

Centrifugal Force

Sample document with complete example values. It shows the report the purchased export produces for YOUR input - it is not itself a report for any part.

Project: Sample project

Part/Position: no real part

Prepared by: Sample, not released

Circular motion of a mass $m = 2 \text{ kg}$ at radius $r = 0.5 \text{ m}$, specified via Rotational speed n . Result: $F = 98,696 \text{ N} = 98.7 \text{ kN}$, $v = 157.08 \text{ m/s}$, $\omega = 314.16 \text{ rad/s}$, $a = 49,348 \text{ m/s}^2 (= 5,030 \cdot g)$.

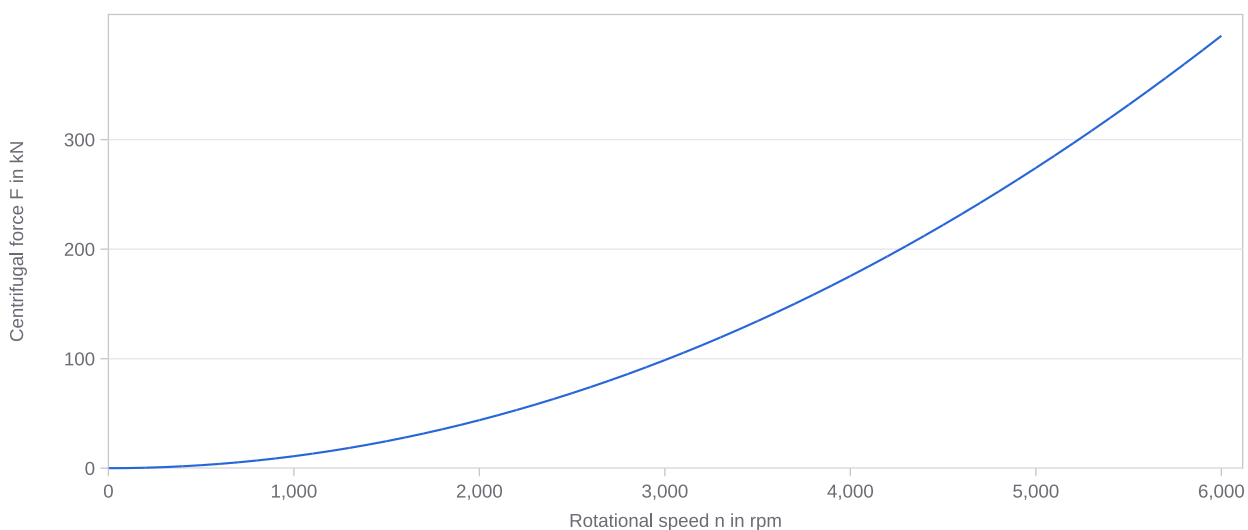
Input

Mass m	2 kg
Radius r	0.5 m
Specify via	Rotational speed n

Results

Centrifugal force F	98,696 N
Centrifugal force F	98.696 kN
Circumferential velocity v	157.08 m/s
Rotational speed n	3,000 rpm
Angular frequency ω	314.159 rad/s
Centripetal acceleration a	49,348 m/s ²
Acceleration a/g	5,030.4 · g

Centrifugal force over rotational speed at constant mass and radius



Calculation basis

In uniform circular motion, a centripetal force directed toward the centre acts on a mass m at distance r ; in the co-rotating reference frame it appears as an outward-directed centrifugal force of equal magnitude. From the rotational speed n follows the angular frequency $\omega = 2 \pi n / 60$, and from that the circumferential velocity $v = \omega r$ and the centripetal acceleration $a = \omega^2 r = v^2 / r$. The force is $F = m a = m \omega^2 r = m v^2 / r$ and thus grows quadratically with the rotational speed. Mass and radius are assumed rigid and point-like; friction, deformation and strength limits (burst speed) are not considered.

About this sample

All values on these pages come from a freely chosen example calculation and belong to no real part. The purchased export contains the same sections with your input, your header data (project, part, prepared by) and as searchable text. Pricing and scope: maschinenbaurechner.de/en/pricing



Note: The results are design and orientation aids. They do not replace independent verification, calculation and approval by a qualified person. The terms of use at maschinenbaurechner.de apply.