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**Compressed air —
Part 4 : Test methods for solid
particle content**

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Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee, as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Fluid Power Association (JFPA) / Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law.

This Standard has been made based on ISO 8573-4 : 2001, *Compressed air – Part 4: Test methods for solid particle content* for the purposes of making it easier to compare this Standard with International Standard; to prepare Japanese Industrial Standard conforming with International Standard; and to propose a draft of an International Standard which is based on Japanese Industrial Standard.

JIS B 8392 consists of the following 4 parts under the general title *Compressed air* :

Part 1 : Contaminants and purity classes

Part 2 : Test methods for aerosol oil content

Part 3 : Test methods for measurement of humidity

Part 4 : Test methods for solid particle content.

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the original JIS is to be the final authority.

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Contents

	Page
Introduction	1
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Units	2
5 Particle classes	2
5.1 Solid particles	2
5.2 Microbiological particles	2
5.3 Aerodynamic particle diameter	2
6 Selection of method	3
7 Sampling techniques	3
7.1 General	3
7.2 Full-flow sampling	3
7.3 Isokinetic sampling	4
7.4 Reducing system pressure before measurement	6
7.5 Average values	7
7.6 Operating conditions	7
8 Measurement methods	7
8.1 General	7
8.2 Laser particle counting	7
8.3 Condensation nucleus counting	7
8.4 Differential mobility analysis	7
8.5 Scanning mobility particle sizing	7
8.6 Sampling on membrane surface in conjunction with a microscope	7
9 Evaluation of test results	8
9.1 Reference conditions	8
9.2 Influence of humidity	8
9.3 Influence of pressure	8
9.4 Influence of temperature	8
9.5 Influence of other contaminants	8
10 Uncertainty	9
11 Test report	9
11.1 Statements	9
11.2 Statement format	9
Annex A (informative) Sample test report on determination of solid particle content in compressed air	11
Annex B (informative) Description of measurement methods	12
Bibliography	13

Compressed air— Part 4 : Test methods for solid particle content

Introduction This Japanese Industrial Standard has been prepared based on the first edition of ISO 8573-4 *Compressed air—Part 4 : Test methods for solid particle content* published in 2001 without modifying the technical contents.

1 Scope This part of JIS B 8392 provides a guide for choosing a suitable method to determine the solid particle concentration in compressed air, expressed as the number of solid particles in respective size classes. It describes the limitations of the various methods.

This part of JIS B 8392 identifies sampling techniques and measurement methods based on the counting of particles, and describes the evaluation, uncertainty considerations and reporting of the air purity parameter, solid particles.

NOTES 1 : The test methods described in this part of JIS B 8392 are those suitable for determining the purity classes given in JIS B 8392-1.

2 : Particle content determined as mass concentration is dealt with in ISO 8573-8.

3 : The International Standard corresponding to this Standard is as follows.

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and JIS are IDT (identical), MOD (modified), and NEQ (not equivalent) according to ISO/IEC Guide 21.

ISO 8573-4:2001, *Compressed air—Part 4 : Test methods for solid particle content* (IDT)

2 Normative references The following standards contain provisions which, through reference in this Standard, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS B 0142 *Glossary of terms for oil hydraulics and pneumatics*

NOTE : ISO 5598 *Fluid power systems and components—Vocabulary* is equivalent to the said standard.

JIS B 8392-1 *Compressed air—Part 1 : Contaminants and purity classes*

NOTE : ISO 8573-1 *Compressed air—Part 1 : Contaminants and purity classes* is equivalent to the said standard.

ISO 1217 *Displacement compressors—Acceptance tests*

ISO 3857-1 *Compressors, pneumatics tools and machines Vocabulary—Part 1 : General*

ISO 5167-1 *Measurement of fluid flow by means of pressure differential devices—Part 1 : Orifice plates, nozzles and Venturi tubes inserted in circular cross-section conduits running full*

3 Terms and definitions For the purposes of this part of JIS B 8392, the terms and definitions given in JIS B 0142, ISO 1217 and ISO 3857-1 and the following apply.

3.1 solid particle discrete mass of solid matter

3.2 microbiological particle solid particle that has the property of forming viable colony units

3.3 aerodynamic particle diameter diameter of a sphere of density of 1 g/cm³ with the same settling velocity, due to gravitational force in calm air, as the particle under the prevailing conditions of temperature, pressure and relative humidity

4 Units For the purposes of this part of JIS B 8392, the following SI units are used:

1 MPa = 10 bar

1 m³ = 1 000 L

5 Particle classes

5.1 Solid particles Solid particles are characterized by their properties of shape, size, density and hardness. Solid particles include microbiological units. Reference is made to microbiological particles in this part of JIS B 8392 to identify what problems may arise that can affect the discrimination of non-microbiological particles from microbiological particles and when to use this part of JIS B 8392 or ISO 8573-7.

The influence of liquids on particle size and number must be eliminated in order to obtain a correct reading.

The influence of liquids other than water shall be given due consideration when selecting a test method.

In order to discriminate non-microbiological particles from microbiological particles, measurements must be taken within a period of 4 h.

5.2 Microbiological particles This part of JIS B 8392 should be used to count the number of microbiological particles present in a sample. The method used to count the particles does not identify microbiological particles directly, therefore if more information is required, ISO 8573-7 should be used to determine their viability.

5.3 Aerodynamic particle diameter Aerodynamic particle diameter is a function of density. For the purposes of the test methods described in this part of JIS B 8392, it is assumed that solid particles have uniform density.

6 Selection of method The method to be selected depends on the concentration range and the sizes of solid particles in the compressed air. For choosing the method most suitable for the concentration range and sizes of particles estimated to be present in the sample, see table 1.

The applicability of particular measurement equipment to a method should be verified with the equipment manufacturer.

Table 1 Guide to selection of method

Method	Applicable concentration range particles/m ³	Applicable solid particle diameter <i>d</i> μm			
		≤0.1	0.5	1	≤5
Laser particle counter	0 to 10 ⁵	-----			
Condensation nucleus counter	10 ² to 10 ⁸	-----			
Differential mobility analyser	Not applicable	-----			
Scanning mobility particle sizer	10 ² to 10 ⁸	-----			
Sampling on membrane surface in conjunction with a microscope	0 to 10 ³	-----			

7 Sampling techniques

7.1 General Solid particles can be measured at atmospheric pressure or under ambient pressure conditions depending on the equipment used. Measurement can be carried out at partial or full flow.

- a) Full flow—sampling of total airflow.
- b) Partial flow—sample taken from a percentage of the airflow.

If the particle diameter is greater than 1 μm, then sampling shall be isokinetic.

7.2 Full-flow sampling

7.2.1 General For full-flow sampling using physical methods, if the particle diameter is greater than 0.5 μm, a gridded membrane shall be used.

The method detailed here deals with the sampling and analysis of airborne particles at constant flowrate, and permits the quantification and sizing of particles in a compressed air system.

Airflow is passed through the test equipment via suitable in-line valves, which have been previously checked to ensure they do not contribute to the level of contamination already present.