

JIS

JAPANESE INDUSTRIAL STANDARD

**High accuracy standards
for carbon dioxide**

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High accuracy standards for carbon dioxide

K 0042-1996

1. Scope This Japanese Industrial Standard specifies the high accuracy standards for carbon dioxide, diluted with air packed into a compressed-gas cylinder, for the purpose of scale marking and calibration of measuring instruments which are to be used for accurately measuring the concentration of carbon dioxide in air.

Remarks 1. The standards cited in this Standard are listed in Attached Table 1.

2. The units and numerical values given in { } in this Standard are based on the traditional units, and appended for informative reference.

2. Matters in common The general matters commonly used in this Standard shall follow JIS K 0055, JIS K 0151, JIS K 0501, and JIS Z 8401.

3. Definitions For the purposes of this Standard, the definitions given in JIS K 0003 and the following definitions apply.

- (1) primary standard gas for carbon dioxide The mixed gas of carbon dioxide and air, which the inspection agency capable of preparing, maintaining, and controlling the standard gas (hereafter referred to as "inspection agency") has prepared according to Annex, using carbon dioxide in Table 2 and air in Table 3 and then whose concentration has been determined by that inspection agency.
- (2) high accuracy standards for carbon dioxide Composition reference material defined in JIS K 0501 and gaseous standard sample, mixed gas of carbon dioxide and air, which has been prepared by compounding carbon dioxide in Table 2 and air in Table 3 according to 7 and whose concentration of carbon dioxide has been evaluated using the primary standard gas for carbon dioxide specified in (1) by the inspection agency.
- (3) constituent gas Carbon dioxide in Table 2, which is making the composing constituent gas of high accuracy standards for carbon dioxide.
- (4) dilution gas Air in Table 3, which is for dilution of constituent gas to make target concentration when preparing high accuracy standards for carbon dioxide, and which does not contain the components causing aged deterioration to constituent gas or giving influences on measured values.
- (5) mixing method by mass ratio This is the method for preparing standard gas, which shall be as follows: measure constituent gas and dilution gas into a compressed-gas cylinder, compound them, and calculate the concentration of the gas on the base of weighed mass of each gas.

4. Class of high accuracy standards for carbon dioxide The high accuracy standards for carbon dioxide shall be classified with the range of concentration as shown in Table 1.

Table 1. Classes

Class (symbol)	Range of concentration	Class (symbol)	Range of concentration
HCD240	237 to 243 volppm	HCD350	347 to 353 volppm
HCD260	257 to 263 volppm	HCD360	357 to 363 volppm
HCD280	277 to 283 volppm	HCD370	367 to 373 volppm
HCD300	297 to 303 volppm	HCD380	377 to 383 volppm
HCD320	317 to 323 volppm	HCD400	397 to 403 volppm
HCD330	327 to 333 volppm	HCD600	550 to 650 volppm
HCD340	337 to 343 volppm	HCD800	750 to 850 volppm

Informative reference: HCD is abbreviation of high accuracy standards for carbon dioxide.

5. Materials of high accuracy standards for carbon dioxide The materials of the high accuracy standards for carbon dioxide shall be both the constituent gas in Table 2 and dilution gas in Table 3.

Table 2. Constituent gas

Kind	Purity	Permissible content of impurities
Carbon dioxide	99.9 vol% min.	Nitrogen, oxygen, methane, non-methane hydrocarbons, and carbon monoxide: each 1 volppm max. Water content: dew point -70°C or lower

Table 3. Dilution gas

Kind	Constituents	Permissible content of impurities
Air	(example of constituent) Oxygen: 20.93 vol% Argon: 0.93 vol% Nitrogen: 78.14 vol%	Methane, non-methane hydrocarbons, and carbon monoxide: each 1 volppm max. Water content: dew point -70°C or lower Carbon dioxide: 0.01 volppm max.

6. Compressed-gas cylinder and valve Compressed-gas cylinder and valve are for packing of compressed gas specified in High Pressure Gas Control Law, and shall be as follows.

- (1) Compressed-gas cylinder The compressed-gas cylinder shall be either following (a) specified in JIS B 8241 or (b) which has been manufactured with the material of the same chemical components as alloy number 6061 specified in JIS H 4140, and the inside shall be treated so as not to cause the high accuracy standards for carbon dioxide to deteriorate its concentration.
 - (a) Compressed-gas cylinder made of manganese steel
 - (b) Compressed-gas cylinder made of aluminum alloy
- (2) Valve for compressed-gas cylinder The valve for compressed-gas cylinder shall be specified in JIS B 8246, and give little influence on the concentration of the high accuracy standards for carbon dioxide.