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**NATIONAL STANDARD OF THE
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GB/T 43772-2024

Electronic gas - Carbon dioxide

电子气体 二氧化碳

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part

1. Structure and drafting rules for standardization documents" Drafting. Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents. This document was proposed and coordinated by the National Technical Committee for Semiconductor Equipment and Materials Standardization (SAC/TC203). This document was drafted by: Henan Xinlianxin Cryogenic Energy Co., Ltd., Haohua Gas Co., Ltd. Southwest Branch, Zhejiang Hongxin Semiconductor Conductor Co., Ltd., CSSC (Handan) Perri Special Gas Co., Ltd., China Testing and Certification Group Co., Ltd., Zhejiang Haichang Gas Co., Ltd., Fujian Del Technology Co., Ltd., Guangdong Huate Gas Co., Ltd., Jinhong Gas Co., Ltd., Jiangxi Huate Electronic Chemicals Co., Ltd., Chongqing Ruixin Gas Co., Ltd., Beijing Gaoma Instrument Technology Co., Ltd., Dalian Huabang Chemical Co., Ltd., Hunan Kaimet Gas Co., Ltd., China Three Gorges University, Hubei Heyuan Gas Co., Ltd., Chongqing Tonghui Gas Co., Ltd. Lanzhou Yulong Gas Co., Ltd., Shenzhen Gaofa Gas Co., Ltd., Shanghai Qiyuan Gas Development Co., Ltd., Zhejiang Provincial Metrology Co., Ltd. With the Standardization Society, Zhejiang Provincial Institute of Standardization, Zhejiang Zhongnitro Kangpeng Chemical Co., Ltd., Hangzhou Oxygen Group Co., Ltd., Air Liquide (China) Investment Co., Ltd., Yumen Dayang Tianqing Petrochemical Co., Ltd., Huizhou Huadatong Gas Manufacturing Co., Ltd., Shanghai Hua Ai Chromatography Analysis Technology Co., Ltd., Shanghai Fanwei Instrument Equipment Co., Ltd., Dalian Data Gas Co., Ltd., Lianxiong Investment (Shanghai) Co., Ltd. Company, Bruker (Beijing) Technology Co., Ltd., Zhejiang Chemical Research Institute Co., Ltd., Zhonghao Guangming Chemical Research and Design Institute Co., Ltd., Dalian Guangming Chemical Industry Gas Quality Monitoring Center Co., Ltd., China National Institute of Metrology, Shanghai Institute of Metrology and Testing Technology, Dalian Zhonghuida Scientific Instrument Co., Ltd., Shenyang Zhongfu Kejin Pressure Vessel Co., Ltd., Hangzhou New Century Mixed Gas Co., Ltd., China Institute of Chemistry, Institute of Testing Technology, Sichuan High

Precision Testing Service Co., Ltd., China Institute of Metrology and Testing, Beijing Ruixinjie Environmental Protection Technology Co., Ltd. Co., Ltd., Harbin Liming Gas Co., Ltd., Meishan Mack Online Equipment Co., Ltd., Air Products and Chemicals (China) Investment Co., Ltd. Co., Ltd., Southwest Chemical Research and Design Institute Co., Ltd. The main drafters of this document are. Cui Zengtao, Guo Qiong, Zhu Ming, Yin Yanjiao, Lan Feng, Wu Huiming, Hu Ying, Zheng Qiuyan, Su Zijie, Cai Jin, Lin Dingbiao, Chen Shihua, Sun Funan, Liao Hengyi, Chen Yanshan, Jin Xianghua, Sun Meng, Fu Zhuhong, Yu Jinlong, Jiang Yuejun, Niu Yandong, Liu Lina, Hou Peng, Qian Ji, Liu Qinghui, Guo Jingnan, Yuan Youlu, Du Dayan, Cao Xiaolin, Fang Qiang, Huang Jiadou, Wang Xiaobo, Yin Aihua, Xu Rufeng, Yu Jun, Cao Yining, Zhang Boyuan, Wang Ziyuan, Jin Xueguang, Liu Shangjin, Han Shuai, Yin Hao, Zhang Weiwei, Ma Binqi, Liu Feng, Shi Wei, Fang Hua, Wang Jianjian, He Bo, Tang Zhongwei, Wang Yunlong, Huang Hui, Zhao Yue, Shang Boyang, Shi Wanjuan, Chang Xia, Bian Luning, Hu Shuguo, Zhang Tiqiang, Gao Yanqiu, Li Chunhua, Cui Hemin, Gong Bing, Jia Renyuan, Shen Yuanjie, Zhou Xin, Ao Ke, Yang Yangzhongfu, Zhao Jie, Shao Chenggang, Zhang Yishan, Wang Jing, Zhou Pengyun, Tang Xiamei. Electronic Gas Carbon Dioxide

1 Scope

GB/T 43772-2024 is the Chinese standard for electronic grade carbon dioxide, the gas used in semiconductor manufacture for supercritical cleaning and drying, for chamber and chemical-mechanical polishing processes and as a process gas in deposition and etch. Electronic grade means something very specific: the assay is quoted to several nines and the specification is really a list of impurity ceilings at the part-per-billion level, because a trace of moisture, oxygen, hydrocarbon, sulfur compound or metal carried into a wafer process destroys device yield in ways that are expensive and slow to trace. The standard sets the grades and the requirements, the assay and the limit for each impurity, then the test methods, which are the substance of the document, gas chromatography with the detectors required for each species, cavity ring-down or other trace moisture measurement, and the particle and non-volatile residue determinations, followed by the inspection rules and the requirements for the cylinders, valves, marking, packaging, transport and storage. It takes effect on 1 October 2024.

23 Gas Cylinder Safety Technical Regulations

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document. For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to This document.

GB 190 Dangerous Goods Packaging Marking

GB/T 5099 (all parts) Seamless steel gas cylinders

GB/T 5275.7 Preparation of calibration gas mixtures by dynamic volumetric method for gas analysis Part

GB/T 28726 Gas analysis - Helium ionization gas chromatography

GB/T 28727 Gas analysis - Determination of sulphide - Flame photometric gas chromatography method

GB/T 33145 Large volume seamless steel gas cylinders

GB/T 34972 Determination of metal content in gases for use in the electronics industry - Inductively coupled plasma mass spectrometry

GB/T 43306 Gas analysis sampling guide TSGR0005 Safety Technical Supervision Regulations for Mobile Pressure Vessels TSG

3 Cavity ring-down spectroscopy

GB/T 7144 Color marking of gas cylinders

GB/T 8979 Pure nitrogen, high purity nitrogen and ultrapure nitrogen

GB/T 8984 Determination of carbon monoxide, carbon dioxide and hydrocarbons in gases - Gas chromatography

GB/T 11446.1 Electronic grade water

GB/T 14193 Regulations for filling liquefied gas cylinders

GB 15258 Provisions for the preparation of chemical safety labels

GB 15603 General Rules for Storage of Hazardous Chemicals in Warehouses

GB/T 16804 Gas Cylinder Warning Label

GB/T 25915.1 Clean rooms and related controlled environments Part

4 Technical requirements

The technical requirements for carbon dioxide should comply with the provisions of Table

1. The requirements for ions and metal elements should comply with the provisions of Table 2 and Table 3.

7 Thermal mass flow controllers

GB/T 5832.3 Determination of trace moisture in gases Part