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(JFCA/AIST/JSA)

**Fine ceramics (advanced ceramics,
advanced technical ceramics)—
Test method for air purification
performance of photocatalytic
materials—Part 1: Removal of nitric
oxide**

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In the event of any doubts arising as to the contents,
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Foreword

This translation has been made based on the original Japanese Industrial Standard revised 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 Fine Ceramics Association (JFCA)/ National Institute of Advanced Industrial Science and Technology (AIST)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS R 1701-1**:2010 is replaced with this Standard.

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JIS R 1701 series consists of the following five parts under the general title “*Fine ceramics (advanced ceramics, advanced technical ceramics)—Test method for air purification performance of photocatalytic materials*”:

Part 1: Removal of nitric oxide

Part 2: Removal of acetaldehyde

Part 3: Removal of toluene

Part 4: Removal of formaldehyde

Part 5: Removal of methyl mercaptan

Fine ceramics (advanced ceramics, advanced technical ceramics)— Test method for air purification performance of photocatalytic materials— Part 1: Removal of nitric oxide

Introduction

This Japanese Industrial Standard has been prepared based on the first edition of **ISO 22197-1** published in 2007, by modifying some of the technical contents to ensure consistency among **JIS R 1701-1** to **JIS R 1701-5** and **JIS R 1751-1** to **JIS R 1751-5** which have been established after the publication of **ISO 22197-1**.

The dotted underlines represent the parts modified from the International Standard. A list of modifications with the explanations is given in Annex JA.

1 Scope

This Standard specifies the method to test the removal performance of nitric oxides [NO_x , total of nitrogen monoxide (NO) and nitrogen dioxide (NO_2)], among air purification performances, of the photocatalytic materials supported on the surface of building materials and other products.

This Standard is mainly intended for photocatalysts which are effective in ultraviolet (UV) region within a wavelength range of 300 nm to 380 nm, under solar radiation. To the testing of NO_x removal performance under visible light, the method given in **JIS R 1751-1** shall be applied instead of the method specified in this Standard.

NOTE : The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 22197-1:2007 *Fine ceramics (advanced ceramics, advanced technical ceramics)—Test method for air-purification performance of semiconducting photocatalytic materials—Part 1: Removal of nitric oxide* (MOD)

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 21-1**.

2 Normative references

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

JIS B 7953 Continuous analyzers for oxides of nitrogen in ambient air

JIS K 0055 General rules for calibration method of gas analyzer

JIS K 0101 Testing methods for industrial water

JIS K 0127 General rules for ion chromatography

JIS K 0557 *Water used for industrial water and wastewater analysis*

JIS R 1600 *Glossary of terms relating to fine ceramics*

JIS R 1709 *Fine ceramics (advanced ceramics, advanced technical ceramics)—Light source for test of photocatalytic materials used under ultraviolet*

JIS R 1751-1 *Fine ceramics (advanced ceramics, advanced technical ceramics)—Test method for air purification performance of photocatalytic materials under indoor lighting environment—Part 1: Removal of nitric oxide*

JIS Z 8401 *Guide to the rounding of numbers*

JIS Z 8806 *Humidity—Measurement methods*

3 Terms and definitions

For the purpose of this Standard, the terms and definitions given in **JIS R 1600**, and the following apply.

3.1 photocatalyst

substance that performs one or more functions based on oxidation and reduction reactions under photoirradiation, including decomposition and removal of air and water contaminants, deodorization, antibacterial, antifungal, antiviral, and self-cleaning actions

It is a type of functional fine ceramics.

3.2 photocatalytic materials

construction materials or other materials in which or on which the photocatalyst is added by coating, impregnation, mixing, etc., intended for using various functions of the photocatalyst

3.3 zero-calibration gas

air that does not contain pollutants (i.e. in which common pollutants that could affect the test are below 0.01 ppm in volume fraction)

The zero-calibration gas is supplied as synthetic air in a gas cylinder or prepared from indoor air using a laboratory air-purification system.

3.4 standard gas

gas of known concentrations, or calibration gas conditioned in accordance with **JIS K 0055**, intended for use for the performance test of a photocatalytic material

3.5 test gas

mixture of air and pollutant(s) of known concentration prepared from a standard gas or a zero-calibration gas

3.6 purified water

water of quality A1 or better specified in **JIS K 0557**, purified by the ion exchange method

3.7 dark condition

test condition with no light illumination by the light source for testing and no incidence of external light

Usually the test gas is supplied for comparison with the illuminated reaction.

4 Test equipment

4.1 Construction of equipment The test equipment enables a photocatalytic material to be examined for its pollutant-removal capability by supplying the test gas continuously, while providing the test piece of photocatalyst with photoirradiation to activate the photocatalyst. It consists of a test gas supply, a photoreactor, a light source, and pollutant measurement equipment.

Since low concentrations of NO_x are to be tested, the equipment shall be constructed with materials of low adsorption so that there is minimum loss due to adsorption that may influence the measurement. An example of a test system is shown in Figure 1.

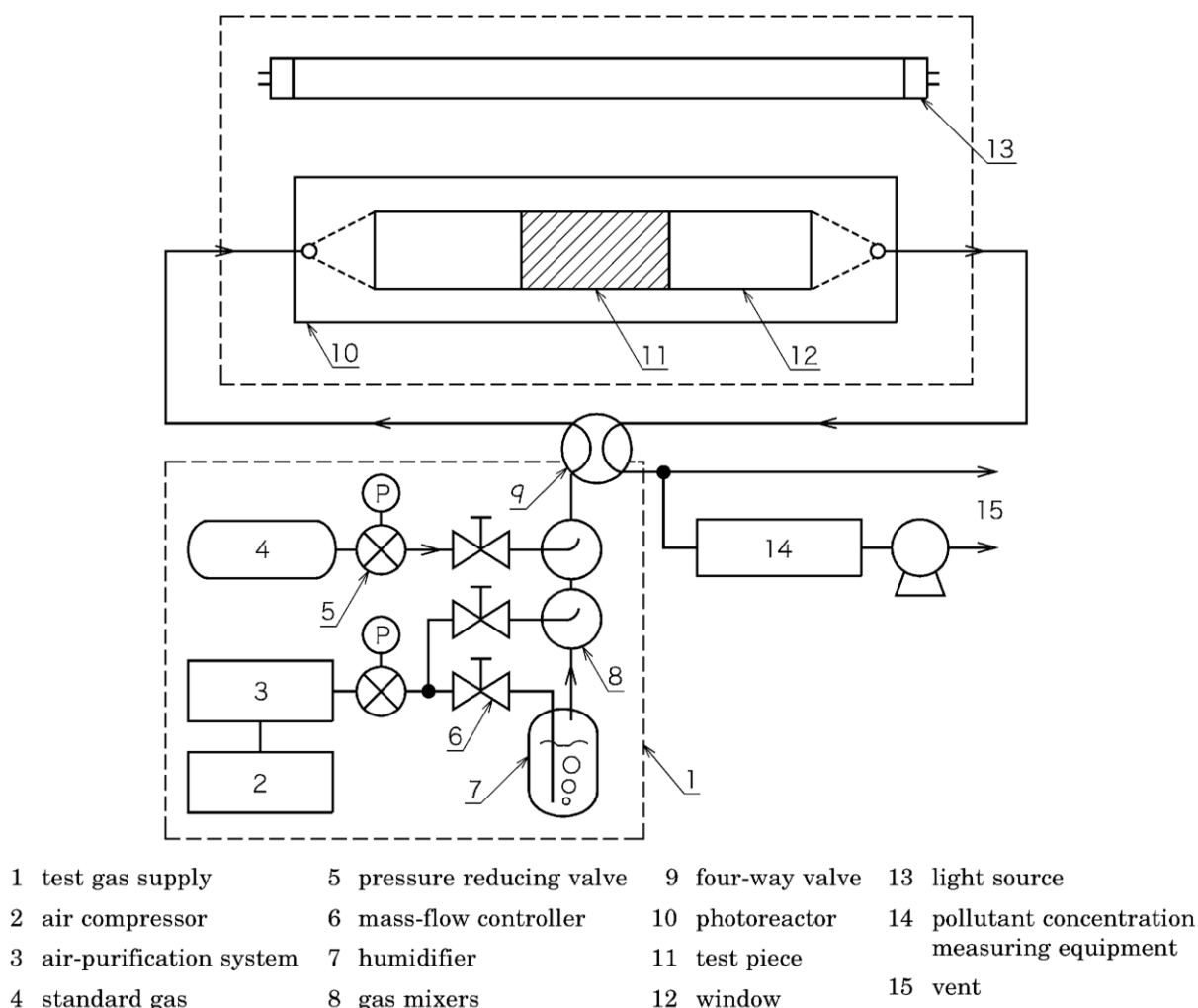


Figure 1 Schematic example of testing equipment