

STANDARD

4405

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**Hydraulic fluid power — Fluid contamination —
Determination of particulate contamination by
the gravimetric method**

*Transmissions hydrauliques — Pollution des fluides — Détermination de
la pollution particulaire par la méthode gravimétrique*



Reference number
ISO 4405:1991(E)

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.

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.

International Standard ISO 4405 was prepared by Technical Committee ISO/TC 131, *Fluid power systems*.

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Introduction

In hydraulic fluid power systems, power is transmitted and controlled through a liquid under pressure within an enclosed circuit. The liquid is both a lubricant and power-transmitting medium.

Reliable system performance requires control of the fluid medium. Qualitative and quantitative determination of particulate contamination in the fluid medium requires precision in obtaining the sample and in determining the nature and extent of contamination.

The gravimetric method of determination of fluid contamination involves weighing suspended solids per unit volume of fluid. The method employs membrane filters, which maintain fluid cleanliness by removing insoluble particles.

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Hydraulic fluid power — Fluid contamination — Determination of particulate contamination by the gravimetric method

1 Scope

This International Standard defines two gravimetric methods for determining the contamination level of fluids used in hydraulic fluid power systems.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3938:1986, *Hydraulic fluid power — Contamination analysis — Method for reporting analysis data*.

ISO 4021:1977, *Hydraulic fluid power — Particulate contamination analysis — Extraction of fluid samples from lines of an operating system*.

ISO 5598:1985, *Fluid power systems and components — Vocabulary*.

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 5598 apply.

4 Principle

Filtration of a known volume of fluid under vacuum conditions through one or two identical superimposed filter membranes. The increase in mass of the

membrane or the difference in mass of the two membranes after filtration represents the solid impurity content.

5 Apparatus

5.1 Filter holder, comprising

- a graduated glass funnel, of 250 ml capacity;
- a clamping device;
- a glass base including a sintered glass or stainless steel filter-holder grid.

5.2 Cap for the funnel, for example, the lid of a Petri dish.

5.3 Filter membranes, of 47 mm diameter, white, non-gridded and compatible with the fluid to be analysed and with the rinsing chemicals. Reference membranes have a 0,8 µm pore size. Any other pore size used shall be stated.

5.4 Filter flask.

5.5 Device, for establishing a vacuum of 86,6 kPa (0,866 bar¹⁾) (i.e. 650 mmHg).

5.6 Filtered-solvent dispenser, (i.e. a pressure-operated system which discharges the solvent through a filter membrane).

5.7 Flat-ended tweezers, of stainless steel.

5.8 Petri dishes, glass, 150 mm in diameter.

5.9 Glass flasks, narrow-necked and with screw caps, at least 100 ml in capacity, with an indelible gauge mark at the level of 100 ml.

1) 1 bar = 10⁵ Pa.