$$

ex $$0.2499N = 2.04 \cdot \left(\left(\frac{350}{1000} \right)^2 \right)$$

85) Minimum Load Factor for Thrust Ball Bearing

Open Calculator

fx $$A = F_{min} \cdot \left(\left(\frac{1000}{N} \right)^2 \right)$$

ex $$2.040816 = 0.25N \cdot \left(\left(\frac{1000}{350} \right)^2 \right)$$

86) Rotational Speed of Bearing given Maximum Axial Load and Maximum Load Factor

Open Calculator

fx $$N = 1000 \cdot \sqrt{\frac{F_{min}}{A}}$$

ex $$350.07 = 1000 \cdot \sqrt{\frac{0.25N}{2.04}}$$

Variables Used

- **a** Constant a of Bearing
- **A** Minimum Load Factor
- **b** Constant b of Bearing
- **C** Dynamic Load Capacity of Bearing *(Newton)*
- C_o Static Load on Bearing *(Newton)*
- **d** Bore Diameter of Bearing *(Millimeter)*
- **D** Train Wheel Diameter *(Millimeter)*
- d_b Ball Diameter of a Bearing *(Millimeter)*
- **F** Force on Ball Bearing *(Newton)*
- F_a Axial or Thrust Load Acting on Bearing *(Newton)*
- F_{min} Minimum Axial Load Thrust Bearing *(Newton)*
- F_r Radial Load Acting on Bearing *(Newton)*
- **k** K Factor *(Newton per Square Millimeter)*
- **L** Corresponding Life of Bearing
- L_{10} Rated Bearing Life
- L_{10h} Rated Bearing Life in Hours
- L_{10s} Nominal Life in Millions of Kilometers
- L_{50} Median Life of Bearing
- M_t Friction Moment on Bearing *(Newton Millimeter)*
- **N** Speed of Bearing in RPM
- N_b Number of Bearings
- **p** Constant p of Bearing

- P_b Equivalent Dynamic Load on Back to Back Bearing *(Newton)*
- P_{eq} Equivalent Dynamic Load on Bearing *(Newton)*
- P_s Equivalent dynamic load on singly bearing *(Newton)*
- Pb_t Equivalent Dynamic Load on Taper Bearing *(Newton)*
- Peq_{sa} Equivalent Dynamic Load on Self Aligning Bearing *(Newton)*
- Peq_{sp} Equivalent Dynamic Load on Spherical Bearing *(Newton)*
- R Reliability of Bearing
- R_s Reliability of Bearing System
- V Race-Rotation Factor
- W Load Acting on Bearing *(Newton)*
- X Radial Factor
- Y Thrust Factor for Bearing
- Y_1 Factor Y1 of Bearing
- Y_2 Factor Y2 of Bearing
- z Number of Balls in Bearing
- β Angle between Balls of Bearing in Degrees *(Degree)*
- μ Coefficient of Friction for Bearing

Constants, Functions, Measurements used

- Constant: **pi**, 3.14159265358979323846264338327950288
  Archimedes' constant
- Constant: **e**, 2.71828182845904523536028747135266249
  Napier's constant
- Function: **log10**, log10(Number)
  The common logarithm, also known as the base-10 logarithm or the decimal logarithm, is a mathematical function that is the inverse of the exponential function.
- Function: **sqrt**, sqrt(Number)
  A square root function is a function that takes a non-negative number as an input and returns the square root of the given input number.
- Measurement: **Length** in Millimeter (mm)
  Length Unit Conversion
- Measurement: **Force** in Newton (N)
  Force Unit Conversion
- Measurement: **Angle** in Degree (°)
  Angle Unit Conversion
- Measurement: **Torque** in Newton Millimeter (N*mm)
  Torque Unit Conversion
- Measurement: **Stress** in Newton per Square Millimeter (N/mm²)
  Stress Unit Conversion

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