



Food to Microorganism Ratio or F to M Ratio Formulas

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List of 20 Food to Microorganism Ratio or F to M Ratio Formulas

Food to Microorganism Ratio or F to M Ratio

1) Biological Oxygen Demand Influent

 $extbf{BOD}_{i} = rac{ ext{FM} \cdot ext{V} \cdot ext{X}}{ ext{O}}$

Open Calculator 🗗

$$ext{ex} \ 0.000901 ext{mg/L} = rac{0.001 \cdot 1.5 ext{m}^3 \cdot 2.0 ext{mg/L}}{3.33 ext{m}^3}$$

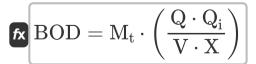
2) BOD Influent given MLSS

 $\left[\mathbf{Q}_{i} = rac{\mathrm{BOD} \cdot \mathbf{X} \cdot \mathbf{V}}{\mathrm{M}_{t} \cdot \mathrm{Q}}
ight]$

Open Calculator 🚰

$$oxed{ex} 0.000901 {
m mg/L} = rac{3.0 {
m mg} \cdot 2.0 {
m mg/L} \cdot 1.5 {
m m}^{
m 3}}{3 {
m g} \cdot 3.33 {
m m}^{
m 3}}$$

3) BOD Load Applied given MLSS



Open Calculator 🗗

$$oxed{ex} 2.997 \mathrm{mg} = 3 \mathrm{g} \cdot \left(rac{3.33 \mathrm{m}^{\scriptscriptstyle 3} \cdot 0.0009 \mathrm{mg/L}}{1.5 \mathrm{m}^{\scriptscriptstyle 3} \cdot 2.0 \mathrm{mg/L}}
ight)$$







4) BOD Load applied to Aeration System 🛂

fx $\mathrm{BOD_a} = \mathrm{Q} \cdot \mathrm{Q_i}$

Open Calculator 🗗

Open Calculator G

Open Calculator 2

- $= 2.997 ext{mg} = 3.33 ext{m}^3 \cdot 0.0009 ext{mg/L}$
- 5) BOD of Influent Sewage given BOD Load Applied
- $\mathbf{f}_{\mathbf{k}}$ $\mathrm{Q_{i}} = rac{\mathrm{BOD}}{\mathrm{Q}}$

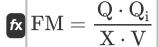
Open Calculator

- $ext{ex} 0.000901 ext{mg/L} = rac{3.0 ext{mg}}{3.33 ext{m}^3}$
- 6) Daily BOD Load given Food to Microorganism Ratio
- fx $\mathrm{BOD} = \mathrm{FM} \cdot \mathrm{M_t}$

- $\mathbf{amg} = 0.001 \cdot 3\mathbf{g}$
- 7) Food to Microorganism Ratio
- $extbf{FM} = rac{ ext{BOD}}{ ext{M}_{ ext{t}}}$
- $0.001 = \frac{3.0 \text{mg}}{3 \text{g}}$



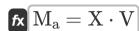
8) Food to Microorganism Ratio given MLSS



Open Calculator 🗗

 $extbf{ex} 0.000999 = rac{3.33 ext{m}^3 \cdot 0.0009 ext{mg/L}}{2.0 ext{mg/L} \cdot 1.5 ext{m}^3}$

9) Microbial Mass in Aeration System

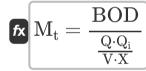


Open Calculator

 $\texttt{ex} \ 3000 \mathrm{mg} = 2.0 \mathrm{mg/L} \cdot 1.5 \mathrm{m}^{_3}$

10) Microbial Mass in Aeration System given MLSS

 $1.5\mathrm{m}^3 \cdot 2.0\mathrm{mg/L}$



Open Calculator

11) Mixed Liquor Suspended Solid

ex $3.003003 ext{g} = \frac{3.001 ext{mg}}{3.33 ext{m}^3 \cdot 0.0009 ext{mg/L}}$

$$\mathbf{K} = rac{\mathbf{Q} \cdot \mathbf{Q_i}}{\mathrm{FM} \cdot \mathbf{V}}$$

Open Calculator

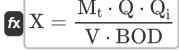
 $ext{ex} 1.998 ext{mg/L} = rac{3.33 ext{m}^3 \cdot 0.0009 ext{mg/L}}{0.001 \cdot 1.5 ext{m}^3}$







12) MLSS given BOD Load Applied to Aeration System



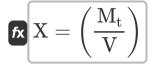
Open Calculator

Open Calculator

Open Calculator G

 $extbf{ex} 1.998 ext{mg/L} = rac{3 ext{g} \cdot 3.33 ext{m}^3 \cdot 0.0009 ext{mg/L}}{1.5 ext{m}^3 \cdot 3.0 ext{mg}}$

13) MLSS given Microbial Mass in Aeration System



stem 🗳

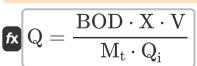
 $extbf{ex} 2 ext{mg/L} = \left(rac{3 ext{g}}{1.5 ext{m}^3}
ight)$

14) Sewage Flow given Food to Microorganism Ratio



 $ext{ex} = rac{0.001 \cdot 1.5 ext{m}^3 \cdot 2.0 ext{mg/L}}{0.0009 ext{mg/L}}$

15) Sewage Flow given MLSS



Open Calculator 🗗

 $ext{ex} = rac{3.0 ext{mg} \cdot 2.0 ext{mg/L} \cdot 1.5 ext{m}^3}{3 ext{g} \cdot 0.0009 ext{mg/L}}$





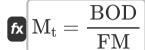
16) Sewage Flow into Aeration System given BOD Load Applied



Open Calculator 🚰

 $oxed{ex} 3.333333 \mathrm{m}^{_3} = rac{3.0 \mathrm{mg}}{0.0009 \mathrm{mg/L}}$

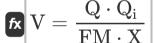
17) Total Microbial Mass given Food to Microorganism Ratio



Open Calculator

 $\mathbf{ex} \left[3\mathbf{g} = \frac{3.0 \mathrm{mg}}{0.001} \right]$

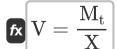
18) Volume of Tank given Food to Microorganism Ratio



Open Calculator 🗗

 $extbf{ex} egin{aligned} 1.4985 ext{m}^3 &= rac{3.33 ext{m}^3 \cdot 0.0009 ext{mg/L}}{0.001 \cdot 2.0 ext{mg/L}} \end{aligned}$

19) Volume of Tank given Microbial Mass in Aeration System 🗹



Open Calculator

 $oxed{ex} 1.5 \mathrm{m}^{\scriptscriptstyle 3} = rac{3\mathrm{g}}{2.0 \mathrm{mg/L}}$





20) Volume of Tank given MLSS



Open Calculator 🗗

$$ext{ex} 1.4985 ext{m}^{_3} = rac{3 ext{g} \cdot 3.33 ext{m}^{_3} \cdot 0.0009 ext{mg/L}}{2.0 ext{mg/L} \cdot 3.0 ext{mg}}$$



Variables Used

- **BOD** Daily BOD (Milligram)
- **BOD**_a BOD Load applied to Aeration System (*Milligram*)
- BOD_i Biological Oxygen Demand (Milligram per Liter)
- FM Food to Microorganism Ratio
- M_a Microbial Mass in Aeration System (Milligram)
- M_t Total Microbial Mass (Gram)
- Q Sewage Flow (Cubic Meter)
- Qi Influent BOD (Milligram per Liter)
- **V** Volume of Tank (Cubic Meter)
- X MLSS (Milligram per Liter)





Constants, Functions, Measurements used

- Measurement: Weight in Milligram (mg), Gram (g)
 Weight Unit Conversion
- Measurement: Volume in Cubic Meter (m³)

 Volume Unit Conversion
- Measurement: Density in Milligram per Liter (mg/L)
 Density Unit Conversion





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