

Load bending moment diagram	Bending moment (M)	Deflection (δ)
<p>1</p>	$M_{max.} = WR$	$\delta_{max.} = \frac{WR^3}{3EI}$
<p>2</p>	$M_{max.} = \frac{wR^2}{2}$	$\delta_{max.} = \frac{wR^4}{8EI}$
<p>3</p>	$M_{max.} = \frac{1}{4} WR$	$\delta_{max.} = \frac{WR^3}{48EI}$
<p>4</p>	$M_{max.} = \frac{1}{8} WR$	$\delta_{max.} = \frac{WR^3}{192EI}$
<p>5</p>	$M_{max.} = \frac{1}{8} wR^2$	$\delta_{max.} = \frac{5wR^4}{384EI}$
<p>6</p>	$M_{max.} = \frac{1}{12} wR^2$	$\delta_{max.} = \frac{wR^4}{384EI}$
<p>7</p>	$M_{max.} = \frac{1}{8} wR^2$	$\delta_{max.} = \frac{wR^4}{184.6EI}$

Young's modulus $E = \text{---}$ = Deflection
 (Vertical elastic modulus) = Rectangular stress $I =$ Cross-sectional secondary moment

Load bending moment diagram	Maximum stress, Maximum deflection																					
<p>1. Disk receiving uniform load and having supported the perimeter</p>	<p>The circumferential stress t and radial r can be expressed as follows at the center.</p> $(t)_{max.} = (r)_{max.} = \pm \frac{3P(3m+1)R^2}{8mt^2}$ <p>Also, the central deflection $\delta_{max.}$ can be expressed as follows :</p> $\delta_{max.} = \frac{3(m-1)(5m+1)}{16Em^2t^3} PR^4$ <p>Wherein, P : Load , R : Radius of plate , t : Plate thickness, E : Young's modulus , $\frac{1}{m}$: Poisson's ratio</p>																					
<p>2. Disk receiving uniform load and having been fixed to the perimeter</p>	<p>The peripheral stress can be expressed as follows :</p> $t = \pm \frac{3PR^2}{4mt^2} \quad (r)_{max.} = \pm \frac{3PR^2}{4t^2}$ <p>and the central one is as follows : $(t)_{max.} = r = \pm \frac{3(m+1)PR}{8mt^2}$</p> <p>The central deflection $\delta_{max.}$ can be expressed as follows :</p> $\delta_{max.} = \frac{3(m^2-1)PR^4}{16Em^2t^3}$ <p>Wherein, P : Load , R : Radius of plate , t : Plate thickness, E : Young's modulus , $\frac{1}{m}$: Poisson's ratio</p>																					
<p>3. Disk receiving uniform load on the concentric circle having supported to the perimeter</p>	<p>The central stress can be expressed as follows :</p> $(t)_{max.} = (r)_{max.} = \pm \frac{3(m+1)P}{2mt^2} \left(\frac{m}{m+1} + \log \frac{R}{r_0} - \frac{m-1}{m+1} \frac{r_0^2}{4R^2} \right)$ <p>When the central deflection r_0 is smaller than R, $\delta_{max.}$ is expressed as follows :</p> $\delta_{max.} = \frac{3(m-1)(3m+1)PR^2}{4Em^2t^3}$ <p>Wherein, P: Total load on the concentric circle. $P = r_0^2 p$ R : Radius of plate , t : Plate thickness, E : Young's modulus , $\frac{1}{m}$: Poisson's ratio</p>																					
<p>4. Disk receiving uniform load on the concentric circle having been fixed to the perimeter</p>	<p>The peripheral stress can be expressed as follows :</p> $t = \pm \frac{3P}{2mt^2} \left(1 - \frac{r_0^2}{2R^2} \right) \quad r = \pm \frac{3P}{2t^2} \left(1 - \frac{r_0^2}{2R^2} \right)$ <p>and the central one is as follows : $t = r = \pm \frac{3(m+1)P}{2mt^2} \left(\log \frac{R}{r_0} + \frac{r_0^2}{4R^2} \right)$</p> <p>The central deflection $\delta_{max.}$ can be expressed as follows :</p> $\delta_{max.} = \frac{3(m-1)(7m+3)PR^2}{16Em^2t^3}$ <p>Wherein, P: Total load on the concentric circle. $P = r_0^2 p$ R...Radius of plate, t...Plate thickness, E...Young's modulus $\frac{1}{m}$...Poisson's ratio</p>																					
<p>5. Rectangular plate receiving uniform load and having supported the perimeter</p>	<p>The X-axis direction stress at center O can be expressed as follows : $(x)_{max.} = \frac{Pb^2}{t^2}$</p> <p>The deflection at the center O can be expressed as follows : $\delta_{max.} = \frac{Pb^4}{Et^3}$</p> <table border="1"> <thead> <tr> <th>a/b</th> <th>1.0</th> <th>1.5</th> <th>2.0</th> <th>3.0</th> <th>4.0</th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1.150</td> <td>1.950</td> <td>2.440</td> <td>2.850</td> <td>2.960</td> <td>3.000</td> </tr> <tr> <td>1</td> <td>0.709</td> <td>1.350</td> <td>1.770</td> <td>2.140</td> <td>2.240</td> <td>2.280</td> </tr> </tbody> </table> <p>E : Young's modulus</p>	a/b	1.0	1.5	2.0	3.0	4.0		1	1.150	1.950	2.440	2.850	2.960	3.000	1	0.709	1.350	1.770	2.140	2.240	2.280
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<p>6. Rectangular plate receiving uniform load and having been fixed to the perimeter</p>	<p>The stress to X-axis direction at the center A of the longer side can be expressed as follows :</p> $(x)_{max.} = \frac{Pb^2}{t^2}$ $\delta_{max.} = \frac{Pb^4}{Et^2}$ <table border="1"> <thead> <tr> <th>a/b</th> <th>1.0</th> <th>1.5</th> <th>2.0</th> <th></th> </tr> </thead> <tbody> <tr> <td>2</td> <td>1.231</td> <td>1.817</td> <td>1.990</td> <td>2.000</td> </tr> <tr> <td>2</td> <td>0.221</td> <td>0.384</td> <td>0.443</td> <td>0.454</td> </tr> </tbody> </table> <p>E : Young's modulus</p>	a/b	1.0	1.5	2.0		2	1.231	1.817	1.990	2.000	2	0.221	0.384	0.443	0.454						
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