

SLOVENSKI STANDARD SIST ISO 5596:1995

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Hydraulic fluid power -- Gas-loaded accumulators with separators -- Range of pressures and volumes, characteristic quantities and identification

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Transmissions hydrauliques -- Accumulateurs hydropneumatiques avec séparateur --Gammes de pressions et de volumes, grandeurs caractéristiques et identification

SIST ISO 5596:1995

Ta slovenski standard je istoveten z: 77a7/sst-so-5596:1982

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Other fluid power system components

SIST ISO 5596:1995

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION MEX CHAPODHAR OPPAHUSALUR TO CTAHDAPTUSALUUPORGANISATION INTERNATIONALE DE NORMALISATION

Hydraulic fluid power — Gas-loaded accumulators with separators — Range of pressures and volumes, characteristic quantities and identification

Transmissions hydrauliques – Accumulateurs hydropneumatiques avec séparateur – Gammes de pressions et de volumes, grandeurs caractéristiques et identification STANDARD PREVIEW

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Descriptors : fluid power, hydraulic fluid power, hydraulic equipment, gas loaded accumulators, separators, characteristics.

SIST ISO 5596:1995

Foreword

ISO (the International Organization for Standardization) is a worldwide tederation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

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 5596 was developed by Technical Committee ISO/TC 131, *Fluid power systems and components.* It incorporates draft International Standarc ISO/DIS 5595. Both documents were circulated to the member bodies in October 1979 and have been approved by the member bodies of the following countries : <u>SIST ISO 5596:1995</u> https://standards.iteh.ai/catalog/standards/sist/ea402c09-a76c-45b6-b89b-

AustraliaGermany, F.AustriaHungaryBelgiumIndiaCanadaJapanChina (DIS 5595 only)NetherlandsCzechoslovakiaNorwayFinlandPoland

Germany, F. R. 838e3d5f75p2isist-iso-5596-1995 Hungary Sweden India Switzerland Japan United Kingdom Netherlands USA Norway USSR Poland Romania

The member body of the following country expressed disapproval of the documents on technical grounds :

South Africa, Rep. of

International Organization for Standardization, 1982 - 9

France

Hydraulic fluid power — Gas-loaded accumulators with separators — Range of pressures and volumes, characteristic quantities and identification

0 Introduction

In hydraulic fluid power systems, power is transmitted and controlled through a liquid under pressure within an enclosed circuit.

Gas-loaded accumulators are devices which are able to store and to return energy following the principle of the compressibility of gases.

1 Scope and field of application

1.1 This International Standard is used to specify the R For definitions of other terms used in this International characteristic performance quantities required for defining, designing, and testing gas-loaded accumulators with a standard, see ISO 5598.

1.2 It defines ranges of pressure and volumes for accumulators. 838e3d5f77a7/sist-iso-5596-1995

1.3 It also defines a code of identification of such accumulators.

2 References

ISO 3, Preferred numbers – Series of preferred numbers.

ISO 5598, *Fluid power systems and components – Vocabulary.*¹⁾

ISO 6743/4, Lubricants, industrial oils and related products – Class L – Classification – Part 4 : Family H (hydraulic systems).¹⁾

3 Definitions

3.1 gas-loaded accumulator: (for the purpose of this International Standard) Hydraulic accumulator with separator between liquid and gas where the liquid is pressurized using the compressibility of an inert gas (for example nitrogen). The separator may be a bladder, a diaphragm or a piston.

3.1.1 standard gas-loaded accumulator : Gas-loaded accumulator which does not include additional gas storage

3.1.2 transfer gas-loaded accumulator: Gas-loaded accumulator for use with additional gas capacity contained in one or more supplementary gas bottles connected to the gas side of the transfer accumulator by a common pipeline.

3.2 compatible fluid : Fluid which does not influence noticeably the nature and life of the components (especially elastomer products) of the accumulator.

The gas-loaded accumulator stores energy during a period of low energy demand from the circuit in which it is mounted.

The stored fluid is then returned to the circuit to supplement or replace the pump discharge temporarily or to ensure emergency operation.

4.2 Pulse or surge damper

4.1 Energy storage

The gas-loaded accumulator absorbs liquid to reduce pressure peaks and returns liquid to compensate for pressure drops.

The accumulator thus reduces the amplitude of pressure oscillations in the circuit in which it is mounted.

4.3 Loaded expansion compensating device

The gas-loaded accumulator absorbs volume changes resulting from temperature changes of the hydraulic fluid contained in an isolated part of the circuit.

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¹⁾ At present at the stage of draft.

Characteristic quantities 5

Use the following quantities to define and design a gas-loaded accumulator.

5.1 Pressures

 p_0 = pre-charging; the gas pressure in the accumulator when the hydraulic circuit is not under pressure (initial state) at a temperature of $20 + 5 \circ C^{(1)}$, 2).

 $p_{0 \text{ max}}$ = the maximum p_0 pressure achieved by the accumulator under normal rise conditions.

 p_1 = minimum working pressure of the hydraulic circuit.

 p_2 = maximum working pressure of the hydraulic circuit.

 p_3 = setting pressure of the relief value of the hydraulic circuit. This pressure, including tolerance and any flowinduced relief valve pressure peaks, is to be greater than p_2 and less than or equal to p_4 .

 p_4 = maximum authorized pressure of the accumulator

RD P $t_{s max}$ = the maximum working temperature of the fluid or p_5 (or p_t) = hydraulic test pressure; it is 1,5 times the d of the environment, whichever is the higher maximum authorized pressure p_4 . Pressure p_5 is reached

when testing the accumulator body under the supervision of NOTE - Temperatures are expressed in degrees Celsius. a competent inspecting authority.

SIST ISO 5596:1995

 Δp = pressure drop; pressure difference between the transformed by the solution of the sol 7a7/sist-iso-5596-1995 accumulator gas pressure and the liquid pressure at the connecting port for a given liquid, at a given flow rate and at the temperatures. working temperature.

NOTES

1 The pressures are expressed in bar (and in megapascals)³⁾.

2 The pressure drop of a transfer accumulator is increased with respect to that of a standard accumulator by the pressure drops in the pipelines, fittings, etc., connecting the additional gas storage chambers to the accumulator.

5.2 Volumes¹⁾

V = water capacity of the accumulator body.

 V_0 = original volume; volume of the space in the accumulator body occupied by the gas at pressure p_0 .

 V_{t_0} , V_{t_1} , V_{t_2} , V_{t_3} = volumes occupied by the gas contained in the accumulator and the additional chambers, if any, at pressures p_0 , p_1 , p_2 and p_3 respectively (those pressures defined in 5.1).

 $\Delta V =$ Volume to be restored (difference between volumes V_{t_1} and V_{t_2}).

NOTE - The volumes are expressed in litres (cubic decimetres).

5.3 Flow rates

 $q_{\rm Vi}$ = instantaneous volume rate of flow.

 $q_{\rm Vm} =$ mean volume rate of flow; the average of the instantaneous volume rates of flow during the transition from p_2 to p_1 .

 $q_{\rm M}$ = limiting volume rate of flow; the maximum mean volume rate of flow for which the accumulator is designed.

NOTE - Flow rates are expressed in litres per second (cubic decimetres per second).

5.4 Temperatures

5.4.1 Working temperatures

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 $t_{s \min}$ = the minimum working temperature of the fluid or of the environment, whichever is the lower.

 $t_{0 \min}$, $t_{0 \max}$ = the minimum and maximum storage

5.5 Maximum working frequency : f_{s max}

 $f_{\rm s\ max}$ = maximum frequency in the liquid that may be withstood by the accumulator under working conditions.

NOTE - Frequencies are expressed in hertz.

Ranges of pressures and volumes 6

6.1 Pressure range

63 (6,3) - 100 (10) - 160 (16) - 200 (20) - 250 (25) - 315 (31,5) = 400 (40) = 500 (50) = 630 (63)

NOTES

1 Pressures are expressed in bar (and in megapascals).

2 For special applications which require higher pressures, use pressures corresponding to the R 10 series of preferred numbers (see ISO 3).

31 $1 \text{ bar} = 0.1 \text{ MPa}; 1 \text{ Pa} = 1 \text{ N/m}^2$

¹⁾ In some cases with low pressures, express the low pressures as absolute values to calculate the quantity of fluid discharged into the accumulator.

²⁾ Use the absolute temperature to determine the correction of the pre-charging as a function of temperature.

6.2 Volume range

 $\begin{array}{r} 0,25 - 0,4 - 0,5 - 0,63 - 1 - 1,6 - 2,5 - 4 - 6,3 - \\ 10 - 16 - 20 - 25 - 32 - 40 - 50 - 63 - 100 - 160 - \\ 200 \end{array}$

NOTES

1 Volumes are expressed in litres (cubic decimetres).

2~ For special applications which require larger volumes, use volumes corresponding to the R 10 series of preferred numbers (see ISO 3).

7 Identification

7.1 Identify a gas-loaded accumulator by the symbols and numerical values in the order in which they are defined below (separated by dashes), and by references to this International Standard.

7.1.1 Symbol for the accumulator category

S : standard accumulator

T : transfer accumulator

7.1.5 Symbol for compatible fluid⁴⁾

- H for mineral oils, all categories
- A for fire-resistant fluids, category HFA
- B for fire-resistant fluids, category HFB
- C for fire-resistant fluids, category HFC
- D for fire-resistant fluids, category HFD

7.2 Examples of identification

7.2.1 Standard gas-loaded accumulator

Identify a standard bladder gas-loaded accumulator, operating at maximum authorized pressure p_4 of 100 bar (10 000kPa), with an initial gas volume of 6,3 l intended for use with mineral oils as follows :

ISO 5596 S - A - 100 - 006,3 - H

7.1.2 Symbol for the separator type STANDARD^{7.2.2} RTransfer gas-loaded accumulator

- A : bladder
- B : diaphragm
- C : piston

(standards. Identify a transfer diaphragm gas-loaded accumulator, operating at a maximum authorized pressure p_4 of 100 bar, (10 MPa), with an initial gas volume of 20 l intended for use <u>SIST ISO 5596:1</u> with fire-resistant fluids of categories HFC as follows :

7.1.3 Value of the maximum authorized pressure standards/sist/ea402c09-a76c-45b6-b89b-838e3d5f77a7/sist-iso-5596-1995

The value of the maximum authorized pressure p_4 , expressed in bar, and taken from the pressure range defined in 6.1

 $063^{(1)} - 100 - 160 - 200 - 250 - 315 - 400 - 500 - 630.$

7.1.4 Value of the initial gas volume

The value²⁾ of the initial gas volume (V_0), expressed in litres, and taken from the volume range defined in 6.2

8 Identification statement (Reference to this International Standard)

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

"Characteristic quantities and identification of gas-loaded accumulators with a separator selected in accordance with ISO 5596, "Hydraulic fluid power — Gas-loaded accumulators with separators — Ranges of pressures and volumes, characteristic quantities and identification".

4) See ISO 6743/4.

¹⁾ So that the code always includes the same number of characters, it was decided to write 063 in place of 63.

²⁾ So that the code always includes the same number of characters, it was decided to use a 4-digit code (i.e. 3 digits before the point and 1 digit after it).

^{3) 000,2} and 000,6 instead of 000,25 and 000,63.

ISO 5596-1982 (E)

Bibliography

The following document served as a reference in the preparation of ISO 5596 and will be helpful in the utilization of the standard :

ISO 2944, Fluid power systems and components – Nominal pressures.

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