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Hydraulic fluid power — Pumps — Method of testing and presenting basic performance data for load sensing pumps

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Descriptors: hydraulic fluid power, load sensing, load sensing control characteristics, mechanical efficiency, output, overall efficiency, power input, pressure compensation characteristics, pumps, reaction characteristics, volumetric displacement, volumetric efficiency.

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Foreword

This Foreword is not part of American National Standard *Hydraulic fluid power — Pumps — Method of testing and presenting basic performance data for load sensing pumps*, ANSI/(NFPA)T3.9.33-1997.

The project was initiated on 23 March 1981. The TSP was approved by the Technical Board on 18 May 1983. On 16 August 1984 Draft No. 1 was sent out and in August of 1986 Draft No. 2 was sent out. There were a few changes made to the document before Draft No. 3 was sent out on 3 November 1986. There were several changes made to the document over the next few years.

Draft No. 4 of T3.9.33 went out on 9 August 1990. At the 20 August 1991 Project Group meeting, several comments were discussed and there were several changes made to the document. The Project Group requested the document go out for General Review with the approved changes from their meeting.

The document was sent out for General Review on 23 September 1991. The General Review closed with comments from four companies. As a result of the comments Table 3 — Viscosity characteristics and Table 4 — Target viscosities were removed from the document. There were several other changes made to the document when the comments were discussed at the Project Group meeting on 10 November 1992.

The Project Group reviewed the updated document at their meeting on 23 March 1993. Both the Project Group and T3.9 approved the document to be sent out for a Second General Review with minor changes.

The document was sent out for Second General Review on 13 April 1993. The Second General Review closed with comments from four companies. At the 16 November 1993 T3.9 meeting the Project Group reviewed the letters Project Chairman Zimmerer wrote to the commentators. At the 8 February 1994 meeting the document was revised and it was voted to send the document to the Technical Board for approval to Ballot after the letters to the commentators had been sent out. The letters were sent out 26 April 1994.

Headquarters received an updated document on 6 July 1994. One commentator had additional comments on the document and did not sign off. At the 8 February 1995, T3.9 meeting the outstanding comments were discussed. On 16 May 1995 Project Chairman Zimmerer wrote again to the commentator, who then signed off on 22 May 1995. This document was approved for Balloting at the 17 August 1995 Technical board meeting.

This document was sent out for Ballot on 25 August 1995. Balloting closed with one approval vote with comments and one negative vote. The negative vote was resolved on 27 February 1996 and final approval was granted at the 11 April 1996 Technical Board meeting.

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On 2 August 1996 ANSI/(NFPA)T3.9.33 was submitted to ANSI Committee B93 for Ballot. Balloting closed with no negative votes. ANSI granted final approval of this document on 6 January 1997.

The membership roster of Standards committee B93 at the time of Ballot:

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Vice Chairman

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Introduction

In hydraulic fluid power systems, power is transmitted and controlled through a liquid under pressure within an enclosed circuit. Pumps are components which convert rotary mechanical power into fluid power.

Nonpositive displacement pumps, such as centrifugal or turbine types, are seldom associated with fluid power systems.

Positive displacement pumps are available either as “fixed” or “variable” displacement types. Fixed displacement units have preselected internal geometries which maintain a constant volume of liquid passing through the unit per revolution of the unit's shaft. Variable displacement units have a means for changing the internal geometries so that the volume of liquid passing through the unit per revolution of the unit's shaft can be changed. One such method of changing internal geometries utilizes pump control which automatically varies pump displacement as a function of pressure drop through a control orifice and is called a load sensing control. Another common name for this control is flow compensation control.

Hydraulic fluid power — Pumps — Method of testing and presenting basic performance data for load sensing pumps

1 Scope

1.1 This standard includes basic methods of testing and presenting the following performance data for rotary positive displacement, variable volume, load sensing hydraulic fluid power pumps used in industrial, mobile and marine applications:

a) volumetric displacement;

b) output;

c) power input;

d) overall efficiency (also called total efficiency);

e) volumetric efficiency;

f) mechanical efficiency;

g) pressure compensation characteristics;

h) load sensing control characteristics;

i) reaction characteristics (transient performance).

1.2 The testing methods apply to a laboratory in which the results are to be used to verify performance specifications, compare products, or prepare catalog information. This standard is not intended to be a production test document.

1.3 This standard provides a uniform and accurate means for determining and expressing pump performance capabilities in a standard form; to guide the establishment of meaningful ratings; and to aid in accomplishing optimum component application.

2 Normative references

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

ANSI/IEEE 268-1992, *Metric Practice.*

NFPA/T2.12.10-1992, *Hydraulic fluid power — Systems and products* — Testing — General measurement, principles and techniques.