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INTERNATIONAL STANDARD ISO 4021

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Hydraulic fluid power — Particulate contamination analysis — Extraction of fluid samples from lines of an operating system

Transmissions hydrauliques — Analyse de la pollution par particules — Prélèvement des échantillons de fluide dans les circuits en fonctionnement

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FOREWORD

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 4021 was developed by Technical Committee ISO/TC 131, *Fluid power systems and components*, and was circulated to the member bodies in March 1976.

It has been approved by the member bodies of the following countries :

Australia	Italy	Sweden
Austria	Japan	Turkey
Belgium	Mexico	U.S.A.
Chile	Netherlands	U.S.S.R.
Germany	Poland	Yugoslavia
Hungary	South Africa, Rep. of	
India	Spain	

The member bodies of the following countries expressed disapproval of the document on technical grounds :

France
United Kingdom

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Hydraulic fluid power — Particulate contamination analysis — Extraction of fluid samples from lines of an operating system

0 INTRODUCTION

In hydraulic fluid power systems, power is transmitted and controlled through a fluid under pressure within an enclosed circuit. The fluid is both a lubricant and a 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 determining the nature and extent of contamination.

The most representative sample is obtained from a system while the fluid is flowing in a turbulent manner. This International Standard gives the procedure for obtaining that sample, known as a dynamic sample.

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method of extracting dynamic fluid samples from a line of an operating hydraulic fluid power system.

The hydraulic fluid samples must be representative of the particulate contaminant in the fluid flowing at the point of sampling. (The samples are used for particulate contamination analysis.)

2 REFERENCES

ISO 1219, *Fluid power systems and components — Graphic symbols.*

ISO 5598, *Fluid power — Vocabulary.*[1)]

3 DEFINITIONS

3.1 fluid sampling, dynamic : The extraction of a sample of fluid from a turbulent section of a flow stream.

3.2 fluid sampling, static : The extraction of a sample of fluid from a fluid at rest.

3.3 sampler, turbulent : A device for creating turbulence in the main stream while extracting a fluid sample.

3.4 For definitions of other terms used, see ISO 5598.

4 GRAPHIC SYMBOLS

Graphic symbols used are in accordance with ISO 1219.

5 RULES

5.1 Use a dynamic fluid sampling method (see clause 7).

5.2 Control the rate of sample extraction only by means of a capillary restriction.

5.3 Attach the sampling device permanently, or by a quick disconnect coupling.

1) In preparation.

6 SAMPLING DEVICE

NOTE – Take normal precautions to safeguard personnel and equipment.

6.1 Use a typical sampling device as shown in the figure if turbulent flow conditions exist in the main stream.

6.1.1 Permanently attach the ball valve or the valved portion of the quick disconnect coupling to the port through which the sample is to be taken.

6.1.2 Provide a dust cap for the item in 6.1.1.

6.1.3 Use the remaining equipment only for sampling.

6.1.4 Select capillary tubing having an inside diameter and length consistent with the sampling rate desired.

6.1.4.1 Do not use capillary tubing having an inside diameter smaller than 1,25 mm. Other cross-sections (such as rectangular) may be used provided that the smallest inside dimension is not less than 1 mm.

6.1.4.2 Sharpen and deburr the ends of the capillary tube to facilitate subsequent piercing of the film covering the sampling bottle mouth.

6.2 If turbulence in the flow stream cannot be ensured, use a means of creating turbulence such as a turbulent flow sampler.

7 SAMPLING PROCEDURE

7.1 Where a sampling device incorporating a quick disconnect coupling is used, attach the separable portions of the sampling device to the permanently attached portion.

7.2 Open the ball valve.

7.3 Pass a minimum of 200 cm^3 of fluid through the sampling device before collecting the fluid.

7.4 Without disturbing the ball valve, place the sampling bottle in position to collect the fluid.

7.4.1 Use the sharp end of the capillary tubing to pierce the plastic film covering the bottle mouth.

7.4.2 Take a sample of not more than 75 % and not less than 50 % of the sampling bottle volume.

7.5 When a sufficient sample has been collected, remove the sampling bottle before turning off the flow with the ball valve.

7.6 Recap the sample bottle immediately after withdrawing the capillary tubing.

7.7 Where a sampling device incorporating a quick disconnect coupling is used, disconnect the separable portions of the sampling device and remove any residual fluid films by flushing with a suitable solvent.

7.8 Immediately upon disconnection, replace the dust cap on the permanently mounted section of the quick disconnect coupling.

8 IDENTIFICATION STATEMENT (Reference to this International Standard)

Use the following statement in test reports, caralogues and sales literature when electing to comply with this International Standard :

"Method of extracting fluid samples conforms to ISO 4021, *Hydraulic fluid power – Particulate contamination analysis – Extraction of fluid samples from lines of an operating system.*"

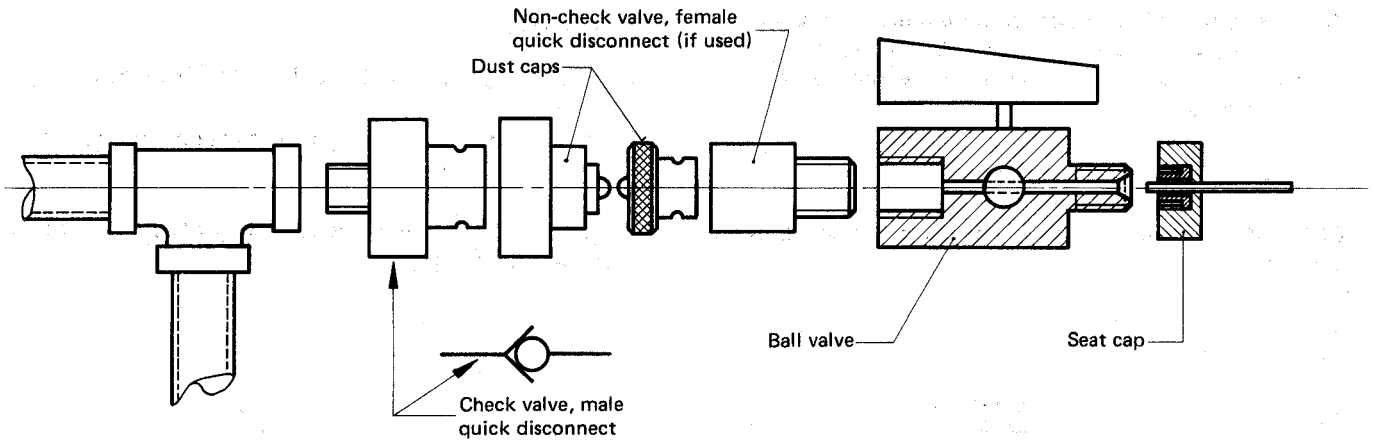

FIGURE – **Typical field type sampling device**