Centrifugal Force and Rotational Speed

Centrifugal force on a rotating mass from its mass, radius and speed, the centripetal acceleration in g, and the peripheral speed.

Method: Newton's laws for circular motion

Input parameters

Unit system: SI

Parameter	Value	Unit
Mass	2.0000	kg
Radius of rotation	0.30000	m
Speed	1,500.0	rpm

Calculated results

Parameter	Value	Unit
Centrifugal force m ω² r	14.804	kN
Acceleration in g	754.81	
Peripheral speed	47.124	m/s

Formula and method

$$F = m\omega^2 r, \quad \omega = 2\pi N, \quad v = \omega r$$

Variables

m	Mass	kg
r	Radius of rotation	m
N	Speed	1/s
F	Centrifugal force m ω² r	N
a/g	Acceleration in g	-
v	Peripheral speed	m/s

Method and standards

Circular motion.

Assumptions and limits

- Rigid rotation.

References

- Newton's laws for circular motion

Report details

Report reference	FCC-9E40-MJ7P (the same inputs always give the same reference)
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Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/mechanical/statics-dynamics/centrifugal-force

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.