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AN INDUSTRY STANDARD FOR FLUID POWER

Fluid power – Square head cylinders – Determination of the static failure pressure rating of pressure-containing components

(Revision and redesignation of ANSI/B93.10-1969)

Descriptors: fluid power cylinders

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NATIONAL FLUID POWER ASSOCIATION, INC.
3333 N. Mayfair Road / Milwaukee, WI 53222-3219 USA
PHONE: +1 414 778 3344 / FAX: +1 414 778 3361 / E-mail: nfpa@nfpa.com

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Foreword

On 24 July 2007, a Title, Scope and Purpose (TSP) for ANSI/(NFPA)T3.6.68.1-200x, *Fluid power systems – Static pressure rating methods of square head fluid power cylinders – Part 1: Pressure containing components* (revision and redesignation of ANSI/B93.10-1969) was approved via the online committee forums, and then approved by the NFPA Technical Board on 9 August 2007. At a project group meeting on 11 March 2008, members of NFPA/T3.6 discussed a draft of the document and agreed to a number of changes. The document was further discussed and changed by members of NFPA/T3.6 at a meeting on 10 June 2008.

At the 17 September 2008 meeting of NFPA/T3.6, a motion was approved to circulate ANSI/(NFPA)T3.6.68.1-200x for general review. The document was circulated for general review on 3 December 2008. The voting resulted in four approval votes, zero disapprovals and four abstentions, as well as submission of a number of comments. As a result of the comment resolutions, the document number and title were changed to ANSI/(NFPA)T3.6.68-200x, *Fluid power – Square head cylinders – Determination of the static failure pressure rating of pressure-containing components*. A revised TSP was approved by the NFPA Technical Board at its meeting on 2 April 2009.

At its teleconference meeting on 12 May 2009, NFPA/T3.6 reviewed the latest draft, which had been updated from the general review comments, and agreed to a number of changes. A motion was approved to ask the NFPA Technical Board for permission to circulate the document for simultaneous NFPA final and ANSI approval ballots. However, as a result of a decision made by the NFPA Board of Directors at its meeting on 27 June 2009, NFPA discontinued its activities as an ANSI Accredited Standards Developer. Therefore, the document designation was changed to NFPA/T3.6.68-20xx.

At its meeting on 6 August 2009, the NFPA Technical Board approved a motion to circulate the document for final ballot. They also approved a revised Title, Scope and Purpose (TSP) with a change to the document's scope.

The document was circulated for final ballot on 20 April 2010. The voting resulted in nine approval votes, zero disapprovals and two abstentions, with one comment which was satisfactorily resolved. On 10 September 2010, a motion was approved by NFPA/T3.6 via the online forums to ask the NFPA Technical Board for permission to publish the document. The Technical Board gave its permission to publish via the online forums on 28 September 2010.

Project Group Members who developed this standard:

Pete Molloy
Project group chair
SMC Corporation

Lido Boni
Parker Hannifin Corp.

Bryan Nelson
Caterpillar, Inc.

Dan Rosinski
Bosch Rexroth Corp.

Charles Woodin
Milwaukee Cylinder

Carrie Tatman Schwartz
Program Manager
National Fluid Power Association

Introduction

Fluid power systems are those that transmit power through the use of a pressurized fluid (liquid or gas) within an enclosed circuit.

One component of such systems is the fluid power cylinder. This is a device that converts fluid power into linear mechanical force and motion. It consists of a movable element, such as a piston and piston rod, plunger, or ram, operating within a cylindrical bore.

The square head tie rod cylinder is a specific design initially developed for industrial (in plant) use. It is manufactured and sold as an interchangeable component by a majority of suppliers.

Fluid power – Square head cylinders – Determination of the static failure pressure rating of pressure-containing components

1 Scope

1.1 This recommended standard covers tie rod constructed square head industrial fluid power cylinders which apply to NFPA/T3.6.7 and provides requirements and design parameters for the determination of the theoretical static failure pressure rating of pressure containing components. It also provides guidance on material selection.

1.2 It is recognized that cylinder mountings, rod buckling, etc. are pertinent to proper cylinder application; but they are considered beyond the scope of this document.

1.3 The information contained in this document is intended to

a) establish a basic method for calculating the static failure pressure rating of a cylinder which will be consistent and understandable to both the manufacturer and the user, but is in no way intended to imply the maximum operating pressure of the cylinder;

b) allow the user or manufacturer to apply or recommend whatever safety factor deemed necessary and consistent with the intended use of the cylinder;

c) allow manufacturers freedom of design in cylinders without restricting the advancement of the art while still providing basic guidelines that will assure users that adequate safeguards are present.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this document. At the time of this publication, the editions indicated were valid. All documents are subject to revision, and parties to agreements based on this document are encouraged to investigate the possibility of applying the most recent editions of the documents indicated below. NFPA maintains registers of currently valid NFPA standards.

ASME B1.1 (latest edition), *Unified Inch Screw Threads (UN and UNR Thread Form).*

NFPA/T3.6.7 (latest edition), *Fluid power systems and products- Square head industrial cylinders – mounting dimensions*.

ISO 5598 (latest edition), *Fluid power systems and components – Vocabulary*.