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**Technical specifications of up-flow anaerobic sludge blanket
(UASB) reactor for wastewater treatment
(English Translation)**

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Foreword

To implement the "Environmental Protection Law of the People's Republic of China" and the "Water Pollution Prevention and Control Law of the People's Republic of China" Construction and operation management of anaerobic biological treatment project for anaerobic sludge blanket (UASB) reactor, prevention and control of environmental pollution, protection this standard is formulated to protect the environment and human health.

This standard specifies the process design, detection and control, labor safety and safety of the upflow anaerobic sludge blanket (UASB) reactor.

Technical requirements for occupational hygiene, construction and acceptance, operation and maintenance.

This standard was formulated by the Science and Technology Standards Department of the Ministry of Environmental Protection.

This standard is mainly drafted by. China Environmental Protection Industry Association, Tsinghua University, Beijing Municipal Academy of Environmental Sciences, Shandong Shifang Environmental Energy Co., Ltd.

This standard was approved by the Ministry of Environmental Protection on March 19, 2012.

This standard has been implemented since June 1, 2012.

This standard is explained by the Ministry of Environmental Protection.

Technical specification for sewage treatment engineering of upflow anaerobic sludge blanket reactor

1 Scope of application

This standard specifies the process design and inspection of the anaerobic biological treatment project of the upflow anaerobic sludge blanket (UASB) reactor wastewater.

Technical requirements for measurement and control, auxiliary engineering, construction and acceptance, operation and maintenance.

This standard applies to the treatment of medium and high concentration organic wastewater treatment with upflow anaerobic sludge blanket (UASB) reactor.

Design, construction and operation management can be used as environmental impact assessment, design, construction, acceptance and operation and management after completion Technical basis.

2 Normative references

The contents of this standard refer to the terms in the following documents. For undated references, the valid version applies to this standard.

GB 3836 Electrical equipment for explosive gas atmosphere GB 12348 Environmental noise emission standards for industrial enterprises General rules for safety and health requirements of GB 12801 production process GB 12999 Technical regulations for the preservation and management of water sampling samples GB 18918 Pollutant discharge standard for urban sewage treatment plants GB 50011 seismic design code for buildings GB 50014 Outdoor Drainage Design Code GB 50015 Building Water Supply and Drainage Design Code GB 50016 Building Design Fire Code GB 50037 Building Ground Design

Specification GB 50040 power machine basic design specification GB 50046 industrial building anti-corrosion design specification GB 50052 design specification for power distribution system GB 50053 10kV and below substation design specifications GB 50054 Low Voltage Distribution Design Specification GB 50057 lightning protection design code for buildings GB 50069 Water supply and drainage engineering structure design specification GB 50108 Underground Engineering Waterproof Technical Specifications GB 50187 General Plan for Design of Industrial Enterprises GB 50202 Code for construction quality acceptance of building foundation engineering GB 50203 Masonry Construction Quality Acceptance Specification GB 50204 Concrete Structure Engineering Construction Quality Acceptance Specification GB 50205 Steel Structure Engineering Construction Quality Acceptance Specification GB 50209 Construction Ground Engineering Construction Quality Acceptance Specification GB 50222 Building interior decoration design fire protection specification General specification for construction and acceptance of GB 50231 mechanical equipment installation engineering GB 50268 Water supply and drainage pipeline engineering construction and acceptance specifications GB 50275 Compressor, fan, pump installation engineering construction and acceptance specifications GB/T 18883 indoor air quality standard GB J 19 Industrial enterprises heating, ventilation and air conditioning design specifications GB J 22 Factory Mine Road Design Code GB J 87 Industrial Enterprise Noise Control Design Specification GB J 141 Code for construction and acceptance of water supply and drainage structures GBZ 1 industrial enterprise design hygiene standard GBZ 2 workplace occupational exposure limit CJ/T 51 Standard for urban sewage quality inspection methods CJJ 60 Urban Wastewater Treatment Plant Operation, Maintenance and Safety Technical Regulations HGJ 212 metal welded structure wet gas cabinet construction and acceptance specification HJ/T 91 Surface Water and Wastewater Monitoring Technical Specifications HJ/T 250 Environmental Protection Products Technical Requirements Rotary Fine Grille HJ/T 262 environmental protection product technical requirements grille decontamination machine HJ/T 353 water pollution source online monitoring system installation technical specification HJ/T 354 water pollution source online monitoring system acceptance technical specification Technical specification for operation and assessment of HJ/T 355 water pollution source online monitoring system JGJ 37 General Rules for Civil Building Design NY/T 1220.1 Technical Specifications for Biogas Engineering Part 1. Process Design NY/T 1220.2 Technical Specifications for Biogas Engineering Part 2. Gas Supply Design NY/T 1220.3 Technical Specifications for Biogas Engineering - Part 3. Construction and Acceptance Measures for Completion and Acceptance of Construction Projects (Engineering) (National Planning Commission (1990) No. 1215) Measures for the Administration of Environmental Protection Acceptance for Completion of Construction Projects (Order of the State Environmental Protection Administration (2001) No. 13)

3 Terms and definitions

The following terms and definitions apply to this standard.

3.1 Upflow anaerobic sludge blanket reactor upflow anaerobic sludge blanket reactor

Means that the wastewater enters the bottom sludge layer and the upper middle sludge suspension zone through the water distribution device, and the anaerobic microorganisms therein the reaction is carried out to generate biogas, and the gas, liquid and solid mixture is separated by the upper three-phase separator, and the sludge is returned to the sludge suspension.

Zone, after separation, the wastewater is discharged from the system, and the anaerobic reactor (referred to as UASB reactor) that produces biogas is recovered.

3.2 Three-phase separator three-phase separator

It is installed in the upper part of the anaerobic sludge bed to collect the biogas generated in the reaction zone, and to precipitate and discharge the suspended solids.

A device for separating gases, solids, and liquids.

3.3 Flocculent sludge

Also known as anaerobic activated sludge, it refers to the mixing of facultative bacteria and obligate anaerobic bacteria with organic and inorganic solids in wastewater.

The dark brown floc formed.

3.4 Granular sludge

Refers to cell aggregates formed by biological self-fixation processes; anaerobic granular sludge has a certain shape, structure and surface area.

The particle size is relatively large ($d > 0.5\text{mm}$), and has relatively stable physical properties in terms of sinking speed, strength, density, and void ratio.

Quality, which contains various enzymes and microflora necessary for degrading organic pollutants in wastewater, and has high methanogenic activity.

3.5 Volumetric load

Refers to the mass of organic pollutants in the wastewater per unit volume of the reactor, generally expressed in $\text{kgCODCr}/(\text{m}^3 \cdot \text{d})$.