ASME A112.19.13-2001

ELECTROHYDRAULIC WATER CLOSETS

AN AMERICAN NATIONAL STANDARD



The American Society of Mechanical Engineers

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FOREWORD

In 1992, the Energy Policy Act was enacted into law. This Act not only addressed energy issues, but also included criteria for water conservation products in the United States which became effective in January 1994. As a complement to the enactment of this Act, the plumbing industry had already developed numerous water-efficient plumbing products that were focused on improving the performance of 1.6 gallon per flush water closets.

One form of technology that has surfaced in the development of water closets utilizes hydraulic pumps to monitor and control the flow curve, and to dictate the exact discharge from the tank into the bowl. This Standard addresses the performance of these products, and defines the electrical and electronic standards that are applicable to these products.

This Standard establishes test criteria for electrohydraulic water closets. This Standard was based on a standard of an ad-hoc committee of the International Association of Plumbing and Mechanical Officials (IAPMO).

Suggestions for improvement of this Standard will be welcomed. They should be sent to The American Society of Mechanical Engineers; Attn: Secretary, A112 Main Committee; Three Park Avenue; New York, NY 10016-5990.

This Standard was approved as an American National Standard on May 4, 2001.

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ELECTROHYDRAULIC WATER CLOSETS

1 GENERAL

1.1 Scope

This Standard establishes performance, electrical/electronic conformance, temperature, life cycle, marking, and identification requirements for electrohydraulic water closets.

The use of alternate materials or methods are permitted, provided the proposed material or method complies with the performance requirements and intent of this Standard.

1.2 Units of Measurement

Values are stated in U.S. Customary units and the International System of Units (SI). The U.S. Customary units shall be considered as the standard.

1.3 Reference Standards

The following documents form a part of this Standard to the extent specified herein. Unless otherwise indicated, the latest issue shall apply.

ANSI Z124.4, Plastic Water Closet Bowls and Tanks

Publisher: International Association of Plumbing and Mechanical Officials, 20001 East Walnut Drive South, Walnut, CA 91789

ASME A112.19.2M,Vitreous China Plumbing Fixtures

ASME A112.19.6, Hydraulic Performance Requirements for Water Closets and Urinals

Publisher: The American Society of Mechanical Engineers, ASME Order Department, 22 Law Drive, Box 2300, Fairfield, NJ 07007

UL 62, Flexible Cord and Fixture Wire

UL 157, Gaskets and Seals

UL 244A-1994, Solid-State Controls for Appliances

UL 746C, Polymeric Materials — Used in Electrical Equipment Evaluations

UL 778, Motor Operated Water Pumps

UL 796, Printed-Wiring Boards

UL 817, Cord Sets and Power-Supply Cords

UL 1585, Class 2 and Class 3 Transformers

Publisher: Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062

1.4 Electrohydraulic Water Closet

An electrohydraulic water closet is a siphonic or wash-down water closet as described in ASME A112.19.2M with a nonmechanical trap seal. The water closet incorporates electrical motor(s), pump(s), and controllers to facilitate the flushing action.

In this Standard, the term *water closet* means an electrohydraulic water closet unless otherwise indicated.

2 REQUIREMENTS

2.1 General

2.1.1 Water Closet. The water closet shall conform to the requirements contained in ASME A112.19.2M or ANSI Z124.4, as appropriate. It shall also meet the requirements of ASME A112.19.6.

2.1.2 Electronic and Electrical Components. The electronic and electrical components utilized in the water closet shall comply with the appropriate Underwriters Laboratories (UL) standard or portions thereof as may be indicated in this Standard.

2.2 Pump System

The pump systems of an electrohydraulic water closet shall be tested as a water pump in accordance with UL 778. The applicable sections of UL 778 for compliance are:

(a) Construction, sections 1 through 8 and 10 through 28;

(b) Performance, sections 29 through 35 and 37 through 47;

(c) Manufacturing and Production Tests, sections 49 and 50;

(d) Rating, section 51;

(e) Markings, sections 48, 52, and 53;

(f) Instruction, sections 54 and 55.

2.3 Pump Motor and Impeller

The pump motor to the pump impeller coupling shall be nonmechanical and seamless. To minimize electrical hazards, the design shall provide a completely sealed

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chamber for the motor and electronics without the use of seals or O-rings.

2.4 Pump Housing

Electric motors or pump enclosures shall comply with UL 746C and be plastic rated 94-5V or better as specified in UL 746C.

2.5 Jet Hose

The pump jet hose, if provided, shall withstand a pressure of 25 ± 1 psi (172 ± 6.9 kPa) for 60 min.

2.6 Printed Wiring Boards

Wiring boards shall comply with UL 244A-1994, sections 14.1 and 14.2, and UL 796.

2.7 Switches

Switches shall be located in class 2 circuits only.

NOTE: A *class 2 circuit* is a circuit with an open potential of no more than 30 V rms (42.2 V peak) supplied by either an inherently limited class 2 transformer or by a transformer and fixed impedance that together comply with all the requirements for inherently limited class 2 transformers in UL 1585.

2.8 Electrical Supply Cord

Electrical supply cords shall be provided with 3 ft (0.9 m) minimum, 6 ft (1.8 m) maximum of permanently attached cord and an attachment plug for connection to the branch-circuit supply. The cord shall conform to UL 62 or UL 817. It shall be marked "Water Resistant" and include an equipment-grounding conductor. Where the electrical supply cord exits the fixture, the surface shall be smooth, with rounded surfaces or provided with a grommet. Seals and gaskets shall conform to UL 157.

2.9 Pump Temperature Testing

The pump shall be tested as described in para. 2.2(b), section 34 of UL 778, at the maximum duty cycle the pump will allow.

2.10 Wiring Harness Entrance and Location

The wiring harness and electrical controls not enclosed in the pump housing shall be located above the flood level rim of the tank or reservoir and above the drains or overflows.

2.11 Life Cycle Test

The electrical components and pump shall pass a 75,000 life cycle test. The test shall be performed on the water closet at the maximum cycle rate the electronic controls will allow. Upon completion of the life cycle test, the average volume per flush shall not vary more than 0.15 gal (0.57 L) or 10%, whichever is greater.

3 MARKING AND INSTRUCTION MANUAL

3.1 Marking

3.1.1 Water Closet. The water closet shall be legibly marked as specified in ASME A112.19.2M and other standards referenced in this Standard (see para. 1.3).

3.1.2 Pump. The pump shall have the following markings visible on it in its normal operating position and a second label visible on the exterior of the water closet or cord stating:

WARNING:
To reduce the risk of shock, connect only to a properly grounded type receptacle, protected by a ground-fault circuit interrupter (GFCI).

The word *warning* shall be a minimum of $^{3}/_{32}$ in. (2.4 mm) high.

3.2 Instruction Manual

An instruction manual shall be provided that includes instructions for routine maintenance and operation.

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