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American National Standard for

Controlled Volume Metering Pump Piping Guideline

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Hydraulic Institute

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

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Controlled Volume Metering Pump Piping Guideline

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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

a) 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.

b) 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.

Definition of a Standard of the Hydraulic Institute

Quoting from Article XV, Standards, of the By-Laws of the Institute, Section B:

“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.”

Definition of a Hydraulic Institute Guideline

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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This document was prepared by a committee of the Hydraulic Institute and approved by following ANSI essential requirements. Neither the Hydraulic Institute, Hydraulic Institute committees, nor any person acting on behalf of the

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This document does not contain a complete statement of all requirements, analyses, and procedures necessary to ensure safe or appropriate selection, installation, testing, inspection, and operation of any pump or associated products. Each application, service, and selection is unique with process requirements that shall be determined by the owner, operator, or his designated representative.

Units of measurement

Metric units of measurement are used, and corresponding US customary units appear in parentheses. 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.

Albemarle
Bechtel Corporation
Black & Veatch
DuPont Company
Ekwestrel Corp.
Fluid Sealing Association
Healy Engineering, Inc.
Kemet Inc.
Las Vegas Valley Water District
MWH Americas, Inc.
Neptune Chemical Pump Co.
Patterson Pump Company
Pumps Positive
Sulzer Pumps (US) Inc.
Weir Floway, Inc.

Committee list

Although this standard was processed and approved for submittal to ANSI by the canvass method, a working committee met many times to facilitate its development. At the time it was developed, the committee had the following members:

Chair – Don Weidemann, Neptune Chemical Pump Co.
Vice-chair – James Carling, Milton Roy, LLC

Committee Members	**Company**
James Burke	Blacoh Fluid Controls, Inc.
Aaron Hinchliffe	Iwaki America Incorporated
Doug Purdy	Wanner Engineering, Inc.
Peter Timpanelli	LEWA-Nikkiso America, Inc.

Alternate Members	**Company**
Gary Cornell (Retired)	Blacoh Fluid Controls, Inc.
Kenneth McQuesten	LEWA-Nikkiso America, Inc.

7.8 Piping considerations for metering pumps

7.8.1 Purpose

The purpose of this guideline is to provide piping and accessory requirements used in the installation of metering pumps, and to educate users about the effects and interactions of inlet (suction) and outlet (discharge) piping on metering system performance. It provides required and recommended practices for pump piping which, if followed, should reduce the risk of the system failing to perform properly, help avoid common mistakes, and eliminate misunderstanding the unique needs of the metering pump system.

7.8.2 Scope

This guideline applies to controlled volume metering pumps, specifically those with pulsating flows. Types of positive displacement pumps include, but are not limited to, hydraulic-coupled disc diaphragm, hydraulic-coupled tubular diaphragm, mechanical-coupled disc diaphragm, packed piston, and plunger. This document covers typical piping and accessories upstream and downstream from the pump(s).

7.8.3 Introduction

Metering pumps are described in detail in ANSI/HI 7.1-7.5 – *Controlled Volume Metering Pump for Nomenclature, Definitions, Application, and Operation*. Refer to this standard for general CVMP knowledge.

The success or failure of a metering pump depends heavily on the design of the system in which it is installed (pumping system). Adequately sized and installed piping, as well as the application of accessories, are key factors in ensuring that a metering pump achieves the performance levels as designed by the manufacturer.

The function of pump piping is to provide a conduit for the flow of liquid to and from a pump, while not adversely affecting the performance and reliability of the pump.

The function of suction piping and accessories is to provide adequate flow and pressure of liquid to the pump under all capacity settings, properly sized for the conditions achieved during the pulsating flow. For example, if the inlet (suction) piping is improperly designed it could fail to deliver adequate flow, resulting in fluid starvation and creating reduced pump performance or offgassing particularly for high vapor pressure liquids.

The function of discharge piping and accessories is to provide an adequate flow of liquid between the pump and the injection point. In addition, it must supply any required backpressure to the pump, contain appropriate system protective devices, control and minimize pulsations, and be adequately rated to withstand the maximum pressures encountered.

The piping must be properly designed to provide an environment conducive enough to allow the pump to achieve the manufacturer's ratings and to meet the customer's performance requirements (Figures 7.8.3a and 7.8.3b).