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Hydraulic fluid power — Application notes for the optimization of the energy efficiency of hydraulic systems

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Contents

Page

Foreword ..... **iv**
Introduction ..... **v**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Goal and principal design considerations **1**
5 Measures **1**
5.1 General 1
5.2 Principal measures 1
5.3 Measures concerning actuators 2
5.4 Measures concerning the hydraulic power supply system 3
5.5 Measures concerning the hydraulic distribution system 3
Bibliography **5**

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Foreword

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This document was prepared by Technical Committee ISO/TC 131, *Fluid power systems*, Subcommittee SC 9, *Installations and systems*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

Energy consumption of machines is primarily defined by the type of machine, e.g. lathes, injection moulding machines and excavators.

Additionally, the level of energy consumption is a function of the requirements of the machine manufacturer and duty cycle and frequency of use by the operator. It is only when the machines are adapted for specific applications (e.g. working cycle, control precision, level of automation) in an optimal manner, that energy efficiency concepts can have a positive impact.

Typical applications for hydraulics in machines are:

— clamping with high force;

— pressing with high force;

— motion, acceleration and braking of heavy loads;

— hydraulic weight compensation;

— hydrostatic transmission.

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Hydraulic fluid power — Application notes for the optimization of the energy efficiency of hydraulic systems

1 Scope

This document gives advice on how to conceive hydraulic systems that can be operated with increased energy efficiency while maintaining the intended functionality of the machine.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 5598, *Fluid power systems and components — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5598 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

4 Goal and principal design considerations

The goal is to reduce the energy consumption for specific functions considering the demand of power input (effective, reactive and peak) of a hydraulic system and related auxiliary systems.

The more precisely the requirements and characteristics of the machine operation and duty cycle are identified, the more energy efficiently machines can be designed.

5 Measures

5.1 General

Measures for the improvement of energy efficiency are only applicable if the requirements of all relevant safety standards (e.g. ISO 12100 and ISO 4413) are still fulfilled. The following list gives examples of measures with which a hydraulic system can be adapted in an optimal way to the requirements. In this context, it has to be considered that some of the listed measures exclude each other and that they need to be selected according to their requested functionality.

5.2 Principal measures

The following list contains principle measures for the improvement of the energy efficiency of hydraulic systems.

a) Obtaining a thorough understanding of the machine's specification, functionality and duty cycle.

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