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*भारतीय मानक मसौदा*  
**बायोगैस (बायोमीथेन) — विशिष्टि**  
*(IS 16087 का दूसरा पुनरीक्षण)*

*Draft Indian Standard*  
**Biogas (Biomethane) — Specification**  
*(Second Revision of IS 16087)*

(ICS 75.060)

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Petroleum and their Related Products of Synthetic or  
Biological or Natural Origin Sectional Committee, PCD 03

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**FOREWORD**

*(Formal Clauses will be added later).*

The standard on biogas was originally published in 2013 and subsequently revised in 2016. The objective of the standard was to provide specification for biogas (biomethane) composition and quality characteristics for application of biogas in thermal applications, stationary engines, automotive applications and supply through piped network.

Biogas (biomethane) is primarily methane gas which is generated through an anaerobic digestion of organic wastes by microorganisms. Biomethanation is a relatively simple and economical method to produce fuel from waste. The waste can include agricultural and crop waste, human waste, and animal waste (cow dung for instance). Biogas (biomethane) is an environment friendly clean burning fuel.

The raw biogas (biomethane) as obtained from the waste digesters comprises of methane (CH<sub>4</sub>) as the main component (50 - 70 percent), and carbon dioxide (CO<sub>2</sub>) (30 - 40 percent) with varying quantities of H<sub>2</sub>S, moisture and few other gases in trace quantities. Its composition varies depending upon the feedstock used. The raw biogas is processed and purified from the unwanted gases like CO<sub>2</sub>, H<sub>2</sub>S and moisture upto a certain required level.

The standard was first taken up for revision to fulfil the need of Ministry of Road Transport and Highways (MoRTH) for compressed biogas for automotive purposes. The Committee reviewed the existing standard and felt that for automotive purposes, the biogas should have same quality

parameters as that of compressed natural gas for automotive use. Hence, the requirement of moisture and H<sub>2</sub>S were modified.

This (second) revision has been brought out on request of the Petroleum and Natural Gas Regulatory Board (PNGRB) to facilitate distribution of biomethane through blending with existing natural gas infrastructure, including city gas distribution (CGD) network. Hence, the following major changes have been made:

- a) Methane content increased to 95 mol percent;
- b) CO<sub>2</sub> + N<sub>2</sub> + O<sub>2</sub> content decreased to 5 mol percent;
- c) Content of total sulphur (including H<sub>2</sub>S) aligned with PNGRB (Access Code for Common Carrier or Contract Carrier Natural Gas Pipelines) Regulations 2008;
- d) Test methods updated; and
- e) Provision for use of composite cylinders for on-board storage of fuel for automotives included in supply clause through reference to IS 15935.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2: 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

## 1 SCOPE

This standard prescribes the requirements and the methods of sampling and test for biogas (biomethane) to be used in stationary engines, automotive [bio-CNG/compressed biogas (CBG)], thermal, and industrial applications as supplied in cylinders and through piped network.

## 2 REFERENCES

The following standards contain provisions which through reference in this text constitute the provisions of the standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreement based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standard indicated below:

<i>IS No./ International Standard</i>	<i>Title</i>
IS 7285 (Part 2): 2017	Refillable seamless steel gas cylinders — Specification : Part 2 Quenched and tempered steel cylinders with tensile strength less than 1100 MPa (112 kgf/ mm <sup>2</sup> ) ( <i>fourth revision</i> )
IS 15125 : 2002 / ISO 10715 : 1997	Natural gas — Sampling guidelines
IS 15130 (Part 4) : 2002 / ISO 6974-4 : 2000	Natural Gas - Determination of Composition with Defined Uncertainty by Gas Chromatography : Part 4 Determination of Nitrogen, Carbon Dioxide and C1 to C5 and C6+ Hydrocarbons for a Laboratory and On-line Measuring System Using Two Columns
IS 15130 (Part 5) : 2021 / ISO 6974-5 : 2014	Natural Gas - Determination of Composition with Defined Uncertainty by Gas Chromatography : Part 5 Determination of Nitrogen Carbon Dioxide and C1 to C5 and C6 Hydrocarbons for a Laboratory and On-line Process Application Using Three Columns
IS 15319 : 2020 / ISO 13734 : 2013	Natural gas — Organic sulphur compounds used as odorants — Requirements and test methods ( <i>first revision</i> )
IS 15490 : 2017	Seamless steel cylinders for on-board storage of compressed natural gas as a fuel for automotive vehicles — Specification ( <i>first revision</i> )
IS 15641(Part 2) : 2006 / ISO 10101-2 : 1993	Natural gas — Determination of water by the Karl Fischer method : Part 2 Titration procedure
IS 15641(Part 3) : 2007 / ISO 10101-3 : 1993	Natural gas — Determination of water by karl fischer method : Part 3 Coulometric procedure
IS 15935 : 2021	Composite Cylinders for On-Board Storage of Compressed Natural Gas (CNG) as a Fuel for Automotive Vehicle — Specification ( <i>first revision</i> )
ISO 14532 : 2014	Natural gas — Vocabulary
ISO 16960 : 2014	Natural gas — Determination of sulfur compounds — Determination of total sulfur by oxidative microcoulometry method
ISO 20729 : 2017	Natural gas — Determination of sulfur compounds — Determination of total sulfur content by ultraviolet fluorescence method

### 3 TERMINOLOGY

For the purpose of this standard, the definitions given in ISO 14532 shall apply.

### 4 REQUIREMENTS

**4.1** Biogas (biomethane) shall be free from liquids over the entire range of temperatures and pressures encountered in the storage and dispensing system, fuel containers, engine and fuel systems, and piped network.

**4.2** The biogas (biomethane) fuel shall be free from particulate matter such as dust, dirt, etc.

#### 4.3 Odour

Biogas (biomethane) delivered as fuel shall be odorized similar to a level found in the local distribution (*see* IS 15319).

**4.4** The biogas (biomethane) shall also comply with the requirements given in Table 1 when tested in accordance with the methods given in col 4 of Table 1.

**Table 1 Requirements for Biogas (Biomethane)**

(Clause 4.4)

SI No.	Characteristic	Requirement	Method of Test
(1)	(2)	(3)	(4)
i.	Moisture, mg/m <sup>3</sup> , <i>Max</i>	5	IS 15641 (Part 2) <sup>a</sup> / IS 15641 (Part 3)
ii.	Methane, mole percent, <i>Min</i>	95	IS 15130 (Part 4) / IS 15130 (Part 5) <sup>a</sup>
iii.	Total sulphur (including H <sub>2</sub> S), mg/m <sup>3</sup> , <i>Max</i>	7	ISO 16960 / ISO 20729 <sup>a</sup>
iv.	CO <sub>2</sub> + N <sub>2</sub> + O <sub>2</sub> , mole percent, <i>Max</i>	5	IS 15130 (Part 4) / IS 15130 (Part 5) <sup>a</sup>
v.	Only CO <sub>2</sub> , mole percent, <i>Max</i>	4	
vi.	Oxygen <sup>b</sup> , mole percent, <i>Max</i>	0.5	IS 15130 (Part 4) / IS 15130 (Part 5) <sup>a</sup>

<sup>a</sup> Referee method in case of dispute  
<sup>b</sup> Oxygen can be determined using IS 15130 (Part 4) or IS 15130 (Part 5) using two TCD detectors with Ar or He as carrier gas.

### 5 SUPPLY OF BIOGAS (BIOMETHANE)

**5.1** Biogas (biomethane) shall be stored and transported in cylinders conforming to IS 7285 (Part 2). For automotive use, it shall be filled in cylinders conforming to IS 15490 or IS 15935.

**5.2** It may be transported through piped network or injected into existing system of pipelines as per regulatory requirements.

## **6 SAMPLING**

The representative samples of biogas (biomethane) shall be drawn as per sampling plan prescribed under IS 15125.

## **7 MARKING**

### **7.1 Marking**

Each cylinder shall be marked with the following information:

- a) Name of the material;
- b) Manufacturer's name, initials or trade-mark, if any;
- c) Net volume of the material, in litre;
- d) Identification in batch number or code number to enable traceability of consignment to date of manufacture;
- e) Month and year of manufacture; and
- f) Any other statutory requirements.

### **7.2 BIS Certification Marking**

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *BIS Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the standard mark.