

**DRAFT**

**New Zealand Standard**

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**Draft Number:  
DZ 5259 A1/V5**

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**Public Comment Draft**

**NZS 5259:2004  
Gas Measurement  
Amendment 1**

| Draft | SPEX # | Date |
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**Committee: P5259 A1**

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# EXPLANATORY NOTES FOR REVIEWERS

## Status

This document is a proposed New Zealand Standard under the Standards Act 1988.

Issue as a draft in this form provides the required statutory opportunity for consideration and comment by the bodies and persons having an interest in the Standard.

## Commenting

Please read to help you send in your comments.

- (a) Comments are invited, preferably in electronic format, on the technical content, wording, and general arrangement of this draft. Please use the comment pages, provided behind this page, for your comments.
- (b) Editorial matters (that is spelling, punctuation, grammar, numbering, references, and so on) will be corrected before final publication.
- (c) Electronic comments should be sent by email to Rachel.Mahony@standards.co.nz. Please do not return marked-up drafts as comments.
- (d) When completing the comments page ensure that the number of this draft, your name and organisation (if applicable) is recorded. Please place relevant clause numbers beside each comment.
- (e) Please provide supporting reasons and suggested wording, for each comment. Where you consider that specific content is too simplistic, too complex or too detailed, provide an alternative.
- (f) If the draft is acceptable without change, an acknowledgement to this effect would be appreciated.
- (g) Normally no acknowledgement of comment is sent. All comments received by the due date will be put before the relevant drafting committee. Where appropriate, changes will be incorporated before the Standard is formally approved.

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|  | Closing date for comment<br><br><b>24/8/2009</b> | Date of your comments |
| <b>DZ 5259 A1/V5</b>   |  |                       |
| <b>Committee: P5259 A1</b>   |  |                       |
| <b>Title: NZS 5259:2004 Gas Measurement Amendment 1</b>  |  |                       |

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Insert the number of the clause, paragraph or figure. Do not preface the number with words (use 1 not clause 1). If there is no clause number, use the section heading (for example, Preface). Insert the page, paragraph, and line number as appropriate. Use a new row for each comment.

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| Clause/<br>Para/<br>Figure/<br>Table<br>no. | Page<br>no. | Recommended changes and reason<br><br><i>Exact wording should be given of changes recommended.</i> |
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New Zealand Standard

**NZS 5259:2004**

**Gas Measurement  
Amendment 1**

## Committee Representation

This draft Standard was prepared under the supervision of the P5259 A1 Committee the Standards Council established under the Standards Act 1988.

The committee consisted of representatives of the following:

| <b>Nominating Organisation</b> | <b>Committee Member</b> |
|--------------------------------|-------------------------|
|--------------------------------|-------------------------|

|                 |             |
|-----------------|-------------|
| Actaris Pty Ltd | Ross Parker |
|-----------------|-------------|

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| Contact Energy Ltd | Martyn Hammond |
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| Energy Safety, Ministry of Economic Development | Paul Stannard |
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|--------------------------------|--------------|
| Gas Association of New Zealand | Tony Hammond |
|--------------------------------|--------------|

|                      |            |
|----------------------|------------|
| Gas Industry Company | Ian Wilson |
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|                |                 |
|----------------|-----------------|
| Genesis Energy | David Whitfield |
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|        |               |
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| iMeter | Peter Baldwin |
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| Landis and Gyr | Richard Buisson |
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| New Zealand Council of Elders | Patricia Cuncliffe |
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| New Zealand Institution of Gas Engineers | Wayne Armishaw |
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| Powerco Ltd | Andrew Stevenson |
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| Vector Ltd | Len Rodenburg |
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## Acknowledgement

Standards New Zealand gratefully acknowledges the contribution of time and expertise from all those involved in developing this Standard.

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# NZS 5259:2004

## GAS MEASUREMENT

### AMENDMENT NO. 1

July 2009

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#### REVISED TEXT

#### EXPLANATORY NOTE

In order to cite NZS 5259:2004 in the revision of the Gas Regulations 1993, Table 3 of NZS 5259 has been amended to conform to the accuracy of conversion requirements given in the current regulation 9. Some changes have been made to the energy conversion section to clarify accuracy requirements, and the competency requirements have been updated. A small number of technical corrections have also been included in this amendment. Two new appendices have been introduced: a new Appendix B which provides guidance for low pressure accuracy of turbine meters calibrated at high pressure and Appendix N to provide guidance for time-stamped data.

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#### APPROVAL

Amendment No. 1 was approved on XXX by the Standards Council to be an amendment to NZS 5259:2004.

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#### REFERENCED DOCUMENTS (page 4)

##### NEW ZEALAND STANDARDS

###### Delete

NZS 10012.1:---- Quality assurance requirements for measuring equipment  
Part 1:1993 Metrological confirmation system for measuring equipment

###### and substitute

AS/NZS ISO 10012:2004 Measurement management systems – Requirements for  
measurement processes and measuring equipment

###### Add

AS/NZS 4645:---- Gas distribution networks  
Part 1:2008 Network management  
Part 2:2008 Steel pipe systems  
Part 3:2008 Plastics pipe systems

##### INTERNATIONAL STANDARDS

###### Delete

IEC CISPR 11:1997 Industrial, scientific and medical (ISM) radio-frequency equipment – Electromagnetic  
disturbance characteristics – Limits and methods of measurement

###### and substitute

IEC CISPR 11:2004 Industrial, scientific and medical (ISM) radio-frequency equipment –  
Electromagnetic disturbance characteristics – Limits and methods of  
measurement

###### Delete

ISO 12213: ---- Natural gas – Calculation of compression factor  
Part 1: 1997 Introduction and guidelines  
Part 2: 1997 Calculation using molar-composition analysis

Part 3: 1997 Calculation using physical properties

and **substitute**

ISO 12213: ---- Natural gas – Calculation of compression factor  
 Part 1: 2006 Introduction and guidelines  
 Part 2: 2006 Calculation using molar-composition analysis  
 Part 3: 2006 Calculation using physical properties

CEN (page 5)

**Delete**

EN 334:1999 Gas pressure regulators for inlet pressures up to 100 bar

and **substitute**

EN 334:2005 Gas pressure regulators for inlet pressures up to 100 bar

**Delete**

EN 1359:1998 Gas meters – Diaphragm gas meters

and **substitute**

EN 1359:1999 Gas meters – Diaphragm gas meters

**Add**

EN 12405:---- Gas meters – Conversion devices  
 Part 1:2005 Volume conversion

OTHER PUBLICATIONS (page 5)

**Delete**

AGA NX19 Manual for the determination of super-compressibility factors for natural gas, 1962.  
 American Gas Association

**Add**

AGA 7 Measurement of Natural Gas by Turbine Meter, 2006. American Gas Association

**Add**

LMB-EG-08 Specifications for approval of type of gas meters and auxiliary devices, 1987.  
 Measurement Canada

(Amendment No.1, XXX 2009)

**FOREWORD** (page 6)

**Add** a new paragraph after paragraph 8:

'In order to cite NZS 5259:2004 in the revision of the Gas Regulations 1993, Table 3 of NZS 5259 has been amended to conform to the accuracy of conversion requirements given in the current regulation 9. Some changes have been made to the energy conversion section to clarify accuracy requirements, and the competency requirements have been updated. A small number of technical corrections have also been included in this amendment. Two new appendices have been introduced: a new Appendix B which provides guidance for low pressure accuracy of turbine meters calibrated at high pressure and Appendix N to provide guidance for time-stamped data.'

(Amendment No.1, XXX 2009)

**1.1.3 Definitions** (page 8)

For 'AS LOW AS REASONABLY PRACTICABLE (ALARP)' **add** after 'NZS 5258': 'and AS/NZS 4645.'

(Amendment No.1, XXX 2009)



**1.2 REQUIREMENTS OF THE GAS MEASUREMENT SYSTEM** (page 13)

Under the heading **add**:

'NOTE – In this section data and measured quantities include time-based measurements as appropriate.'

(Amendment No.1, XXX 2009)

**Delete** Table 3 including notes (page 16) and **substitute**:

**Table 3 – Maximum permissible errors for conversion (% of conversion)**

| Conversion type   | MPEs                                |   |                                     |   |
|---|-------------------------------------|---|-------------------------------------|---|
|   | Initial                             |   | In-service                          |   |
|   | Reference conditions <sup>(1)</sup> | Rated operating conditions <sup>(2)</sup> | Reference conditions <sup>(1)</sup> | Rated operating conditions <sup>(2)</sup> |
| Temperature conversion applied by electronic converter  | ± 0.5 %                             | ± 0.7 %                                   | ± 0.7 %                             | ± 1.2 %                                   |
| Temperature and pressure conversion applied by electronic converter   | ± 0.5 %                             | ± 1.0 %                                   | ± 1.0 %                             | ± 1.3 %                                   |
| Temperature and pressure and ideal gas law deviations conversion applied by electronic converter  | ± 0.5 %                             | ± 1.0 %                                   | ± 1.2 %                             | ± 1.5 %                                   |
| Temperature conversion – other  | ± 0.7 %                             | ± 0.9 %                                   | ± 0.9 %                             | ± 1.1 %                                   |
| Pressure conversion – other   | ± 0.7 %                             | ± 0.9 %                                   | ± 0.9 %                             | ± 1.1 %                                   |
| Altitude conversion – other<br>Metering pressure < 100kPa   | ± 1.0 %                             | N/A                                       | ± 1.0 %                             | N/A                                       |
| Altitude conversion – other<br>Metering pressure > 100kPa   | ± 0.5 %                             | N/A                                       | ± 0.5 %                             | N/A                                       |
| Compressibility conversion – other than as above<br>Metering pressure < 500kPa  | ± 0.2 %                             | N/A                                       | ± 0.2 %                             | N/A                                       |
| Compressibility conversion – other than as above<br>Metering pressure > 500kPa  | ± 0.25 %                            | N/A                                       | ± 0.25 %                            | N/A                                       |
| <p>NOTE –</p> <p>(1) Reference conditions: Condition of use prescribed for testing the performance of a measuring device for inter-comparison of results of measurements.</p> <p>(2) Rated operating conditions: Values for the measurand (pressure, temperature, compressibility as applicable) and influence variables (ambient temperature, humidity, battery voltage etc.) making up the normal operating conditions of the device.</p> <p>For any as-found test accuracy of conversion test, the MPE for in-service rated operating conditions is applicable when testing conversion devices over a range of pressures and temperatures per 2.3.6.6, where this range of pressures and temperatures covers the normal operating conditions of the device when it was used for conversion purposes.</p> <p>For any acceptance test accuracy of conversion test, the MPE for initial rated operating conditions is applicable when testing conversion devices over a range of pressures and temperatures per 2.3.6.6. This range of pressures and temperatures is representative of the range referred to in 2.3.9.2 (g) and is representative of the range of pressures and temperatures over which the device is considered to meet the MPEs and can be used for conversion purposes. Consideration should also be given to the maximum rated operating range specified by the manufacturer.</p> |                                     |   |                                     |   |

- (3) For temperature and pressure conversion MPEs are relative to absolute temperature and pressure.
- (4) The estimated uncertainty of measurement of the test facility need not be applied to the MPEs.
- (5) When a conversion device is used to convert the measured volume to the volume at standard conditions the combined MPEs shall not exceed  $\pm 1.0\%$  prior to being placed in service or  $\pm 1.5\%$  at any time after being placed in service.
- (6) When factors are used to convert the measured volume to the volume at standard conditions the combined MPEs shall not exceed  $\pm 1.5\%$ .

(Amendment No.1, XXX 2009)

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## 2.1 SCOPE AND APPLICATION (page 19)

**Delete** the last sentence and **substitute** 'It is limited to volumetric measurement eg rotary displacement, turbine or diaphragm meters.'

(Amendment No.1, XXX 2009)

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### Table 4 – Selection of equipment (page 19)

Under 'Suitable Standard' **add** 'AGA 7' next to 'Turbine meter'.

**Add** a new row: under 'GMS component type', **add** 'Conversion devices', under 'Suitable Standard' **add** 'EN 12405' and 'LMB-EG-08'

**Delete** note (2) and **substitute**:

'(2) GMS components may be considered suitable if they comply with the Standards consistent with the OIML recommendations.'

(Amendment No.1, XXX 2009)

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### 2.1.5 General safety (page 20)

**Delete** last sentence and **substitute**:

'Systems shall be developed to minimise operating risks as specified in NZS 5258, NZS 5261 and AS/NZS 4645.'

(Amendment No.1, XXX 2009)

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### 2.2.2 GMS position and orientation (page 20)

**Delete** current note and **substitute**

NOTE – The installation and the network are covered by the relevant distribution and installation Standards NZS 5261, NZS 5258 or AS/NZS 4645.'

(Amendment No.1, XXX 2009)

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#### 2.2.6.1 Selection of suitable regulators (page 22)

**Delete** last sentence and **substitute** 'The requirements for the over-pressure protection device are specified in NZS 5258, NZS 5261 and AS/NZS 4645.'

(Amendment No.1, XXX 2009)

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### 2.2.9 Flow restriction (page 23)

**Delete** 'Guidance is provided in Appendix B' and **substitute** 'Guidance is provided in AGA 7'

(Amendment No.1, XXX 2009)

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**2.2.10 Protection of electronic components** (page 23)

**Delete** current note and **substitute**

'NOTE – NZS 5258, NZS 5261 and AS/NZS 4645 specifically require electrical isolation.'

(Amendment No.1, XXX 2009)

**2.3.3 Meter testing procedure** (page 24)

Under first sentence **add**:

'Guidance for turbine meters that have been calibrated at high pressure is provided in Appendix B.'

(Amendment No.1, XXX 2009)

**2.3.6.4 Accuracy of registration test** (page 26)

In the fourth paragraph, **delete** '0.5%' and **substitute** '1.0%'

On page 27, **add** '(1)' to the existing note, **add** a new note below:

'(2) It is recommended that where a turbine meter operates at pressures above 5 bar, consideration should be given to calibration at elevated pressures.'

(Amendment No.1, XXX 2009)

**2.4.3 GMS location and protection** (page 30)

After 'NZS 5258' **add** 'and AS/NZS 4645'

(Amendment No.1, XXX 2009)

**Table 7 – Acceptance testing intervals** (page 31)

**Add** a new row: under 'GMS component type' **add** 'Ultrasonic meters', under 'Maximum interval between acceptance tests' **add** '5 years'.

(Amendment No.1, XXX 2009)

**2.7.4.2 Temperature factor  $F_T$**  (page 37)

After the third paragraph of the existing note, **add** a new paragraph:

'Where possible temperature factors should be determined based on monthly ground temperature records for periods consistent with the billing periods.'

(Amendment No.1, XXX 2009)

**2.7.4.4 Altitude factor  $F_A$**  (page 38)

**Add** a new note at the end of the clause:

'NOTE – To minimise uncertainty due to altitude factor the altitude used should be determined to a level of 10 m where practicable.'

(Amendment No.1, XXX 2009)

**2.7.4.5 Compressibility factor  $F_Z$**  (page 40)

**Delete** '(b) AGA NX19;'

**Delete** ' $F_Z = Z/Z_b$ ' and **substitute** ' $F_Z = Z_b/Z$ '

(Amendment No.1, XXX 2009)

**2.7.4.6 Calorific value H** (page 40)

**Delete** first paragraph and **substitute**:

'The calorific value of the gas shall be determined, at the point of measurement of the CV, using equipment or methods which have a measurement uncertainty of not more than  $\pm 0.5\%$ .'

(Amendment No.1, XXX 2009)

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**2.7.5 Documentation** (page 40)

Under first sentence **add**:

'Guidance on the accuracy requirements for the time parameter of time-stamped data is given in Appendix N.'

(Amendment No.1, XXX 2009)

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**2.8 COMPETENCY OF PERSONS WORKING ON A GMS** (page 40)

**Delete** and **substitute**

'All persons involved in activities within the selection, design, installation and maintenance of a GMS and components shall be competent to carry out their duties and responsibilities.'

Competency and currency thereof to perform GMS and component installation and maintenance should be measured by compliance with the requirements of the New Zealand Gas Industry Certificate of Competency category appropriate for the activity.

Procedures for selection and design of GMSs and components shall be documented, and all persons involved in GMS selection and design shall be appropriately qualified.'

(Amendment No.1, XXX 2009)

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**APPENDIX B** (page 2 and page 43)

**Delete** Appendix B 'GUIDANCE FOR FLOW RESTRICTION'  
and **substitute** new Appendix B:

**ESTABLISHING THE LOW-PRESSURE ACCURACY CURVE FOR TURBINE METERS CALIBRATED AT HIGH PRESSURE**

(Informative)

**B 1 Scope****B1.1**

This appendix sets out the procedure to establish a low-pressure accuracy curve for turbine meters that have been calibrated at a high pressure, normally 0.5 to 2 times the anticipated working pressure.

**B1.2**

The meter should be subjected to the standard low-pressure acceptance test for accuracy at the facility that will be responsible for monitoring the accuracy of the meter during its life. This curve can be labelled the meters 'LP Footprint Accuracy Curve'. A record should be kept of this curve.

**B1.3**

If during subsequent low pressure testing the resulting curve approximates the LP Footprint Accuracy Curve this indicates that a high pressure test curve carried out at that time would also approximate the original high pressure that came with the meters.

Confidence for this assertion emanates from the knowledge that there is substantially more energy available to drive the meter at high pressure.

(Amendment No.1, XXX 2009)

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**Table L1 – GMS component compliance periods** (page 66)

Add new row to table:

| GMS component category | Compliance period  |
|------------------------|--|
| Ultrasonic meters      | The committee seeks public comment on the component category(s) and associated compliance period(s) for ultrasonic meters. |

(Amendment No.1, XXX 2009)

## APPENDIX N (page 3 and page 70)

**Delete** Appendix N 'COMPETENCY REQUIREMENTS OF PERSONS WORKING ON A GMS' and **substitute** new Appendix N:

### GUIDANCE ON THE ACCURACY REQUIREMENTS FOR THE TIME PARAMETER OF TIME-STAMPED DATA

(Informative)

#### N1 Rationale

The accuracy of the time parameter of time-stamped data is relevant in the following situations:

- (a) Where a gas property that is used in the determination of energy quantity is variable and the gas property data is obtained in a time-stamped format. For example – where time-stamped calorific value data is applied to time-stamped volume data;
- (b) Where the gas energy measured in any particular time period is of contractual significance. For example – where there is a financial penalty for exceeding a pre-determined maximum quantity of gas in any one hour;
- (c) Where time-stamped data from a number of related gas measurement systems is analysed. For example – reconciliation of gas quantities on discrete gas networks.

The attribution of the time parameter of time-stamped data needs to be understood by those parties using the data.

- (a) The time stamp can be applied at the beginning or end of the time period over which the data is gathered.
- (b) The data which is time-stamped can be a spot reading at the time of the time stamp, or it can be an average over the time period over which the data is gathered.

#### N2 Requirement

- (a) For time of use applications the reference shall be to NZ Standard Time (NZST).
- (b) Systems used shall be +/- 300 seconds against NZST.

#### N3 Methodology

- (a) A time parameter shall be determined for the time recording mechanism within the individual gas measurement device or associated equipment, and a documented maintenance regime shall be followed to ensure that the time recording mechanism stays within this limit.
- (b) The equipment and methodology used to transfer the time-stamped data from the individual gas measurement device to the billing computer and the reconciliation agent shall be examined for sources of time error. A time parameter shall be established for each source of time error and documented procedures shall be followed to ensure that the time error stays within this limit.

- (c) Each company within the time-stamped data supply chain shall supply information to each other company with respect to the time parameter applied at points in the supply chain.
- (d) The user of the time-stamped data shall be responsible for ensuring that the error of time parameter of the time stamped data complies with the limit set out in N2 (a) at the point that this data is used.

(Amendment No.1, XXX 2009)

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