INTERNATIONAL STANDARD

ISO 6953-2

Second edition
2015-03-01

Pneumatic fluid power — Compressed air pressure regulators and filter-regulators —

Part 2: Test methods to determine the main characteristics to be included in literature from suppliers

Transmissions pneumatiques — Régulateurs de pression et filtres-régulateurs pour air comprimé —

Partie 2: Méthodes d'essai pour déterminer les principales caractéristiques à inclure dans la documentation des fournisseurs

Reference number
ISO 6953-2:2015(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword ..... **v**
Introduction ..... **vi**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **2**
4 Symbols and terms **2**
4.1 Symbols and units 2
4.2 Graphical symbols 2
5 Test conditions **2**
5.1 Gas supply 2
5.2 Temperature 2
5.3 Pressures 2
5.4 Inlet pressure 2
5.5 Test pressures (regulated pressure) 3
6 Test procedure to verify rated pressure **3**
7 Flow characteristics tests **4**
7.1 Test installation 4
7.2 General requirements 5
7.3 Test procedures 5
7.3.1 Initial test procedure 5
7.3.2 Forward flow rate — pressure characteristics test 5
7.3.3 Relief flow rate — pressure characteristics test 6
7.3.4 Procedure for other regulated pressure values 6
7.4 Calculation of characteristics 6
7.4.1 Characteristic curves 6
7.4.2 Flow rate — pressure hysteresis 7
7.4.3 Maximum forward sonic conductance 7
7.4.4 Maximum relief sonic conductance 8
8 Pressure regulation test **9**
8.1 Test circuit 9
8.2 Test procedure 9
9 Maximum air consumption at null forward flow rate or relief flow rate for pilot-operated regulator with air bleed **9**
9.1 Test installation 9
9.2 Test procedures 10
9.3 Calculation of characteristics 10
10 Special test procedures **10**
10.1 Pilot pressure/regulated pressure characteristics test in the case of external pilot-

operated pressure regulators 10
10.1.1 Test installation 10
10.1.2 Test procedures 11
10.1.3 Calculation of characteristics 11
10.2 Optional resolution test for pilot-operated regulator with air bleed 13
10.2.1 General 13
10.2.2 Test installation 13
10.2.3 Test procedures 13
10.2.4 Calculation of characteristics 14
10.3 Optional repeatability test 15
10.3.1 General 15
10.3.2 Test installation 15
10.3.3 General test method 16
10.3.4 Calculation of the repeatability value 16
11 Presentation of data 16
11.1 Flow-pressure characteristics 16
11.2 Pressure regulation characteristics 16
11.3 Maximum air consumption for pilot operated regulators with air bleed 16
11.4 Additional characteristics for pilot operated pressure regulators 17
11.5 Optional data 17
Annex A (informative) **Comparison of repeatability test methods 18**
Bibliography 35

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary information.

The committee responsible for this document is ISO/TC 131, *Fluid power systems*, Subcommittee SC 4, *Connectors and similar products and components*.

This second edition cancels and replaces the first edition (ISO 6953-2:2000), which has been technically revised.

ISO 6953 consists of the following parts, under the general title *Pneumatic fluid power — Compressed air pressure regulators and filter-regulators*:

— *Part 1: Main characteristics to include in supplier's literature and product-marking requirements*

— *Part 2: Test methods to determine the main characteristics to be included in literature from suppliers*

— *Part 3: Alternative test methods for measuring the flow-rate characteristics of pressure regulators*

Introduction

In pneumatic fluid power systems, power is transmitted and controlled through a gas under pressure within a circuit.

When pressure reduction or pressure regulation is required, regulators and filter-regulators are components designed to maintain the pressure of the gas at an approximately constant level.

It is therefore necessary to know the performance characteristics of these components in order to determine their suitability in an application.

Pneumatic fluid power — Compressed air pressure regulators and filter-regulators —

Part 2:
Test methods to determine the main characteristics to be included in literature from suppliers

1 Scope

This part of ISO 6953 specifies test procedures and a method of presenting the results concerning the parameters which define the main characteristics to be included in literature from suppliers of regulators and filter-regulators conforming to ISO 6953-1.

The purpose of this part of ISO 6953 is the following:

— to facilitate the comparison of pressure regulators and filter-regulators by standardizing test methods and presentation of test data;

— to assist in the proper application of pressure regulators and filter-regulators in compressed air systems.

The tests specified are intended to allow comparison among the different type of regulators and filter-regulators; they are not production tests to be carried out on each pressure regulator or filter-regulator manufactured.

NOTE 1 The tests related to electro-pneumatic pressure control valves are specified in ISO 10094–2.

NOTE 2 Use ISO 6953-3 for an alternative dynamic test method for flow-rate characteristics using an isothermal tank instead of a flow meter. However, this method measures only the decreasing flow rate part of the hysteresis curve of forward flow and relief flow characteristics.

2 Normative references

The following documents, in whole or in part, are referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1219-1, *Fluid power systems and components — Graphical symbols and circuit diagrams — Part 1: Graphical symbols for conventional use and data-processing applications*

ISO 3448, *Industrial liquid lubricants — ISO viscosity classification*

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

ISO 6358-1, *Pneumatic fluid power — Determination of flow-rate characteristics of components using compressible fluids — Part 1: General rules and test methods for steady-state flow*

ISO 6953-1:2015, *Pneumatic fluid power — Compressed air pressure regulators and filter-regulators — Part 1: Main characteristics to be included in literature from suppliers and product-marking requirements*

ISO 10094-1, *Pneumatic fluid power — Electro-pneumatic pressure control valves — Part 1: Main characteristics to include in the supplier's literature*

ISO 10094-2, *Pneumatic fluid power — Electro-pneumatic pressure control valves — Part 2: Test methods to determine main characteristics to include in the supplier's literature*