



Film Thickness Formulas

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List of 11 Film Thickness Formulas

Film Thickness (**

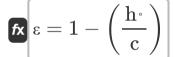
1) Eccentricity of Bearing in Terms of Minimum Film Thickness 🗗



 $\mathbf{f}\mathbf{x} = \mathrm{R} - (\mathrm{h} \cdot + \mathrm{r})$

(0.48776 mm = 26 mm - (0.01224 mm + 25.5 mm))

2) Eccentricity Ratio in Terms of Minimum Film Thickness of Bearing



 $\boxed{ \textbf{ex} \ 0.49 = 1 - \left(\frac{0.01224 \text{mm}}{0.024 \text{mm}} \right) }$

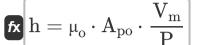
3) Eccentricity Ratio of Bearing in Terms of Minimum Film Thickness Variable

fx
$$\epsilon = 1 - \mathrm{h_{min}}$$

$$\boxed{\textbf{ex} \ 0.5 = 1-0.5}$$



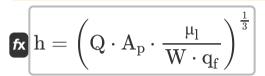
4) Film Thickness in Terms of Absolute Viscosity and Tangential Force



Open Calculator 🗗

 $0.020035 \mathrm{mm} = 490 \mathrm{cP} \cdot 1750 \mathrm{mm}^2 \cdot rac{5 \mathrm{m/s}}{214 \mathrm{N}}$

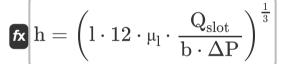
5) Film Thickness in Terms of Flow Coefficient and Flow of Lubricant



Open Calculator

 $= 0.019537 \text{mm} = \left(1600 \text{mm}^3/\text{s} \cdot 450 \text{mm}^2 \cdot \frac{220 \text{cP}}{1800 \text{N} \cdot 11.80}\right)^{\frac{1}{3}}$

6) Fluid Film Thickness in Terms of Flow of Lubricant



Open Calculator 🗗

 $= \left(48 \text{mm} \cdot 12 \cdot 220 \text{cP} \cdot \frac{15 \text{mm}^3/\text{s}}{49 \text{mm} \cdot 5.1 \text{MPa}}\right)^{\frac{1}{3}}$

7) Minimum Film Thickness given Radius of Bearing

fx
$$igl|\mathbf{h}_{^\circ}=\mathbf{R}-(\mathbf{e}+\mathbf{r})igr|$$

Open Calculator

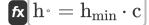
 $0.013 \mathrm{mm} = 26 \mathrm{mm} - (0.487 \mathrm{mm} + 25.5 \mathrm{mm})$







8) Minimum Film Thickness in Terms of Minimum Film Thickness Variable of Bearing 🖸



Open Calculator

 $oxed{ex} 0.012 \mathrm{mm} = 0.5 \cdot 0.024 \mathrm{mm}$

O) Minimum Film Thickness of bearing in Torms of Fee

9) Minimum Film Thickness of bearing in Terms of Eccentricity Ratio

fx $\mathbf{h}^{\circ} = \mathbf{c} \cdot (1 - \mathbf{\epsilon})$

Open Calculator

 $\mathbf{ex} \ 0.01224 \mathrm{mm} = 0.024 \mathrm{mm} \cdot (1 - 0.49)$

10) Minimum Film Thickness Variable of Bearing

fx $\left[\mathrm{h_{min}} = rac{\mathrm{h}^{\circ}}{\mathrm{c}}
ight]$

Open Calculator

 $= 0.51 = \frac{0.01224 \text{mm}}{0.024 \text{mm}}$

11) Minimum Film Thickness Variable of Bearing in Terms of Eccentricity Ratio

fx $h_{min} = 1 - \epsilon$

Open Calculator

ex 0.51 = 1 - 0.49



Variables Used

- A_D Total Projected Area of Bearing Pad (Square Millimeter)
- App Area of Moving Plate on Oil (Square Millimeter)
- **b** Breadth of Slot for Oil Flow (Millimeter)
- C Radial clearance for bearing (Millimeter)
- **e** Eccentricity in Bearing (Millimeter)
- **h** Oil Film thickness (Millimeter)
- h Minimum Film Thickness (Millimeter)
- h_{min} Minimum Film Thickness Variable
- Length of Slot in Direction of Flow (Millimeter)
- P Tangential Force on Moving Plate (Newton)
- Q Flow of Lubricant (Cubic Millimeter per Second)
- Qf Flow Coefficient
- Q_{Slot} Flow of Lubricant from Slot (Cubic Millimeter per Second)
- r Radius of Journal (Millimeter)
- R Radius of Bearing (Millimeter)
- V_m Velocity of Moving Plate on Oil (Meter per Second)
- W Load Acting on Sliding Bearing (Newton)
- ΔP Pressure Difference between Slot Sides (Megapascal)
- ε Eccentricity Ratio of Journal Bearing
- μ_I Dynamic Viscosity of Lubricant (Centipoise)
- μ₀ Dynamic Viscosity of Oil (Centipoise)





Constants, Functions, Measurements used

- Measurement: Length in Millimeter (mm)
 Length Unit Conversion
- Measurement: Area in Square Millimeter (mm²)
 Area Unit Conversion
- Measurement: Pressure in Megapascal (MPa)

 Pressure Unit Conversion
- Measurement: Speed in Meter per Second (m/s)
 Speed Unit Conversion
- Measurement: Force in Newton (N)
 Force Unit Conversion
- Measurement: Volumetric Flow Rate in Cubic Millimeter per Second (mm³/s)
 - Volumetric Flow Rate Unit Conversion
- Measurement: Dynamic Viscosity in Centipoise (cP)
 Dynamic Viscosity Unit Conversion



Check other formula lists

🗸 Film Thickness Formulas 🛂

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