Guidelines for Manual Operation of Valves

Standard Practice
Developed and Approved by the
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Unless otherwise specifically noted in this MSS SP, any standard referred to herein is identified by the date of issue that was applicable to the referenced standard(s) at the date of issue of this MSS SP.

In this Standard Practice all notes, annexes, tables, and figures are construed to be essential to the understanding of the message of the standard, and are considered part of the text unless noted as "supplemental". All appendices appearing in this document are construed as "supplemental". Supplemental" information does not include mandatory requirements.

U.S. customary units in this Standard Practice are the standard; metric (SI) units are for reference only.

Substantive changes in this 2009 edition are “flagged” by parallel bars as shown on the margins of this paragraph. The specific detail of the change may be determined by comparing the material flagged with that in the previous edition.

Originally Approved 1980

FOREWORD

The handwheels or handles provided with manually actuated valves are designed so that reasonable effort exerted by the operator(s) is sufficient to actuate. However, operability of manually controlled valves is dependent on many factors, such as fluid pressure and temperature, location of valve in relation to operators, desired speed of operation, physical capabilities of operators, ambient conditions, and frequency of operation. The purchaser, based upon anticipated on-site conditions, should therefore evaluate suitability of valves with manual actuators. This document was prepared to assist users in establishing actual requirements relative to valve operation. Most valves can be provided with actuators suitable for specific service conditions, regardless of severity, when conditions are defined.

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0. PURPOSE

The purpose of this Standard Practice is to provide valve users with information for use in evaluating the manual operation of valves.

It must be understood that this information is general in nature and must be supplemented by specific operational data for the valve and service conditions to be experienced. The maximum and minimum torque ratings of specific valve and actuator types are not covered by this Standard Practice, but must be considered when applying manual input devices to any specific valve. Data from the valve and actuator manufacturers should be consulted regarding valve and actuator types and ratings.

1. SCOPE

This Standard Practice provides guidelines for the operation of manually actuated valves as affected by the valve operator's input.

2. DEFINITIONS

2.1 ***Manual Actuator*** A device requiring manual force to provide the torque and/or thrust required to operate a valve, including levers, T-levers, T-chain-levers, handwheels, chainwheels, worm gear/spur gear/traveling nut units, and manual override units on power actuators.

2.2 ***Manual-Impact Device*** A hammerblow handwheel or chainwheel device that momentarily increases the breakloose seating and unseating torque capability of handwheels or chainwheels by the application of impact forces.

2.3 ***Power Actuator*** A mechanism for actuating valves using other than manual input to apply force or energy, such as pneumatic, electric, and hydraulic units.

2.4 ***Operator*** Person or persons who apply manual force to an actuating device. A typical operator is one who is capable of exerting approxiamately 150 pounds of force (670 N) on a lever with an effective length of 12 inches (300 mm) at waist level. If the intended operators or the system requirements differ, specific information should be obtained from the valve supplier.

2.5 ***Effective Lever or Effective T-Lever Length*** The actual lever length measured from the stem-center to the center of force application, 1 1/2 inches (38 mm) from the lever end, or the total T-lever length less 3 inches (76 mm).

2.6 ***Effective T-Chain-Lever Length*** The length from stem center to the center of the chain attachment multiplied by the sine of the angle included between lever and chain in the position under consideration.

2.7 ***Available Lever Torque*** The product of a force exerted on a lever at the effective lever-length, multiplied by the effective lever-length.

2.8 ***Handwheel Rim-Force*** The total rim-force exerted on the rim of a handwheel or on the spokes of a capstan handwheel, which is the sum of a push-and-pull force.

2.9 ***Available Handwheel Torque*** A product of the handwheel rim force multiplied by the handwheel radius (handwheel diameter divided by 2), or if a capstan handwheel, spoke forces multiplied by the length of one spoke, measured from the center of the handwheel less 1 1/2 inches (38 mm).

2.10 ***T-Chain-Lever or Chainwheel Torque*** The product of the total pull force exerted by the operator multiplied by the chainwheel radius (effective chainwheel diameter divided by 2) or multiplied by the effective T-chain lever length.

2.11 ***Normal Operating Conditions*** This refers to the conditions experienced by one operator when attempting to apply force to an actuating device. Normal conditions are with the manual actuator at waist level and the plane of rotation of the lever, handwheel, or chainwheel located vertically or horizontally, with temperature at 70^0F (20^0C), good footing, and with no space restrictions.

2.12 ***Momentary Force*** If an operator must apply a high force to a manual actuator to cause a valve to break loose, but may exert relatively lower forces to continue actuation of the valve, the initial high force is referred to as a momentary force.