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## GB/T 34537-2017

**Hydrogen and compressed natural  
gas (HCNG) blended as vehicle fuel**

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## Foreword

This Standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This Standard was proposed by and shall be under the jurisdiction of National Technical Committee 309 on Hydrogen Energy of Standardization Administration of China (SAC/TC 309).

The drafting organizations of this Standard: Shanxi Provincial Guoxin Energy Development Group Co., Ltd., Suzhou Jingli Hydrogen Production Equipment Co., Ltd., Tsinghua University Institute of Nuclear and New Energy Technology, China National Institute of Standardization, Zhejiang University, China Electronics Engineering Design Institute, Sichuan Oil Natural Gas Technology Co., Ltd., Shenyang Gas Cylinder Safety Technology Co., Ltd., Beijing Tianhai Industry Co., Ltd., Beijing Eastern Hydrogen Technology Co., Ltd.

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# Hydrogen and compressed natural gas (HCNG) blended as vehicle fuel

## 1 Scope

This Standard specifies the terms, technical requirements, test methods, transportation, storage, use and test requirements of hydrogen-compressed natural gas (HCNG) blended as vehicle fuel.

This Standard applies to hydrogen-compressed natural gas (HCNG) blended as vehicle fuel whose pressure is not greater than 35 MPa and hydrogen content is not greater than 25% (volume fraction).

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition dated applies to this document. For undated references, the latest edition of the referenced documents (including all amendments) applies to This Standard.

GB/T 3634.1, *Hydrogen - Part 1: Industrial hydrogen*

GB/T 11062, *Natural gas - Calculation of calorific values, density, relative density and Wobbe index from composition*

GB/T 13609, *Natural gas guidelines*

GB/T 13610, *Analysis of natural gas by gas chromatography*

GB 17820, *Natural gas*

GB 18047, *Compressed natural gas as vehicle fuel*

GB/T 29729, *Essential requirements for the safety of hydrogen systems*

GB 50177, *Design code for hydrogen station*

GB 50516, *Technical code for hydrogen fuelling station*

TSG 21, *Supervision regulation on safety technology for stationary pressure vessel*

TSG R0006, *Supervision regulation on safety technology for gas cylinder*

	area for vehicle driving, under the conditions of maximum operating pressure and the environmental temperature lower than -13°C
NOTE 1: The standard reference conditions for gas volumes in the table include 101.325 kPa and 20°C.	
NOTE 2: The percentages in the table are volume fractions.	

## 5 Test methods

**5.1** The calculation of gross calorific value of hydrogen-compressed natural gas blend vehicle fuel shall be as specified in GB/T 11062 or Annex A.

**5.2** The testing of the purity of raw material hydrogen in hydrogen-compressed natural gas blend vehicle fuel shall be as specified in GB/T 3634.1.

**5.3** The testing of the content of raw material hydrogen in hydrogen-compressed natural gas blend vehicle fuel shall be as specified in GB/T 13610 and as required by Annex B to this Standard.

**5.4** The testing of the constituents and content of raw material natural gas in hydrogen-compressed natural gas blend vehicle fuel shall be as specified in GB 18047.

**5.5** The testing of total sulfur in hydrogen-compressed natural gas blend vehicle fuel shall be as specified in GB 18047.

**5.6** The testing of the content of hydrogen sulfide in hydrogen-compressed natural gas blend vehicle fuel shall be as specified in GB 18047.

**5.7** The testing of the content of carbon dioxide in hydrogen-compressed natural gas blend vehicle fuel shall be as specified in GB 18047.

**5.8** The testing of the content of oxygen in hydrogen-compressed natural gas blend vehicle fuel shall be as specified in GB 18047.

**5.9** The testing of water content and water dew point of hydrogen-compressed natural gas blend vehicle fuel shall be as specified in GB 18047.

## 6 Transportation, storage and use

**6.1** The transportation, storage and use of hydrogen-compressed natural gas blend vehicle fuel shall be as specified in GB 50516 and GB/T 29729.

**6.2** The storage containers of hydrogen-compressed natural gas blend vehicle fuel shall be as specified in TSG 21 and TSG R0006 and as required in Annex C to this Standard. When the pressure of the storage containers of hydrogen-compressed natural gas blend vehicle fuel is greater than 20 MPa or the hydrogen content in blend fuel gas is greater than 20%, cylinders of type III shall be used.

## Annex C

(Normative)

### General safety requirements for gas cylinder materials for hydrogen-compressed natural gas blend vehicle fuel

#### C.1 General requirements

**C.1.1** The nominal working pressure of gas cylinders of hydrogen-compressed natural gas blend vehicle fuel in this Annex shall not be greater than 35 MPa.

**C.1.2** The steels for gas cylinders of hydrogen-compressed natural gas blend vehicle fuel shall comply with the provisions of GB/T 29729, in addition to the conditions specified here. When the pressure of storing containers of hydrogen-compressed natural gas blend vehicle fuel or the hydrogen content in blend fuel gas is greater than 20%, cylinders of type III shall be used.

**C.1.3** Attention shall be drawn to hydrogen embrittlement problems of the materials which are in contact with hydrogen; their materials and design shall ensure that the installation or equipment has not significant deformation or mechanical change functionally and that no detrimental corrosion, deformation or material deterioration will occur.

#### C.2 Materials for steel gas cylinders or steel liners

**C.2.1** Integral seamless steel pipes shall be used as the steel for cylinder body; and no welding or repair welding is allowed.

**C.2.2** The actually-measured mechanical properties of the steel for cylinder body after heat treatment: the tensile strength shall not be greater than 880 MPa; the yield ratio not greater than 0.86; and the percentage elongation after fracture ( $A_{50\text{ mm}}$ ) not less than 20%.

**C.2.3** When the actual tensile strength of the steel for cylinder body after heat treatment is greater than 880 MPa, limit the contents of sulfur and phosphorus; pass the hydrogen sulfide stress-corrosion test (the stress ring method) in accordance with relevant standards; and ensure good compatibility with hydrogen-compressed natural gas blend vehicle fuel.

#### C.3 Aluminium alloy liners of fully-wrapped gas cylinders

**C.3.1** No welding or repair welding is allowed for aluminium alloy liners.

**C.3.2** The use of the following aluminium alloys is recommended: A6061-T6, A6061-T62, A6061-T651 and A6061-T6511.

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