



American National Standard for

Rotodynamic Centrifugal Slurry Pumps

for Nomenclature, Definitions,
Applications, and Operation



6 Campus Drive
First Floor North
Parsippany, New Jersey
07054-4406
www.Pumps.org

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Sponsor
Hydraulic Institute
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American National Standard

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Contents

12	Rotodynamic centrifugal slurry pumps	1
12.1	Introduction.	1
12.1.1	Scope	1
12.1.2	Purpose	1
12.1.3	Pump types and nomenclature.	1
12.1.4	Definition of slurry	2
12.1.5	Definition of slurry pumps.	2
12.1.6	Overhung impeller	3
12.1.7	Frame mounted	3
12.1.8	Cantilevered wet pit	3
12.1.9	Submersible	3
12.1.10	Lined type.	4
12.1.11	Unlined type	4
12.1.12	Construction drawings	4
12.1.13	Part names.	4
12.1.14	Letter dimensional designations.	27
12.2	Definitions.	31
12.2.1	Rate of flow (Q)	33
12.2.2	Speed (n)	33
12.2.3	Head (h) - general term	33
12.2.4	Condition points	35
12.2.5	Suction conditions	35
12.2.6	Power	36
12.2.7	Pump pressures.	37
12.2.8	Mechanical seal terms	37
12.2.9	Slurry terminology	38
12.3	Design and application.	44
12.3.1	Scope	44
12.3.2	Slurry services	44
12.3.3	Froth pumping	54
12.3.4	Wear in centrifugal slurry pumps	58
12.3.5	Hydraulic design and application considerations	63
12.3.6	Slurry system design	64
12.3.7	Wetted materials of construction	65
12.3.8	General arrangement details	68
12.3.9	Drive train arrangements	85
12.4	Installation, operation, and maintenance	86
12.4.1	Installation	86
12.4.2	Nozzle loads.	86
12.4.3	Connecting piping.	91
12.4.4	Commissioning.	92
12.4.5	Start-up	92
12.4.6	Storage of elastomer linings.	92
12.4.7	Impeller removal.	92
12.4.8	Axial adjustment of the bearing housing	92
12.4.9	Piping system design	92
12.4.10	Possible operating problems	93
12.4.11	Spare parts stock.	95
12.4.12	Maintenance procedures for maximum part life	95
12.4.13	Operational considerations.	96

12.5	Intentionally left blank	96
12.6	Testing	96
12.6.1	Scope	96
12.6.2	Test conditions	97
12.6.3	Manufacturer’s testing	97
12.6.4	Field tests	97
12.6.5	Wear tests	97
12.6.6	Instrumentation	98
Appendix A	Equipment data sheets (informative)	99
Appendix B	Nozzle loads tables (informative)	104
Appendix C	Materials data (informative)	106
Appendix D	Source material and references (informative)	109
Appendix E	Index (informative)	113
Figures		
12.1.3	– Rotodynamic centrifugal slurry pump types	2
12.1.5	– Typical material types and discharge pressure for particle size.	3
12.1.13a	– Overhung impeller, separately coupled, single stage, frame mounted, metal-lined pump (OH0)	5
12.1.13b	– Overhung impeller, separately coupled, single stage, frame mounted, elastomer-lined pump (OH0)	6
12.1.13c	– Overhung impeller, separately coupled, single stage, frame mounted, elastomer-lined pump, adjustable sideliners (OH0)	7
12.1.13d	– Overhung impeller, separately coupled, single stage, frame mounted, end suction, vulcanized-elastomer-lined pump (OH0)	8
12.1.13e	– Overhung impeller, separately coupled, single stage, frame mounted, end suction, metal, unlined casing pump (OH0)	9
12.1.13f	– Overhung impeller, separately coupled, single stage, frame mounted, side inlet, metal, unlined casing pump (OH0)	10
12.1.13g	– Overhung impeller, separately coupled, single stage, frame mounted, end suction, metal, tie bolt plate construction pump (OH0)	11
12.1.13h	– Overhung, open impeller, separately coupled, single stage, foot mounted, metal, ASME B73.1 type pump (OH1)	12
12.1.13i	– Overhung impeller, separately coupled, single stage, wet pit cantilever, elastomer-lined, single suction pump (VS5)	13
12.1.13j	– Overhung impeller, separately coupled, single stage, wet pit cantilever, elastomer, vulcanized-lined, double suction pump (VS5)	14
12.1.13k	– Overhung impeller, separately coupled, single stage, wet pit cantilever, unlined, metal, single suction pump (VS5)	15
12.1.13l	– Overhung impeller, close coupled, single stage, submersible, elastomer-coated, single suction pump (OH8B)	16
12.1.13m	– Overhung impeller, close coupled, single stage, submersible, elastomer-lined, single suction pump (OH8B)	17

12.1.13n – Overhung impeller, close coupled, single stage, submersible, elastomer-lined, double suction pump (OH8B)	18
12.1.13o – Overhung impeller, close coupled, single stage, end suction, metal, submersible pump with agitator (OH8B)	19
12.1.13p – Overhung impeller, close coupled, single stage, submersible, metal, double suction pump (OH8B)	20
12.1.14a – Horizontal pump dimensions	28
12.1.14b – Direct drive pump and motor assembly dimensions	29
12.1.14c – Vertical pump dimensions	30
12.2.3.4 – Datum elevations for various slurry pump designs	34
12.3.2.1 – Solids transport rate	46
12.3.2.2 – Nomograph for the relationship of concentration to specific gravity in aqueous slurries	47
12.3.2.3 – Schematic classification of slurries in industrial pipeline applications	48
12.3.2.4 – Nomograph for maximum velocity at limit of stationary deposition of solids.	49
12.3.2.5 – Effect of settling slurry on pump characteristics (schematic)	51
12.3.2.7 – Effect of average particle size and impeller diameter on H_r and R_h (For solids concentration by volume, $C_v = 15\%$ with solids $S_s = 2.65$ and a negligible amount of fine particles. Impeller diameters are given in millimeters and inches.)	52
12.3.3.2 – Application of empirical froth factor	56
12.3.3.3 – Approximate correlation between empirical froth factor (FF) and experimental froth volume factor (FVF) for froth pumps with increased inlet size	57
12.3.4.1a – Sliding wear coefficient W_c for different resisting materials in a neutral pH media for different average-sized, silica based, abrading particles	59
12.3.4.1b – Erosion response for different impingement angles and materials.	60
12.3.4.2a – Service class chart for slurry pump erosive wear.	62
12.3.4.2b – Miller number versus material abrasivity	62
12.3.6 – Typical constant concentration slurry pipeline friction loss characteristics	65
12.3.8.2a – Typical lip seal and its components	69
12.3.8.2b – Typical labyrinth seal.	70
12.3.8.2c – Generic bearing isolator and its major components	70
12.3.8.3.1a – “Flush-type” stuffing box with lantern ring in standard position	72
12.3.8.3.1b – “Weep-type” stuffing box with lantern ring	72
12.3.8.3.1c – Flow through flush	73
12.3.8.3.6 – Centrifugal (dynamic) seal with “dry-type” packing	75
12.3.8.3.7 – Multiple elements lip seal with internal flush	76
12.3.8.3.8a – Flow rates required to create 4.6 m/s (15 ft/s) velocity past a bushing	78
12.3.8.3.8b – Slurry pump shaft alignment and runout	79
12.3.8.3.8c – Dual back-to-back pressurized seal arrangement for high pressure slurry applications	80
12.3.8.3.8d – Typical face-to-back dual pressurized seal arrangement for slurry applications	80

12.3.8.3.9a – Rotating elastomeric bellows seal	81
12.3.8.3.9b – Stationary elastomeric bellows seal	81
12.3.8.3.9c – Heavy-duty slurry seal with quench device	82
12.3.8.3.9d – Heavy-duty slurry seal with elastomeric liner	82
12.3.8.3.9e – Fully split nonpusher seal	83
12.3.8.9f – Fully split pusher seal	83
12.3.8.3.9g – Specialty slurry seal	83
12.4.2 – Direction of forces and moments being applied to suction and discharge nozzles	86
12.4.2.7a – Sliding movement when forces and moments are transferred to pump feet.	88
12.4.2.7b – Forces and moments applied to pumps with various suction and discharge nozzle locations.	89
12.4.2.9 – Bolts in tension when a moment is applied to the pump	91
Tables	
12.1.13a — Slurry pump nomenclature – alphabetical listing	21
12.1.13b – Slurry pump nomenclature — numerical listing.	26
12.2a — Principal symbols	31
12.2b — Subscripts	32
12.3.2.7 — Specific gravity correction factor	52
12.3.3.2 — Approximate froth factors	55
12.3.5a — Recommended service limitations for acceptable wear.	63
12.3.5b — Acceptable range of relative flow rates for slurry pump casing optimum wear	64
12.3.7.1 — General suitability of wetted materials	66
12.3.8.2 — Calculated fatigue life of bearings by slurry service class.	71
12.3.8.3.8 — Application limits of single mechanical seals	77
12.3.8.3.10 — Recommended water quality limits	84
12.4.2.9 — Calculation of allowable forces and moments on the suction(s) and discharge(d) connections.	90
B.1 – Typical allowable combined nozzle loads for centrifugal end-suction slurry pumps – metric	104
B.2 – Typical allowable combined nozzle loads for centrifugal end-suction slurry pumps – US customary units.	105

Foreword (Not part of Standard)

Purpose and aims of the Hydraulic Institute

The purpose and aims of the Hydraulic Institute are to promote the advancement of the pump manufacturing industry and further the interests of the public, and to this end, among other things:

- a) Develop and publish standards;
- b) Address pump systems;
- c) Expand knowledge and resources;
- d) Educate the marketplace;
- e) Advocate for the industry.

Purpose of Standards and Guidelines

- 1) Hydraulic Institute Standards and Guidelines are adopted in the public interest and are designed to help eliminate misunderstandings between the manufacturer, the purchaser, and/or the user, and to assist the purchaser in selecting and obtaining the proper product for a particular need.
- 2) Use of Hydraulic Institute Standards and Guidelines is completely voluntary. Existence of Hydraulic Institute Standards does not in any respect preclude a member from manufacturing or selling products not conforming to the Standards.

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“An Institute Standard defines the product, material, process or procedure with reference to one or more of the following: nomenclature, composition, construction, dimensions, tolerances, safety, operating characteristics, performance, quality, rating, testing and service for which designed.”

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A Hydraulic Institute Guideline is not normative. The guideline is tutorial in nature, to help the reader better understand the subject matter.

Comments from users

Comments from users of this standard will be appreciated, to help the Hydraulic Institute prepare even more useful future editions. Questions arising from the content of this standard may be directed to the Technical Director of the Hydraulic Institute. If appropriate, the inquiry will then be directed to the appropriate technical committee for provision of a suitable answer.

Revisions

American National Standards of the Hydraulic Institute are subject to constant review, and revisions are undertaken whenever it is found necessary because of new developments and progress in the art. If no revisions are made for five years, the standards are reaffirmed using the ANSI canvass procedure.

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Units of measurement

Metric units of measurement are used, and corresponding US customary units appear in brackets. Charts, graphs, and sample calculations are also shown in both metric and US customary units. Because values given in metric units are not exact equivalents to values given in US customary units, it is important that the selected units of measure to be applied be stated in reference to this standard. If no such statement is provided, metric units shall govern.

Consensus

Consensus for this American National Standard was achieved by use of the canvass method. The following organizations, recognized as having an interest in the standardization of pumps, were contacted prior to the approval of this revision of the standard. Inclusion in this list does not necessarily imply that the organization concurred with the submittal of the proposed standard to ANSI.

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12 Rotodynamic centrifugal slurry pumps

12.1 Introduction

This standard covers rotodynamic slurry pumps used for pumping and/or transporting mixtures of solids and liquids or so-called “slurries.” Slurries are often abrasive and, if not considered, may cause high wear and shortened life of pumps. Unlike clear water, slurries alter the performance of the pumps and cause wear to the wet-end parts. Below a certain velocity, some slurries also settle out in the piping, causing blockages. These differences are such that if they are not taken into account, the pumps will not work satisfactorily or not at all. For this reason, this standard includes information about slurries and their effects, which is necessary to select, apply, operate, and maintain slurry pumps of different designs and materials of construction.

12.1.1 Scope

This standard is for rotodynamic centrifugal, single-stage, overhung impeller slurry pumps, horizontal and vertical of industrial types used for abrasive slurries, herein referred to as slurry pumps. It includes types and nomenclature; definitions; design and application; installation, operation and maintenance; and guidelines on testing.

12.1.2 Purpose

This standard is normative and sets out requirements, recommendations, and statements to define, select, apply, operate, and maintain slurry pumps. Requirements convey criteria to be fulfilled if compliance with the document is to be claimed and from which no deviation is permitted. Recommendations convey that, among several possibilities, one is particularly suitable, without excluding or prohibiting others.

12.1.3 Pump types and nomenclature

Figure 12.1.3 shows classifications of rotodynamic slurry pumps based on mechanical configuration. Figures 12.1.13a–12.1.13p show typical constructions commonly used for each pump type. Lowercase letter part designations are for different manufacturer variants of the same type. Other variations are also acceptable.

While there are no rigid rules about where different mechanical configurations are to be applied, initial cost, wear parts (maintenance) cost, and arrangement convenience are such that mechanical configurations tend to be aligned to certain services.

Separately coupled, frame mounted mechanical configurations are preferred for the heavier solids transport wear services (described as class 3 and class 4 in Section 12.3.4.2). Hard metal pumps are preferred for services involving the largest sizes of solids. Elastomer pumps, by virtue of the needed support, must be of the lined type.

Cantilevered wet pit pumps are used in plant mining process service (described as class 3 in Section 12.3.4.2) but are more widely used in the lighter-class wear services (described as class 1 and class 2 in Section 12.3.4.2) for cleanup and lower concentration slurries. These pumps usually are limited to no more than 300-mm (12-in) discharge size.

Close-coupled submersible pump types are similar to the cantilevered wet pit pumps, mostly used in cleanup services, but there may be areas where they are used as process pumps. These are also limited to smaller discharge sizes.