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Hydraulic fluid power — Monitoring the level of particulate contamination of the fluid —

Part 1:
General principles

Transmissions hydrauliques — Surveillance du niveau de pollution particulaire des fluides —

Partie 1: Principes généraux

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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.

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 21018-1 was prepared by Technical Committee ISO/TC 131, *Fluid power systems*, Subcommittee SC 6, *Contamination control*.

ISO 21018 consists of the following parts, under the general title *Hydraulic fluid power — Monitoring the level of particulate contamination of the fluid*:

— *Part 1: General principles*

— *Part 3: Use of the filter blockage technique*

A Part 2, dealing with the calibration and verification procedure for field contamination monitoring, and a Part 4, dealing with the use of the light extinction technique, are under development.

Introduction

In hydraulic fluid power systems, power is transmitted through a liquid under pressure within a closed circuit. The liquid is both a lubricant and power-transmitting medium. The presence of solid particulate contamination in the liquid interferes with the ability of the hydraulic liquid to lubricate and causes wear to the components. The extent of this form of contamination in the liquid has a direct bearing on the performance and reliability of the system and it is necessary that this be controlled to levels that are considered appropriate for the system concerned. Hydraulic filters are used to control the amount of particulate contamination to a level that is suitable for both the contaminant sensitivity of the system and the level of reliability required by the user.

Operators of hydraulic equipment are gradually defining maximum particle concentration levels for components, systems and processes, beyond which corrective actions are implemented to normalize the levels. These are often referred to as the required cleanliness level (RCL). The cleanliness level is obtained by sampling the hydraulic liquid and measuring the particulate contamination level. If the level is above the RCL, then corrective actions are necessary to restore the situation. To avoid taking unnecessary actions, which can often prove costly, precision in sampling and measuring the particulate contamination level is required.

A comprehensive range of measurement equipment is available, but the instruments used are usually laboratory-based. This often requires that the equipment is operated in a special environment by specialist laboratories and this delays delivery of the test result to the user. To overcome this disadvantage, instruments are being continuously developed to determine the particulate contamination level, either using equipment that can be operated in or near the workplace or directly using on-line or in-line techniques. For equipment operated in the workplace, direct traceability to national measurement standards might not be appropriate, or relevant, and the instruments are used to monitor the general level of particulate contamination or to inform the user of a significant change in the level. When a significant change in the particulate contamination level is detected, the actual level is then usually qualified by using an approved particle-counting method. Also, these monitors can have simplified circuitry compared to similar laboratory units and this means that they are not so precise.

In addition, some instruments are designed to work on the “go/no-go” principle and their ability to rapidly evaluate the cleanliness level has resulted in an increase in their usage both in the fluid power industry and other markets. Unfortunately, the lack of a standardized method for their use, recalibration (if applicable) and means of checking the output validity means that the variability in the measurement data is at a level higher than is desirable.

This International Standard has been developed to provide uniform and consistent procedures for instruments that are used for monitoring the contamination levels in hydraulic systems, especially those where direct traceability to national measurement standards is not possible or is not applicable.