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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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Industrial liquid carbon dioxide

工业液体二氧化碳

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1 Scope

This document specifies the requirements for industrial liquid carbon dioxide, including technical specifications, sampling, test methods, inspection rules, marks, labels, accompanying documentation, packaging, filling, transportation, and storage. It describes methods for determining the content of industrial liquid carbon dioxide and its impurities, and provides safety information regarding the product.

This document applies to industrial liquid carbon dioxide produced from lime kiln gas, fermentation gas, or hydrocarbon conversion gas, as well as that recovered from industrial waste gas.

2 Normative references

GB/T 150

GB 190

GB/T 191
GB/T 5099
GB/T 5832.1
GB/T 5832.2
GB/T 6285
GB/T 6682
GB/T 7144
GB/T 8170
GB/T 8984
GB/T 14193
GB 15258
GB/T 16483
GB/T 16804
GB/T 23938
GB/T 24159
GB/T 28054
GB/T 28726
GB/T 28727
GB/T30685
GB/T 33145
GB/T 34525
GB/T 34528
GB/T 43306

3 Terms and definitions

There are no terms and definitions requiring definition in this document.

4.1 The technical requirements for welding-grade carbon dioxide shall comply with the

specifications in Table 1.

Table 1 -- Technical requirements for welding-grade carbon dioxide

4.2 The technical requirements for industrial carbon dioxide for non-welding purposes

shall comply with the provisions of Table 2.

Table 2 -- Technical requirements for industrial carbon dioxide for non-welding applications

5.1 Batching

Industrial liquid carbon dioxide products filled into gas cylinders via continuous, stable production on the same line constitute a single batch, with each batch not exceeding 500 cylinders. For industrial liquid carbon dioxide filled into gas cylinder bundles, tank trucks, welded insulated cylinders, or spherical tanks, the product quantity within each individual containment unit constitutes a single batch.

5.2 Sampling

Sampling of industrial liquid carbon dioxide shall be carried out in accordance with GB/T 23938. Other requirements shall comply with the provisions of GB/T 43306.

Samples for the determination of all parameters shall be taken from the liquid phase within the packaging container.

5.3.1 For industrial liquid carbon dioxide packaged in cylinders, random sampling and

inspection shall be conducted in accordance with the sampling quantities specified in Table 3.

Table 3 -- Sampling inspection of industrial liquid carbon dioxide in gas cylinders

5.3.2 Industrial liquid carbon dioxide transported in tank trucks, welded insulated gas

cylinders, spherical tanks, gas cylinder bundle assemblies, or large-volume seamless steel cylinders shall be inspected individually.

5.3.3 For industrial liquid carbon dioxide transported via pipeline, sampling and testing

shall be conducted once every 4 hours, or the sampling frequency shall be determined through consultation between the supplier and the purchaser.

6 Test methods

WARNING -- Some of the test procedures specified in this document may result in hazardous situations. Users should take appropriate safety and health precautions.

6.1.1.1 Overview of the method

Absorb carbon dioxide using potassium hydroxide solution. The difference in gas volume before and after absorption represents the carbon dioxide content.

6.1.1.2 Reagents and materials

Potassium hydroxide solution (300 g/L). Weigh 300 g of analytical-grade potassium hydroxide, dissolve in an appropriate amount of water, dilute to 1000 mL, and store in a tightly sealed container for use.

Water. It shall comply with the requirements for Grade 3 water specified in GB/T 6682.

6.1.1.3 Apparatus

For the carbon dioxide content analyzer, all components must be intact, undamaged, and free from leaks. See Annex A for the fabrication diagram.

The volume of the analyzer's absorber is 100.00 mL. The smallest scale division between 98 mL~100 mL is 0.05 mL, and the permissible error is ± 0.01 mL.

6.1.1.4 Determination

Open two-way stopcocks A and B. Connect the glass tube at stopcock B to the pressure-reducing valve outlet on the sample container using a rubber hose. Thoroughly purge the analyzer and its connecting lines with a sample gas volume exceeding 1000 mL.

Close stopcock A first, then close stopcock B. Disconnect the rubber hose. Quickly rotate stopcock A several times to equilibrate the internal pressure of the instrument with atmospheric pressure.

Add 105 mL of potassium hydroxide solution to the dropping funnel. Slowly open stopcock A to allow the potassium hydroxide solution to flow into the absorber until the flow ceases, indicating that absorption is complete. Close stopcock A. Read the graduation mark corresponding to the liquid level in the absorber; this indicates the carbon dioxide content.

The average of the readings from two parallel determinations is taken as the result. The difference between the two readings should not exceed 0.05 mL.

6.1.2 Equivalent methods

Other equivalent methods are permitted. In the event of a dispute regarding the test results,