ANSI/CSA B149.6-15

Code for digester gas, landfill gas and biogas generation and utilization

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Preface

This is the first edition of bi-national ANSI/CSA B149.6, *Code for digester gas, landfill gas, and biogas generation and utilization*.

This Code replaces the CSA B149.6-11, *Code for Digester Gas and Landfill Gas Installations*.

In this 2015 edition, major changes and/or additions have been made to the 2011 edition being replaced.

Below are a few of the major changes:

- Part III was created to address "Digester Gas System for Renewable Energy (agricultural type biogas systems)"
- Several Definitions were added; a few were changed.
- The requirements for the controls for Boilers, Waste Gas Burners, Engines, and Incinerators were taken out of the main text of the code and relocated to an Annex.
- A requirement was modified to ensure that a waste gas burner has a pilot fuel (Natural Gas or Propane only, and not Biogas) that is reliable and is not just sparking the raw main gas.
- A requirement was added indicating that Manometers must always reliably indicate the system pressures, especially during power outages, for plant personnel accessing gas rooms and for trouble shooting purposes etc.
- A requirement was expanded to ensure that a liquid filled manometer, which does not require external power, is only used.
- Incinerator Controls have been removed from the body of the code and put into Annexes, which can be adopted by the Authority Having Jurisdiction (AHJ), if they so wish.
- Controls for Ventilation and Combustion Air have been removed from the body of the code and put into Annexes, which can be adopted by the AHJ, if they so wish.
- Requirements for compliance with piping design codes have been updated to include Canadian and American standards.
- Requirements for compliance underground piping have been updated to include Canadian and American standards.
- The previous edition required instruments to measure the composition of the landfill gas for an explosive mixture but did not specify what to do when it occurred. The system is now required to shutdown when the methane in the landfill gas is between 2.5% and 25% by volume.
- Hazardous areas requirements have been updated to include Canadian and American standards.

This Code was prepared by the Technical Committee on Biogas Generation and Utilization (B149.6), under the jurisdiction of the Strategic Steering Committee on Fuel-Burning Equipment, and has been formally approved by the Technical Committee. This Code has also been formally approved by the Interprovincial Gas Advisory Council and the American National Standards Institute.

The CSA B149.6 Code Committee, which is responsible for preparing this Code, consists of members of the provincial gas inspection authorities, biogas and waste management entities, certification organizations, and representatives from the Canadian and US federal government . This Code has been formally approved by the Technical Committee on Biogas Generation and Utilization Code, by the Interprovincial Gas Advisory Council, and American National Standards Institute.

Notes:

(1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*

(2) *Although the intended primary application of this Code is stated in its Scope, it is important to note that it remains the responsibility of the users of the Code to judge its suitability for their particular purpose.*

(3) *This Code was developed by consensus, which is defined by* CSA Policy governing standardization — Code of good practice for standardization *as "substantial agreement. Consensus implies much more than a simple majority, but not necessarily unanimity". It is consistent with this definition that a member may be included in the Technical Committee list and yet not be in full agreement with all clauses of this Code.*

(4) *To submit a request for interpretation of this Code, please send the following information to* ***inquiries@csagroup.org*** *and include "Request for interpretation" in the subject line:*
(a) define the problem, making reference to the specific clause, and, where appropriate, include an illustrative sketch;

(b) provide an explanation of circumstances surrounding the actual field condition; and
(c) where possible, phrase the request in such a way that a specific "yes" or "no" answer will address the issue.

Committee interpretations are processed in accordance with the CSA Directives and guidelines governing standardization *and are available on the* Current Standards Activities *page at* ***standardsactivities.csa.ca****.*

(5) *This Code is subject to review five years from the date of publication. Suggestions for its improvement will be referred to the appropriate committee. To submit a proposal for change, please send the following information to* ***inquiries@csagroup.org*** *and include "Proposal for change" in the subject line:*
(a) Standard designation (number);
(b) relevant clause, table, and/or figure number;
(c) wording of the proposed change; and
(d) rationale for the change.

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Code for digester gas, landfill gas, and biogas generation and utilization

1 Scope

1.1 General

1.1.1
This Code applies to the installation of systems for the production, handling, storage, and utilization of ***digester gas*** in newly constructed wastewater treatment plants, as well as additions to, and the upgrading of, existing systems.

1.1.2
This Code applies to the installation of systems for the production, handling, and utilization of ***landfill gas*** in newly constructed ***landfill gas*** systems, as well as additions to, and the upgrading of, existing systems and temporary systems.

1.1.3
This Code applies to the installation of systems for the production, handling, storage, and utilization of ***biogas*** in newly constructed biogas systems.

1.1.4
This Code applies to piping systems in which the maximum operating pressures for piping used in digester systems, landfill gas systems, or biogas systems do not exceed 860 kPa for piping installed outdoors or 450 kPa for piping installed indoors.

1.1.5
This Code applies to the safety aspects of the operation and maintenance for handling, storage, and utilization of ***digester gas*** in wastewater treatment plants and ***landfill gas*** at landfill sites or biogas in biogas systems.
Note: *This Code does not apply to substrate storage, long-term digestate storage, or pilot scale and research digesters in biogas systems.*

1.1.6
This Code applies to existing ***digester gas*** and ***landfill gas*** systems where, in the opinion of the ***authority having jurisdiction***, a hazard or potential hazard exists.

1.1.7
Within the scope of Clauses 1.1.1 to 1.1.5, there may be provisions not covered in this Code, in which case the applicable provisions of the ***authority having jurisdiction*** are to apply.

1.1.8
Renewable natural gas is excluded from this Code.

1.2 Scope of each Clause of this Code

1.2.1 General
Each Clause of this Code shall be used with other applicable Clauses.

1.2.2 Clause 1 — Scope
Clause 1 contains the scope of this Code.

1.2.3 Clause 2 — Reference publications
Clause 2 contains the reference publications used in this Code.

1.2.4 Clause 3 — Definitions and abbreviations
Throughout this Code certain words appear in ***bold italic*** type. These are the words which for the purpose of this Code have been defined to ensure understanding of their intended meaning.

1.2.5 Clause 4 — General requirements for digester gas systems
Clause 4 contains general requirements for ***appliances, accessories, components***, and ***equipment***, quality of work, personnel qualifications, control of sources of ***ignition***, compliance with other codes, and prohibited practices.

1.2.6 Clause 5 — Installation requirements for appliances and equipment on digester gas systems
Clause 5 contains basic requirements pertaining to the installation of ***appliances*** and ***equipment*** with respect to their suitability for use, connections, clearances, accessibility, etc.

1.2.7 Clause 6 — Installation requirements for specific types of appliances and equipment on digester gas systems
Clause 6 contains minimum requirements for ***compressors, boilers, waste gas burners***, stationary gas engines, and ***incinerators***.

1.2.8 Clause 7 — Air for combustion, venting, and ventilation in digester gas systems
Clause 7 contains minimum requirements for the air to be used for combustion, venting, and ***ventilation*** of ***appliances*** and ***equipment***.

1.2.9 Clause 8 — Piping and tubing systems and fittings in digester gas systems
Clause 8 contains minimum requirements for the material, size, pressure, location, practices, protection, ***purging***, and identification of piping and tubing systems and fittings.

1.2.10 Clause 9 — Digesters and gas storage tanks
Clause 9 contains requirements for the ***tanks*** used in the generation and storage of ***digester gas***.

1.2.11 Clause 10 — Building and building services for digester gas systems
Clause 10 contains requirements for ***compressor*** rooms, ***boiler*** rooms, ***hazardous areas***, and combustible gas detection ***equipment***.

1.2.12 Clause 11 — Testing hazardous areas and digester gas systems
Clause 11 contains requirements for testing ***digester tank roofs*** and piping systems.

1.2.13 Clause 12 — Electrical requirements for digester gas systems

Clause 12 contains requirements for the safety electrical circuits for ***equipment*** utilizing ***digester gas***.

1.2.14 Clause 13 — Operation and maintenance of digester gas systems

Clause 13 contains requirements for the operation and maintenance procedures affecting the safety of ***digester*** systems.

1.2.15 Clause 14 — General requirements for landfill gas systems

Clause 14 contains general requirements for ***appliances***, ***accessories***, ***components***, and ***equipment***, quality of work, personnel qualifications, control of sources of ***ignition***, compliance with other codes, and prohibited practices.

1.2.16 Clause 15 — Installation requirements for appliances and equipment on landfill gas systems

Clause 15 contains basic requirements pertaining to the installation of ***appliances*** and ***equipment*** with respect to their suitability for use, connections, clearances, accessibility, etc.

1.2.17 Clause 16 — Installation requirements for specific types of appliances and equipment on landfill gas systems

Clause 16 contains minimum requirements for blowers, ***boilers***, ***waste gas burners***, stationary gas engines, and ***incinerators***.

1.2.18 Clause 17 — Air for combustion, venting, and ventilation in landfill gas systems

Clause 17 contains minimum requirements for the air to be used for combustion, venting, and ***ventilation*** of ***appliances*** and ***equipment***.

1.2.19 Clause 18 — Piping and tubing systems and fittings in landfill gas systems

Clause 18 contains minimum requirements for the material, size, pressure, location, practices, protection, ***purging***, and identification of piping and tubing systems and fittings.

1.2.20 Clause 19 — Building and building services for landfill gas systems

Clause 19 contains requirements for blower rooms, ***boiler*** rooms, ***hazardous areas***, and combustible gas detection ***equipment***.

1.2.21 Clause 20 — Testing hazardous areas and landfill gas systems

Clause 20 contains requirements for testing piping systems.

1.2.22 Clause 21 — Electrical requirements for landfill gas systems

Clause 21 contains requirements for the safety electrical circuits for ***equipment*** utilizing ***landfill gas***.

1.2.23 Clause 22 — Operation and maintenance of landfill gas systems

Clause 22 contains requirements for the operation and maintenance procedures affecting the safety of ***landfill gas*** systems.

1.2.24 Clause 23 — General requirements for biogas systems

Clause 23 contains general requirements for ***appliances***, ***accessories***, ***components***, and ***equipment***, quality of work, personnel qualifications, control of sources of ***ignition***, compliance with other codes, and prohibited practices.

1.2.25 Clause 24 — Installation requirements for appliances and equipment on biogas systems

Clause 24 contains basic requirements pertaining to the installation of ***appliances*** and ***equipment*** with respect to their suitability for use, connections, clearances, accessibility, etc.

1.2.26 Clause 25 — Installation of specific types requirements for appliances and equipment on biogas systems

Clause 25 contains minimum requirements for blowers, ***boilers, waste gas burners***, stationary gas engines, and incinerators.

1.2.27 Clause 26 — Air for combustion, venting, and ventilation in digester systems

Clause 26 contains minimum requirements for the air to be used for combustion, venting, and ***ventilation*** of ***appliances*** and ***equipment***.

1.2.28 Clause 27 — Piping and tubing systems and fittings in biogas systems

Clause 27 contains minimum requirements for the material, size, pressure, location, practices, protection, ***purging***, and identification of piping and tubing systems and fittings.

1.2.29 Clause 28 — Digesters and gas storage tanks

Clause 28 contains requirements for the ***tanks*** used in the generation and storage of ***digester gas***.

1.2.30 Clause 29 — Building and building services for biogas systems

Clause 29 contains requirements for blower rooms, ***boiler*** rooms, ***hazardous areas***, and combustible gas detection ***equipment***.

1.2.31 Clause 30 — Testing hazardous areas and biogas systems

Clause 30 contains requirements for testing piping systems.

1.2.32 Clause 31 — Electrical requirements for biogas systems

Clause 31 contains requirements for the safety electrical circuits for ***equipment*** utilizing ***landfill gas***.

1.2.33 Clause 32 — Operation and maintenance of biogas systems

Clause 32 contains requirements for the operation and maintenance procedures affecting the safety of ***biogas*** systems.

1.3 Terminology

In this Code, unless approved otherwise by the authority having jurisdiction, “shall” indicates a mandatory requirement; “should” indicates a recommendation or that which is advised but not mandatory; and “may” indicates an advisory or optional statement.

Notes to the text do not include mandatory or alternative requirements. The purpose of a note is to separate from the text explanatory or informative material that is not properly a part of this Code. Notes to figures and tables, however, are considered part of the figure or table and may be written as mandatory requirements.

Annexes are designated normative (mandatory) or informative (non-mandatory) to define their application.