

# ISO 15112:2007-12 (E)

## Natural gas - Energy determination

---

<b>Contents</b>		<b>Page</b>
Foreword .....		v
Introduction .....		vi
1	Scope .....	1
2	Normative references .....	1
3	Terms and definitions .....	1
4	Symbols and units .....	6
5	General principles .....	6
6	Gas measurement .....	8
6.1	General .....	8
6.2	Volume measurement .....	9
6.3	Calorific value measurement .....	9
6.4	Volume conversion .....	10
6.5	Calibration .....	11
6.6	Data storage and transmission .....	11
7	Energy determination .....	12
7.1	Interfaces .....	12
7.2	Methods of energy determination .....	14
8	Strategy and procedures .....	16
8.1	General .....	16
8.2	Strategies for energy determination .....	18
8.3	Plausibility checks .....	22
9	Assignment methods .....	23
9.1	Fixed assignment .....	23
9.2	Variable assignment .....	25
9.3	Determination of the representative calorific value .....	26
10	Calculation of energy quantities .....	28
10.1	General equations for energy .....	28
10.2	Calculation of averaged values -- Calculation from average calorific values and cumulative volumes .....	29
10.3	Volume and volume-to-mass conversions .....	30
10.4	Energy determination on the basis of declared calorific values .....	30
11	Accuracy on calculated energy .....	31
11.1	Accuracy .....	31
11.2	Calculation of uncertainty .....	31
11.3	Bias .....	32
12	Quality control and quality assurance .....	33
12.1	General .....	33
12.2	Check of the course of the measuring data .....	33
12.3	Traceability .....	34

<b>12.4</b>	<b>Substitute values .....</b>	<b>34</b>
	<b>Annex A (informative) Main instruments and energy-determination techniques .....</b>	<b>36</b>
	<b>Annex B (informative) Different possible patterns in the change of the calorific value .....</b>	<b>40</b>
	<b>Annex C (informative) Volume conversion and volume-to-mass conversion .....</b>	<b>43</b>
	<b>Annex D (informative) Incremental energy determination .....</b>	<b>44</b>
	<b>Annex E (informative) Practical examples for volume conversion and energy quantity calculation ..</b>	<b>46</b>
	<b>Annex F (informative) Practical examples for averaging the calorific value due to different delivery situations .....</b>	<b>50</b>
	<b>Annex G (informative) Ways of determining substitute values .....</b>	<b>55</b>
	<b>Annex H (informative) Plausibility check graphical example .....</b>	<b>57</b>
	<b>Annex I (informative) Uncorrected data, bias correction and final result graphical example .....</b>	<b>58</b>
	<b>Annex J (informative) Single-reservoir calorific value determination .....</b>	<b>60</b>
	<b>Bibliography .....</b>	<b>61</b>