SLOVENSKI STANDARD
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Fluidna tehnika - Hidravlika - Snažnost komponent - Navodila za doseganje in kontrolo snažnosti komponent od izdelave do vgradnje

Hydraulic fluid power -- Component cleanliness -- Guidelines for achieving and controlling cleanliness of components from manufacture to installation

Transmissions hydrauliques -- Propreté des composants -- Lignes directrices pour l'obtention et le maintien de la propreté des composants de leur fabrication jusqu'à leur installation

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TECHNICAL REPORT

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Second edition
2002-10-15

Hydraulic fluid power — Component cleanliness — Guidelines for achieving and controlling cleanliness of components from manufacture to installation

Transmissions hydrauliques — Propreté des composants — Lignes directrices pour obtenir et contrôler la propreté des composants de la fabrication à l'installation

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TR 10949 was prepared by Technical Committee ISO/TC 131, *Fluid power systems*, Subcommittee SC 6, *Contamination control*.

This second edition cancels and replaces the first edition (ISO/TR 10949:1996), which has been technically revised.

Introduction

In hydraulic fluid power systems, power is transmitted and controlled through a pressurized liquid within an enclosed circuit. Contaminants present in the circulating working liquid may degrade system performance. One method of reducing the amount of these contaminants within the system is to manufacture, package, ship, store and install components in ways that achieve and control the desired component cleanliness level.

Hydraulic fluid power — Component cleanliness — Guidelines for achieving and controlling cleanliness of components from manufacture to installation

1 Scope

This Technical Report gives guidelines for achieving, evaluating and controlling the cleanliness of hydraulic fluid power components from the time of their manufacture through to their installation in a hydraulic fluid power system.

2 Normative references

The following referenced documents are indispensable for the application 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 4406, *Hydraulic fluid power — Fluids — Method for coding the level of contamination by solid particles*

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

ISO 18413:—[1], *Hydraulic fluid power — Cleanliness of parts and components — Inspection document and principles related to contaminant collection, analysis, and data reporting*

3 Terms and definitions

For the purposes of this Technical Report, the terms and definitions given in ISO 5598 and the following apply.

3.1
component
part, assembly, or collection of parts that performs a function in a fluid power system

NOTE This definition differs from that in ISO 5598 because connectors, tubes and hoses are included here but are excluded from the definition in ISO 5598.

3.2
manufacturer
party that fabricates or assembles the component

NOTE The manufacturer and supplier may be the same person or company.

3.3
purchaser
party that stipulates the requirements of a machine, equipment, system, or component and judges whether the product satisfies those requirements

1) To be published.

3.4
supplier
party that contracts to provide the product(s) to satisfy the purchaser's requirements

NOTE The manufacturer and supplier may be the same person or company.

4 General principles

4.1 Component cleanliness during production

The manufacturer is responsible for providing components that meet the requirements either stated by the manufacturer or agreed upon with the purchaser. This includes achieving and evaluating, as necessary, appropriate levels of component cleanliness during the production process.

The required cleanliness level at the time of manufacturing release should be clearly stated in an inspection document drawn up in accordance with ISO 18413 and agreed upon between the manufacturer and purchaser.

The manufacturer is to exercise care at all steps of the production process to ensure that the required level of component cleanliness is achieved and controlled. More specifically, the manufacturer is responsible for the following:

— cleaning component parts prior to assembly, if this operation is needed to achieve the required cleanliness level;

— assembling components in an area having an overall level of contamination that will not significantly affect component cleanliness;

— flushing components, if this operation is needed to achieve the required cleanliness level;

— testing components with fluids that will not add significant contaminant to the product;

— evaluating component cleanliness by appropriate test methods;

— preparing components for packaging, including corrosion prevention, sealing of ports, etc.

4.2 Component cleanliness during packaging, storage and transport

The supplier and purchaser are to make an agreement about who is responsible for controlling component cleanliness during packaging, storage and transport to the purchaser. If the manufacturer and supplier are independent parties, their respective responsibilities should be mutually and explicitly agreed.

NOTE The supplier is generally not responsible for contamination that results from damage to either the components themselves or their packaging during transport.

The supplier (or other party that has agreed to take responsibility for ensuring component cleanliness) is to exercise care at all steps of the packaging, storage and transport processes to ensure that the required level of component cleanliness is maintained. More specifically, that responsibility includes the following:

— providing adequate packaging for component storage and shipment;

— using appropriate storage conditions;

— using appropriate shipping methods.

If deterioration in component cleanliness occurs between the time of release by the manufacturer and the time of receipt by the purchaser, then the supplier and purchaser should jointly investigate the cause and take corrective action.

4.3 Component cleanliness after receipt by the purchaser

The purchaser is responsible for controlling component cleanliness from receipt of the component through its installation in the assembled hydraulic fluid power system or resale of the component to another party.

The purchaser is to exercise care at all steps of the receiving, unpacking and storage processes. More specifically, the purchaser is responsible for the following:

— taking care in unpacking;

— using appropriate storage methods;

— taking care that no significant contamination is added to the component after removing protective plugs, etc.

Care is also to be taken to install the component in the system in a way that does not add significant contamination.

5 Achieving component cleanliness

5.1 Cleaning of components

To ensure that an adequate standard of cleanliness of finished components is achieved, it is essential that all parts that make up a component meet the specified cleanliness level before assembly. Using clean parts for assembly of components is essential to ensure that no more than insignificant damage to the finished component occurs during flushing or performance testing.

Appropriate procedures are to be implemented for each part or component in order to remove such residues as chips, sand, filings, rust, weld spatter and slag, elastomers, sealants, water, aqueous products, chlorine, acid, detergent, etc.

When cleaning components, special care is to be taken to ensure that cored passages and deep holes are cleaned, and it should be remembered that items with designed sharp edges, such as grooved spools, can collect contamination from contact with human hands.

The cleaning procedure can be carried out as follows:

— shot blast, ultrasonically clean or chemically clean castings to remove casting sand and scale prior to machining, and then carefully deburr and wash the castings before assembly;

— remove manufacturing residues, burrs, fins, etc. by mechanical, ultrasonic or chemical means, etc.;

— remove cleaning residues using chemical means (e.g. filtered solvents), dry filtered compressed air, etc.;

— oven-dry or dry with dry, filtered compressed air.

5.2 Descriptions of commonly used cleaning methods

5.2.1 Shot blasting

Shot blasting removes surface contamination by impacting material designed to remove contamination while leaving the surface itself undamaged. Blasting may use sand, glass beads, carbon particles, metal balls or other materials generally recognized as applicable for this purpose. The type of cleaning desired and the