



The following addendum presents the corrections and revision of ANSI/HI 14.1-14.2 Rotodynamic Pumps For Nomenclature & Definitions, approved on **July 29, 2020**. An addendum is issued to change or alter any technical information in a published standard, substantive in nature, from its original intended form. It has been approved through a 2 week ballot process.

Please note that this document is released with the acknowledgement and consideration of all other previous revisions made since the last publication of the standard.

The Hydraulic Institute and its affiliates caution and encourage all users to ensure that they have the latest edition of any HI standard by periodically checking the following URL:
<http://www.pumps.org/StandardsUpdates.aspx>

Edit 1:

Page:

Document Page 18&19
PDF Page 31&32

Change:

Updated 14.1.4.1.2 Type Number paragraph, updated the equation to include K and edit definitions for n and Q'. Updated

Former 14.1.4.1.2:

14.1.4.1.2 Type Number

Type number: A variation of specific speed is type number. This is a dimensionless quantity calculated at the point of best efficiency, which is defined by the following formula:

$$K = \frac{2\pi n Q'^{0.5}}{(gH')^{0.75}} = \frac{\omega Q'^{0.5}}{(y')^{0.75}}$$

Where:

Q' = volume rate of flow per eye, in meters cubed per second (feet cubed per second)

H' = head of first stage, in meters (feet)

n = rotative speed, in revolutions per minute

g = gravitational acceleration, in meters per second squared (feet per second squared)

ω = angular velocity, in radians per second

y' = specific energy, in joule per kilogram (British thermal unit per pound mass)

NOTES:

- 1) The type number (specific speed) is to be taken at maximum diameter of the first-stage impeller.
- 2) To obtain specific speed based on cubic meter per second and meters, multiply type number by 52.92. To obtain specific speed based on gallon per minute and feet, multiply type number by 2733.72.

Standard ID and Name: ANSI/HI 14.1-14.2 – 2019 – Rotodynamic Pumps For Nomenclature & Definitions

Title of Addendum: Edit to equation, edit to table 14.2a, updating graphic for BB3 Pump type

Date of Addendum Release: August 10, 2020

Updated 14.1.4.1.2:

14.1.4.1.2 Type Number

Type number: *A variation of specific speed is type number. Type number is a dimensionless quantity calculated at the point of best efficiency. Note, that to obtain a dimensionless value, the specified units of measure for each variable below may be different than the units of measure assigned to that variable in other parts of this Standard. Close attention to the units of measure for variables in any calculation is advised. Type number is defined by the following formula:

$$K = \frac{2\pi n Q^{0.5}}{(gH')^{0.75}} = \frac{\omega Q^{0.5}}{(y')^{0.75}}$$

*Addenda 2020

*Where

K = Type number

Q' = volume rate of flow per eye, in cubic meters per second (cubic feet per second)

H' = head of first stage, in meters (feet)

n = rotative speed, in revolutions per second

g = gravitational acceleration, in meters per second squared (feet per second squared)

ω = angular velocity, in radians per second

y' = specific energy, in joule per kilogram (British thermal unit per pound mass)

NOTES:

- 1) The type number (specific speed) is to be taken at maximum diameter of a single impeller.
- 2) To obtain specific speed based on cubic meter per second and meters, multiply type number by 52.92. To obtain specific speed based on gallon per minute and feet, multiply type number by 2733.72.

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Edit 2

Page:

Document Page 87

PDF Page 100

Change:

Updated table 14.2a – Principal symbols to mirror the edits to the equation on pages 18&19. Changed “revolutions per minute” to “revolutions per second” and “RPM” to “ 1/s”.

Former Table 14.2a – Principal symbols:

Symbol	Term	Metric unit	Abbr.	US customary unit	Abbr.	Conversion factor ^a
WR ²	Mass moment of inertia	newton-meter squared	N-m ²	pound force-foot squared	lbf-ft ²	47.88
K	Thrust factor	dimensionless	-	dimensionless	-	1
K _T	Thrust factor	kilogram/meter	kg/m	pound mass/foot	lbm/ft	1.488
K ^b	Type number	dimensionless	-	dimensionless	-	1
l	Static lift	meter	m	foot	ft	0.3048
MAWP	Maximum allowable working pressure	kilopascal	kPa	pound force/square inch	psi	6.895
n	Rotative speed	revolution/minute	rpm	revolution/minute	rpm	1
NPSH	Net positive suction head	meter	m	foot	ft	0.3048
NPSHA	Net positive suction head available	meter	m	foot	ft	0.3048
NSPHR	Net positive suction head required	meter	m	foot	ft	0.3048
NPSH3	Net positive suction head required for a 3% head reduction at first stage	meter	m	foot	ft	0.3048
ns (Ns)	Specific speed	index number	-	index number	-	0.0194
p	Pressure	kilopascal	kPa	pound force/square inch	psi	6.895
P	Power	kilowatt	kW	horsepower	hp	0.7457
Q ^c	Volume rate of flow	cubic meter/second	m ³ /s	US gallon/minute	gpm	0.0000631
		cubic meter/hour	m ³ /h	US gallon/minute	gpm	0.2271
Q ^d	Volume rate of flow per eye	cubic meter/second	m ³ /s	US gallon/minute	gpm	0.0000631
q	Mass rate of flow	kilograms/second	kg/s	pound mass/second	lbm/s	0.4536
RM	Linear model ratio	dimensionless	-	dimensionless	-	1
S (Nss)	Suction specific speed	index number	-	index number	-	0.0194
s	Specific gravity	dimensionless	-	dimensionless	-	1
T ^b	Torque	newton-meter	N-m	pound-foot	lbf-ft	1.356

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Updated Table 14.2a – Principal symbols:

Symbol	Term	Metric unit	Abbr.	US customary unit	Abbr.	Conversion factor ^a
WR ²	Mass moment of inertia	newton-meter squared	N-m ²	pound force-foot squared	lbf-ft ²	47.88
K	Thrust factor	dimensionless	-	dimensionless	-	1
K _T	Thrust factor	kilogram/meter	kg/m	pound mass/foot	lbm/ft	1.488
K ^o	Type number	dimensionless	-	dimensionless	-	1
l	Static lift	meter	m	foot	ft	0.3048
MAWP	Maximum allowable working pressure	kilopascal	kPa	pound force/square inch	psi	6.895
*n	Rotative speed	revolution/second	s ⁻¹	revolution/second	s ⁻¹	1
		revolution/minute	rpm	revolution/minute	rpm	1
NPSH	Net positive suction head	meter	m	foot	ft	0.3048
NPSHA	Net positive suction head available	meter	m	foot	ft	0.3048
NSPHR	Net positive suction head required	meter	m	foot	ft	0.3048
NPSH3	Net positive suction head required for a 3% head reduction at first stage	meter	m	foot	ft	0.3048
ns (Ns)	Specific speed	index number	-	index number	-	0.0194
p	Pressure	kilopascal	kPa	pound force/square inch	psi	6.895
P	Power	kilowatt	kW	horsepower	hp	0.7457
*Q ^c	Volume rate of flow	cubic meter/second	m ³ /s	US gallon/minute	gpm	0.0000631
		cubic meter/hour	m ³ /h	US gallon/minute	gpm	0.2271
*Q ^e	Volume rate of flow per eye	cubic meter/second	m ³ /s	US gallon/minute	gpm	0.0000631
				cubic feet per second	ft ³ /s	0.0283
q	Mass rate of flow	kilograms/second	kg/s	pound mass/second	lbm/s	0.4536
RM	Linear model ratio	dimensionless	-	dimensionless	-	1
S (Nss)	Suction specific speed	index number	-	index number	-	0.0194
s	Specific gravity	dimensionless	-	dimensionless	-	1
T ^b	Torque	newton-meter	N-m	pound-foot	lbf-ft	1.356

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Edit 3

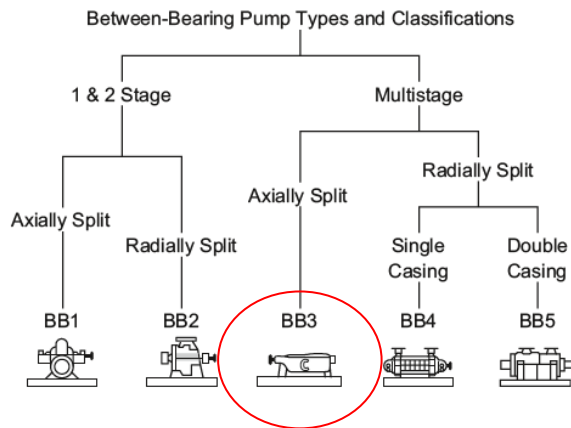
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Change:
Updated the graphic for a BB3 pump in 14.1.3.7.8 Rotodynamic pump types – between bearing pump to a more accurate version as seen elsewhere in the standard. See images below:

Former 14.1.3.7.8. BB3 graphic:

14.1.3.7.8 Rotodynamic pump types – between bearing



Updated 14.1.3.7.8. BB3 graphic:

14.1.3.7.8 Rotodynamic pump types – between bearing

