



Standard Practice for Selection of Valve Operators¹

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^{ε1} NOTE—The Keywords Section was editorially added in November 2014.

1. Scope

1.1 This practice provides guidance in the selection of manual and power-actuated valve operators.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety concerns—concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety—safety, health, and healthenvironmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ANSI/ASME Standards:*²

B16.5 Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard

3. List of Valve Operator Types

3.1 *Manual Operators:*

3.1.1 Handwheels.

3.1.2 Tee-wrenches.

3.2 *Electric Operators:*

3.2.1 Stem Nut Driven.

3.2.2 Handwheel Driven.

3.3 *Pneumatic Operators:*

3.3.1 Stem Nut Driven.

3.3.2 Handwheel Driven.

3.4 *Hydraulic Operators:*

3.4.1 Stem Nut Driven.

3.4.2 Handwheel Driven.

4. General Requirements

4.1 General requirements apply to all types of valve operators.

4.2 Operating terminals shall be accessible during all service conditions but shall not constitute an obstruction in working spaces.

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² Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, Society of Mechanical Engineers (ASME), ASME International Headquarters, Two Park Ave., New York, NY 10036, <http://www.ansi.org>, 10016-5990, <http://www.asme.org>.

4.3 Valve controls that are not immediately identifiable as to service shall be fitted with name plates.

4.4 Valve operating stations shall be fitted with a valve position indicator unless valve position is obvious for the service intended (full open or full closed), or valve is classified damage control smaller than 1½ in. (38.1 mm).

4.5 Positioning of the valve by either the local or remote actuators shall not void the ability of any other actuator to position the valve.

4.6 All valves, regardless of size, shall be readily operable by one man in a reasonable and limited time period, either through a manual or power-actuated valve operator.

5. Manual Valve Operators

5.1 Material for handwheels and tee-wrenches for casualty or damage control shall be either malleable iron, ductile iron, or steel.

5.2 Portable valve wrenches shall be labeled and stored near the valve operating station. Valve operating wrenches shall fit and turn (to open and close) deckbox operator covers.

5.3 Valves shall be located to prevent the necessity for ratchet wrenches wherever possible. Ratchet wrenches are, however, permitted where valve location prevents complete wrench rotation.

5.4 Handwheel diameter and tee-wrench handle length, based on the system torque at the operating station, is presented in **Table 1**.

6. Requirements for Power-Actuated Valve Operators

6.1 Requirements for power-actuated operators apply to electric, pneumatic, and hydraulic valve operators.

6.2 All power-actuated valves, except for valves within tanks, shall have a means for local, manual operation. Manual operation shall override power operation of the valve. Stem nut driven electric, pneumatic, and hydraulic operators shall return to the power mode after manual reset.

6.3 To prevent personnel injury during remote actuation of the valve, the manual handwheel shall be either the solid disk type, or it shall have a spoke cover plate or handwheel enclosure, or it shall disengage so that it does not rotate.

6.4 Valve actuators in critical systems may be provided with an energy storage system with sufficient capacity to cycle the valve once (from the initial position to the opposite and return).

7. Electric Valve Operators

7.1 The valve operator shall be powered by the ship's service power system. Critical valve operators may be additionally powered by an emergency power system.

7.2 Handwheel acting operators shall consist of the electric motor, gearing, limit and torque switches, reversing starter and pilot lights, and permanently mounted handwheel to form a complete self-contained unit to be mounted directly on the valve or through a reach rod transmission with flanges in accordance with ANSI/ASME B16.5.

TABLE 1 Handwheel Diameters and Tee-Wrench Handle Lengths

Torque, lbf-ft	Tee-Wrench Handle Length, in. (mm)	Handwheel Diameter, in. (mm)
7.5	10 (254)	2 (50.8)
12.3	10 (254)	3 (76.2)
17.7	10 (254)	4 (101.6)
23.3	10 (254)	5 (127.0)
29.5	10 (254)	6 (152.4)
35.3	12 (304.8)	7 (177.8)
41.3	12 (304.8)	8 (203.0)
47.6	20 (508)	9 (228.6)
54.2	20 (508)	10 (254.0)
61.0	20 (508)	11 (279.4)
67.5	20 (508)	12 (304.8)
80.5	20 (508)	14 (355.6)
94.0	20 (508)	16 (406.4)
108.0	...	18 (457.2)
128.6	...	21 (533.4)
150.0	...	24 (609.6)
168.8	...	27 (685.8)
187.5	...	30 (762.0)
225.0	...	36 (914.4)