Pump Suction Specific Speed and NPSH Margin

Suction specific speed of a centrifugal pump from speed, flow per eye and NPSH required, with the NPSH margin and margin ratio against NPSH available.

Method: Suction specific speed definition N_ss = n √Q / NPSH_r^0.75 (Hydraulic Institute terminology)

Input parameters

Unit system: SI

Parameter	Value	Unit
Speed	2,950.0	rpm
Flow at best efficiency (per impeller eye)	100.00	m³/h
NPSH required	4.0000	m
NPSH available	6.0000	m

Calculated results

Parameter	Value	Unit
Suction specific speed (rpm, m³/s, m)	173.83	
Suction specific speed (US units: rpm, gpm, ft)	8,977.5	
NPSH margin NPSH_a − NPSH_r	2.0000	m
NPSH margin ratio	1.5000	

Formula and method

$$N_{ss} = \frac{n\sqrt{Q}}{NPSH_r^{0.75}}, \quad \text{margin} = NPSH_a - NPSH_r$$

Variables

n	Speed	1/s
Q	Flow at best efficiency (per impeller eye)	m³/s
$NPSH_r$	NPSH required	m
$NPSH_a$	NPSH available	m
N_{ss}	Suction specific speed (rpm, m³/s, m)	-
$N_{ss,US}$	Suction specific speed (US units: rpm, gpm, ft)	-
Δ	NPSH margin NPSH_a − NPSH_r	m
$NPSH_a/NPSH_r$	NPSH margin ratio	-

Method and standards

Definitions.

Assumptions and limits

- Values at best efficiency point.

References

• Suction specific speed definition N_ss = n √Q / NPSH_r^0.75 (Hydraulic Institute terminology)

Report details

Report reference	FCC-Y34K-WSSG (the same inputs always give the same reference)
Generated	17 November 2026, 19:44 UTC
Calculator	Pump Suction Specific Speed and NPSH Margin
Method last reviewed	12 November 2026
Software release	FireCAD Calc, release of 17 November 2026
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/pumps/suction-specific-speed

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Reopens the calculator with the inputs of this report.