

Fiscal Gas Metering

presented by Mr. Rune Øverland, Trainor Elsikkerhet AS

Fiscal Gas Metering - Internet Explorer

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Fiscal Gas Metering

System considerations

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**NORWEGIAN PETROLEUM
DIRECTORATE**

System consideration: Sales gas station

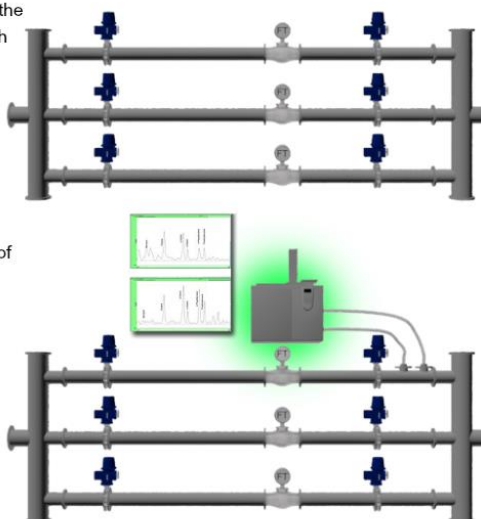
The uncertainty limit for sales metering stations is 1.0% of mass at 95% confidence level.

The number of parallel meter runs shall be such that the maximum flow of hydrocarbons can be measured with one meter run out of service.

This is required to avoid reduction of production capacity because of failure or maintenance.

It is also required to install a gas chromatograph.

The gas composition may be used for determination of density.



The diagram illustrates a sales gas station metering system. It features three parallel horizontal meter runs, each equipped with a valve and a meter. A gas chromatograph (GC) is connected to the system, with its output displayed on a screen showing two chromatograms. The GC is connected to the middle meter run via a line and a valve.

What is it?

- It's a computer based training course
- Accessible from www.nfoggm.no
- Free of charge
- Offered for two knowledge levels

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Fiscal Gas Metering

Flow meters

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USM: Transducers




The pulse detection method shall ensure reliable time measurement.

The signal-to-noise ratio shall be indicated for each transducer or acoustic path.

Transducers may be damaged by rapid depressurization.
Recommendation: depressurization less than 0.5 megaPascal per minute.

Special transducers can be required for extreme or difficult application such as:

- high or low temperature or pressure
- high gas velocity
- valves generating noise
- rapid or cyclic operating changes



Who were involved in the development of the course?

Client: **NFOGM**
NORSK FORENING FOR
OLJE OG GASSMÅLING

Supported by:



Contractor: **TRAINOR**
Einar Thorén/Rune Øverland

Sub Contractors: **ATLANTIA**
Competence gives excellence
Pål Verner Viken



Kjell-Eivind Frøysa



Simon Fellows

Reference Group: Dag Hendrik Flølo, Per Lunde and Steinar Vervik



Who are target personnel?

Level 1

- Personnel operating the measurement stations
- Administrative personnel

Level 2

- Engineers (design, verification, validating)
- Maintenance personnel (calibration, maintenance, quality checks)

What are the course objectives?

Level 1 (2 hours)

- Introduction to influencing parameters
- Measurement regulation
- Main components of measurement stations

Level 2 (4 hours)

- In addition to level 1:
- Influencing parameters
- Design of measurement stations
- NORSOK I-106, ISO standards, AGA reports

Course content

M0: Course introduction	M7: Secondary measurements
M1: Definitions	M8: Sampling systems
M2: Regulation and standards	M9: Gas chromatographs
M3: Gas dynamics, flow profiles	M10: Fiscal gas calculations
M4: System considerations	M11: Gas computer systems
M5: Flow meters	M12: NFOGM Uncertainty tool
M6: Calibration of flow meters	M13: Final assessment

How to take the course.

You are free to select either

Free navigation:

- No log on necessary
- You can navigate freely in the course.
- No final assessment

Structured training course:

- Log on necessary
- You follow a structured path of learning and exercise steps
- You can exit at any time to continue later on
- Final assessment and course certificate

Helpful navigation tools.

- Navigation Button:
selects a **Module**

- Menu Button:
selects a **Step** within
a module

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8. Sampling systems
9. Gas chromatographs, other online analysis instruments
10. Fiscal gas calculations
11. Fiscal gas computer systems

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Navigation

Principle of operation: an example (part 2)

The column valve position now changes, thus bringing the gas in column number one to the detector, and also mirroring its position.

The heaviest molecules will enter the detector first and be the first peak in the chromatogram.

While this is happening, the carrier gas has dragged the lightest group of molecules from column two into column three.

The middle-sized molecules in column two also travel forward, but still remains in column two.

A bypass valve is opened to bring the gases inside column two towards the detector. The carrier gas drags the middle-sized molecules C3, C4 and C5 through the detector, group by group.

Finally, the bypass valve is closed. Carrier gas then drags the last molecules in column 3 through the detector.

The diagram illustrates the internal components of a gas chromatograph: a sample gas inlet with a shut-off valve, a sample gas valve, a re-flushing valve, two columns (Column 2 and Column 3), a double column valve, and a detector. Helium carrier gas is shown entering from the bottom. A chromatogram at the bottom shows peaks labeled C6+, C8, C7, C6, C3, C4, C5, N2, C1, CO2, and C2. Arrows indicate the flow of gas through the system.

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8. Sampling systems
9. Gas chromatographs, other online analysis instruments
10. Fiscal gas calculations
11. Fiscal gas computer systems

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Navigation

Principle of operation: an example

The column valve position now changes, thus bringing the gas in column number one to the detector, and also mirroring its position.

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Finally, the bypass valve is closed. Carrier gas then drags the last molecules in column 3 through the detector.

The diagram is identical to the one in the left panel, showing the gas flow and chromatogram peaks.

Introduction
Gas chromatograph: General
Gas chromatograph: General (continued)
Sample: Velocity and retention time
Sample: Eddy diffusion
Separation of components: An example (part 1)
Separation of components: An example (part 2)
Principle of operation: an example (part 1)
Principle of operation: an example (part 2)
Chromatograms (part 1)
Chromatograms (part 2)
Calibration
GC: Normalization
Normalization: Example
Exercise 1
Exercise 2
Main components GC: Sample handling system
Main components GC: Oven
Main components GC: Columns
Main components GC: Carrier gas
Main components GC: Injection valve (sample loop)
Main components GC: Detector (general)
Main components GC: Computer unit
Main components GC: Calibration gas
Exercise 3
Exercise 4
Gas chromatograph: uncertainty calculation/general

How to make the most of it.

- Combine the training course with documentation

www.npd.no

www.nfoggm.no

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6. Calibration of flow meters
7. Secondary measurements (temperature/pressure/density)
8. Sampling systems
9. Gas chromatographs, other online analysis instruments

Principle of operation: an example (part 1)

Gas from pipeline is routed through the sample handling system and flows into the sampling valve. The sample loop is constantly flushed with representative sample gas.

Carrier gas is constantly flushing the columns and detector.

The inlet valve is then temporary closed.

Be aware that varying back pressure, that is atmospheric pressure, may impair sample amount repeatability. This is due to the fact that the number of molecules in a certain volume of gas is dependent on pressure and temperature.

Carrier gas is now connected to the sample loop. Carrier gas is driving the gas in the sample loop into the first column.

After some seconds, the lighter molecules have been dragged by the carrier gas into column two, while the heavier molecules still remain in column one.

More than one column is used because it is normally impossible to separate all compounds in one single column. Introducing a change in flow direction can speed up the total analysis time, because heavier compounds take longer time to move through the column.

The diagram illustrates a gas chromatography system. Sample gas enters from the top left through a 'Sample gas valve' and a 'Shut-off valve'. It flows through 'Column 1', then 'Column 2', and finally 'Column 3'. A 'Re-flushing valve' is located between Column 1 and Column 2. A 'Helium carrier gas' inlet is shown at the bottom left, connected to the system. The gas flows through the columns and is detected by 'Detectors' and 'Ventilation' at the end. A 'Double column valve' is located between Column 2 and Column 3.

http://www.standard.no

NORSOK STANDARD

NORSOK I-106

Fiscal metering systems for hydrocarbon liquid and gas

ISO 17089-1

ISO

Measurement of fluid flow in closed conduits — Ultrasonic meters for gas — Part 1: Meters for custody transfer and allocation measurement

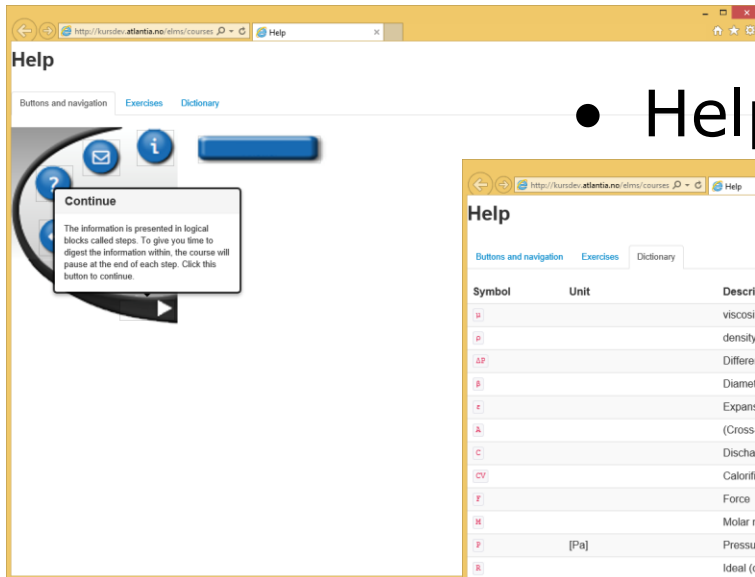
Published by Standard Norge AS for Norsk Standard, 2011-10-30

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Still need help?

- Help: Buttons and navigation

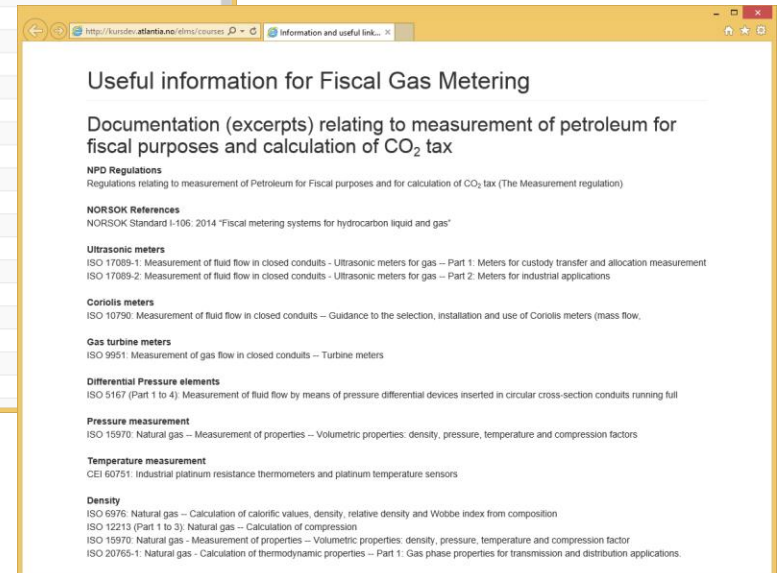


- Help: Exercise

The screenshot shows the 'Help' page with a table of physical properties. The table has three columns: Symbol, Unit, and Description. The table lists various properties such as viscosity, density, differential pressure, expansion factor, discharge coefficient, calorific value, force, molar mass, pressure, ideal gas constant, Reynolds number, temperature, volume, Wobbe Index, compressibility factor, and acceleration.

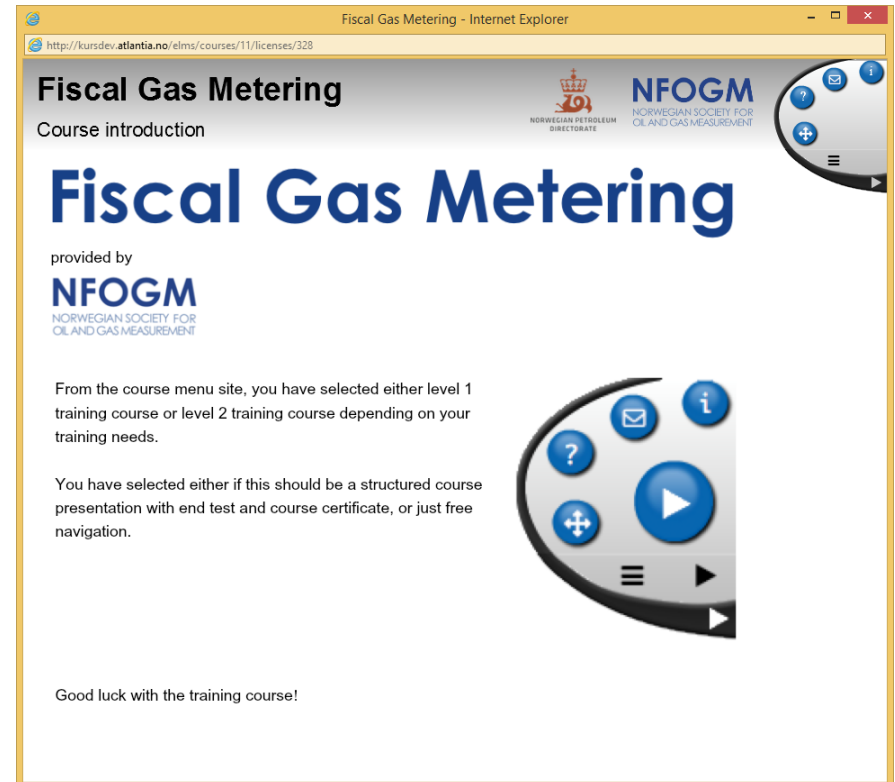
Symbol	Unit	Description
μ		viscosity (small mu)
ρ		density (small rho)
ΔP		Differential pressure ($P_1 - P_2$)
β		Diameter ratio factor
E		Expansion factor
A		(Cross-sectional) Area
C		Discharge coefficient
CV		Calorific Value
F		Force
M		Molar mass (m/n)
P	[Pa]	Pressure
R		Ideal (or universal) gas constant
Re		Reynold's number
T	[K]	Temperature
V	[m ³]	Volume
W_i		Wobbe Index
Z		Compressibility factor
a	[m/s ²]	acceleration

- Info: Documentation



Module 0: Course introduction

- Navigation technics
- Course objectives
- Working practice
- Documentation
- Terminology



Module 1: Definitions

- Definition of terminologies
- Examples:
 - Temperature, pressure, density
 - Ideal and real gases
 - Energy flow rates
 - CO2 emission factor
 - Repeatability, reproducibility, random error, uncertainty

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Fiscal Gas Metering

Definitions

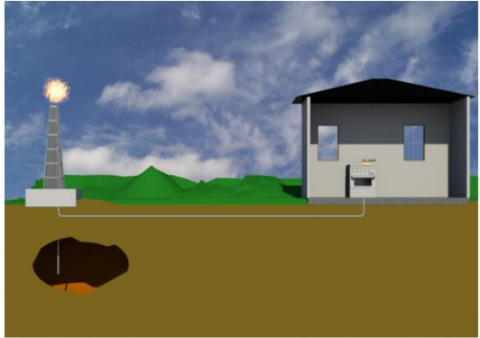
Energy flow rate

q_e Energy flow rate

$$q_e = q_{v0} \cdot H_s$$

Calorific value (CV):
Measure of heating potential of the gas, and depends on the composition of the gas. It refers to the amount of energy released when a known volume of gas is completely combusted under specified conditions.

q_e is expressed e.g. as [MJ/h]



The illustration shows an oil and gas facility. On the left, there is a flare stack with a flame at the top. To the right is a large industrial building with a dark roof and several windows. In the foreground, there is a brown, irregular shape representing a wellhead or a similar underground structure. The background features green hills under a blue sky with white clouds.

Module 2: Regulations and Standards

- Norwegian Petroleum Directorate:
The Measurement regulations
 - Chapter 1 to 8
 - Remarks to Chapter 1 to 8
- CO₂-tax act
- NORSOK I-106 (Nov 2014)

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Fiscal Gas Metering

Regulations and standards

**The Measurement Regulations, chapter 3:
General requirements relating to measuring
and the measurement system**

The measurement system shall be designed so that systematic measurement errors are avoided or compensated for.

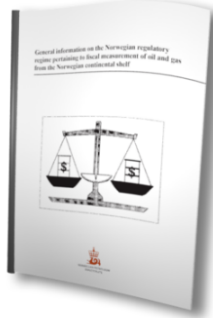
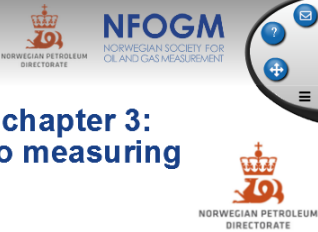
Uncertainty requirements (95% confidence level):
Sales and allocation of gas: 1.0% of mass
Fuel gas metering: 1.5% of standard volume
Flare gas metering: 5.0% of standard volume

The NPD provide uncertainty requirements also for the measurement system's individual components.

Determination of energy content:
Gas composition from continuous flow proportional gas chromatography or from automatic flow proportional sampling shall be used

Bypassing of the metering system is not permitted.

Specify measurement uncertainty requirements for different types of fiscal measurement and carbon dioxide tax calculations.



Module 3: Gas dynamics, Flow profiles

- Compressible flows
- Flow velocity profiles
- Gas laws
- Standard volume flow rate
- Mass flow rate
- Calorific value
- Energy flow rate

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Fiscal Gas Metering

Gas dynamics, flow profiles

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Calorific value

The superior calorific value is the amount of heat released by complete combustion in air of a specific quantity of gas.


Calorific value - H_s

Methane (25 °C):

Mass	55.3 [MJ/kg]
Molar	890 [kJ/mole]
Std. Volume	37.7 [MJ/Sm ³]

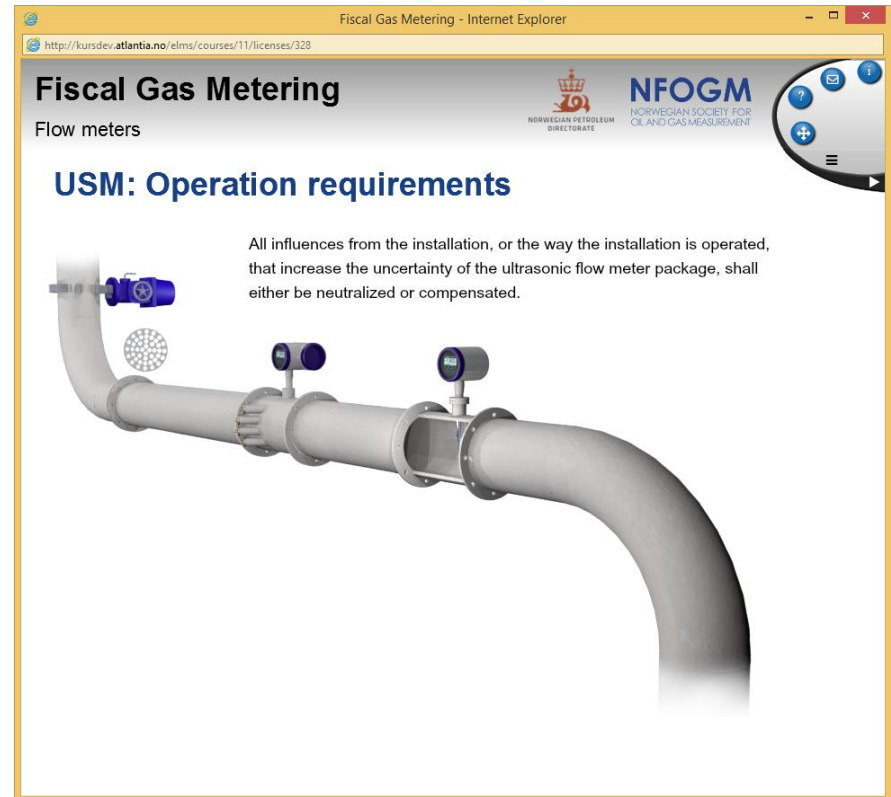
The quantity of gas is specified either on mass basis, molar basis, or volumetric basis, at a reference pressure and temperature.

The ISO 6976 standard describes how the superior calorific value is calculated from the gas composition.



Module 5: Flow meters

- Ultrasonic Flow meter, turbine flow meter, Coriolis mass meter, Differential pressure elements (Orifice, Venturi and Cone)
- Installation, Principle of measurement, influencing parameters, NPD requirements, standards and guidelines



Module 6: Calibration of flow meters

- Ultrasonic Flow meter (ISO 17089)
- Coriolis mass meter (ISO 10790)
- Differential pressure elements (ISO 5167)
- Laboratory flow calibration, calibration certificate, from Lab to Field, recalibration, type testing


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Fiscal Gas Metering

Calibration of flow meters

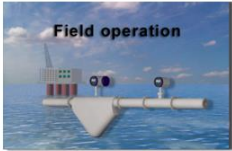
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From laboratory to field: Change in flow conditions



Flow calibration

p, T, flow profile



Field operation

p, T, flow profile

The ISO 17089 also points out that a calibration curve without the guarantee that the meter behaves the same way in the field as in the calibration laboratory is meaningless.

In order to ensure that the quality of the calibration curve is transferable to the field, type testing is introduced.

Only with a type test will the calibration curve be transferable from laboratory to field.


When a meter is not type tested, the user has no guarantee of the final performance in the field. When no documentation from type test is present, every individual USM requires compliance testing in accordance with the ISO 17089.

Difference in pressure, temperature and flow profile between calibration conditions and operational conditions may introduce additional uncertainty or significant systematic errors.

Changes in temperatures or pressures will alter the physical dimensions of the meter. If not corrected for, these changes may introduce significant systematic flow measurement error.

For ultrasonic meters the ISO 17089 contains guidelines on how to handle altered temperature and pressure conditions between calibration and operation.

If not corrected for, a systematic error up to 0.2 to 0.3 % might occur.



Module 7: Secondary measurements (temperature, pressure, density)

- Temperature: Pt100 element
- Static and differential pressure: Capacitive sensor element
- Densitometer: vibrating element
- Principle of measurement, requirements, installation, calibration

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Fiscal Gas Metering

Secondary measurements (temperature/pressure/density)

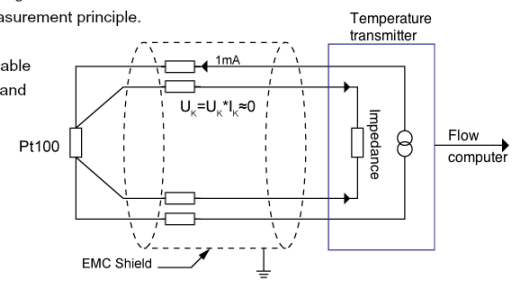
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Temperature: Sensor wiring

Any possible asymmetries in the connecting cable's lead resistances are compensated by the measurement principle.

The maximum length of the connecting cable depends on the conductor cross section and on the compensation options of the electronic evaluation.


• Applications
• Calibration technology
• Tolerance Class A or AA
• Connecting cables up to 1,000 m



EMC: ElectroMagnetic Compatibility

Because of the low signal levels, it is important to keep the cables away from electric cables, motors, switchgear and other devices that may emit electrical noise.

Using screened cable, with the EMC Shield screen grounded at one end, may help to reduce interference.



Module 8: Sampling systems

- Requirements
- Principles of sampling methods
 - Spot sampling
 - Incremental sampling
 - Direct sampling
- Sample frequency
- Isothermal expansion

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Sampling systems

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Principles of sampling methods

Sample handling systems:

The diagram shows three sampling methods with their respective equipment and applications:

- Spot sampling:** Represented by a vertical gas cylinder. A blue arrow points down to the text: "mostly used on fuel gas systems, and test separators".
- Incremental sampling:** Represented by a computer monitor displaying a chromatogram, a keyboard, and a gas cylinder connected to the monitor by a blue line. A blue arrow points down to the text: "normally used for sales gas measurement utilizing online gas chromatograph".
- Direct sampling:** Represented by a large industrial gas meter. A blue arrow points down to the text: "normally used for sales gas measurement utilizing online gas chromatograph".

The objective of any sampling system is to obtain a representative gas mixture

Module 9: Gas chromatograph

- Requirements
- Principles of separation
 - Retention time, eddy diffusion
- Main components
 - Carrier gas, Injection valve, Columns, detectors,
- Chromatogram
- Calibration
- Combines uncertainty
 - Repeatability, linearity, uncertainty calibration gas

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Fiscal Gas Metering

Gas chromatographs, other online analysis instruments

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Principle of operation: an example (part 2)

The column valve position now changes, thus bringing the gas in column number one to the detector, and also mirroring its position.

The heaviest molecules will enter the detector first and be the first peak in the chromatogram.

While this is happening, the carrier gas has dragged the lightest group of molecules from column two into column three.

The middle-sized molecules in column two also travel forward, but still remains in column two.

A bypass valve is opened to bring the gases inside column two towards the detector.

The carrier gas drags the middle-sized molecules C3, C4 and C5 through the detector, group by group.

Finally, the bypass valve is closed. Carrier gas then drags the last molecules in column 3 through the detector.

The diagram illustrates the internal components and flow of a gas chromatograph. It includes a sample gas inlet with a shut-off valve, a sample gas valve, a re-flushing valve, and a helium carrier gas inlet. The gas flows through Column 1, then Column 2, and finally Column 3. A double column valve is positioned between Column 2 and Column 3. The flow continues to the detectors and then to ventilation. A chromatogram is shown at the bottom right, with peaks labeled C6+, C8, C7, C6, C3, C4, C5, N2, C1, CO2, and C2. The peaks are arranged in a sequence that corresponds to the order of elution from the columns.

Module 10: Fiscal gas calculations

- Gas parameters
 - Relevant standards, compressibility factor, density, calorific value, CO₂ emission factor
- Volume based flow meters
- Mass based flow meters
- Differential pressure based flow meters
- Accumulated values
- CO₂ reports

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Fiscal gas calculations

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Volume based flow meters: Energy flow rate

$$q_e = q_m \cdot \hat{H}_s$$
$$q_e = q_{v0} \cdot \tilde{H}_s$$

where:

q_e is energy flow rate [MJ/h]
 q_m is the mass flow rate [kg/h]
 \hat{H}_s is the superior calorific value per unit mass [MJ/kg]
 \tilde{H}_s is the superior calorific value per unit volume [MJ/Sm³]
 q_{v0} is the standard volumetric flow rate [Sm³/h]

If the same gas composition is used in all calculations from volumetric flow rate at line conditions to mass flow rate, standard volumetric flow rate, and also for calculation of the calorific values, the two ways of finding the energy flow rate will give the same result.

If, however, the mass flow rate is established from a density measured by a densitometer, the energy flow rate will not necessarily be the same in the two ways of obtaining it.

Module 11: Fiscal gas computer systems

- The Measurements regulation
- Flow Computer design
- Supervisory system
- Alarms and events
- Provisions for gas metering stations

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Fiscal Gas Metering

Fiscal gas computer systems

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Computer design: Computer

Sufficient number of digits shall be available to verify that calculation uncertainties are within the requirements in the measurement regulations.

It shall be possible to operate all valves from the graphics.

Check functions for dual instrumentation:

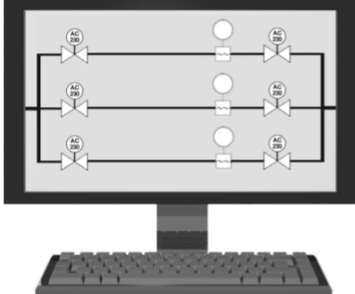
- comparisons between duplicated instruments measuring the same process value
- an averaging technique shall be used for monitoring of deviation.

Check functions for single instrumentation:

- comparisons between instruments measuring the same process value in different meter runs
- an averaging technique shall be used for monitoring.

In the event of instrument readings outside predefined limits or at instrument failure, back-up instrument or fall-back value shall be selected.

It shall be possible to request a report with configuration parameters at any time.



Module 12: NFOGM tool for uncertainty calculations

- NFOGM tool web based
- Configuration of tool parameters
 - Series or parallel design
 - Flow meter: USM, Coriolis, Orifice
 - Single or dual temperature/pressure etc
- Generating of results
- Charts, plots
- Reports

The screenshot shows the 'Fiscal Gas Metering' web application in an Internet Explorer browser. The page title is 'Fiscal Gas Metering' and the subtitle is 'NFOGM tool for uncertainty calculations'. The main heading is 'Fiscal Gas Metering Station Uncertainty' with a sub-heading 'metering station'. A paragraph explains that the 'Metering Station' page is the start of the uncertainty calculation tool, where users specify the metering station in terms of instrument types and layout. It lists three aspects to be specified: 1. type of flow meter, 2. measurement of pressure and temperature, and densitometer if present, and 3. how the gas composition is established.

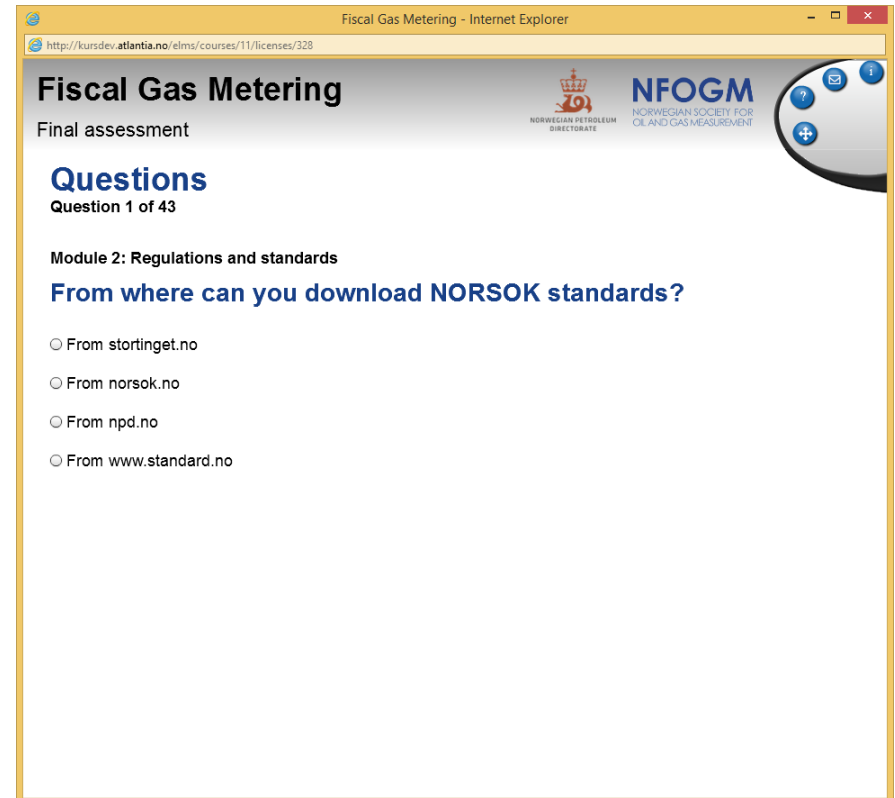
The interface includes several input fields and dropdown menus:

- <Enter Name>: 11/17/2014
- <Enter Description>: (empty)
- Flow Metering: ☐ Single Meter, ☐ Dual in Series, ☒ Dual in Parallel. A dropdown menu shows 'Ultrasonic'.
- Line Conditions: Temperature (Average), Pressure (Average), Densitometer (Average), and Dens. Type (HasTempAndPress).
- Gas Analysis: Gas Composition From: FixedComposition.

A schematic diagram shows two 'Ultrasonic' flow meters in parallel, each with associated temperature (T), pressure (P), and density (D) sensors. The outputs are combined into a 'FixedComposition' block. A checkbox at the bottom indicates 'Flow meters calibrated at the same time and location' is checked. Buttons for 'Accept and Continue' and 'Open From File..' are at the bottom right.

Module 13: Final assessment

- Level 1 and Level 2 has their own Final test
- To pass, more than 70 % correct answers
- A course certificate is stored at My page, and can be printed.



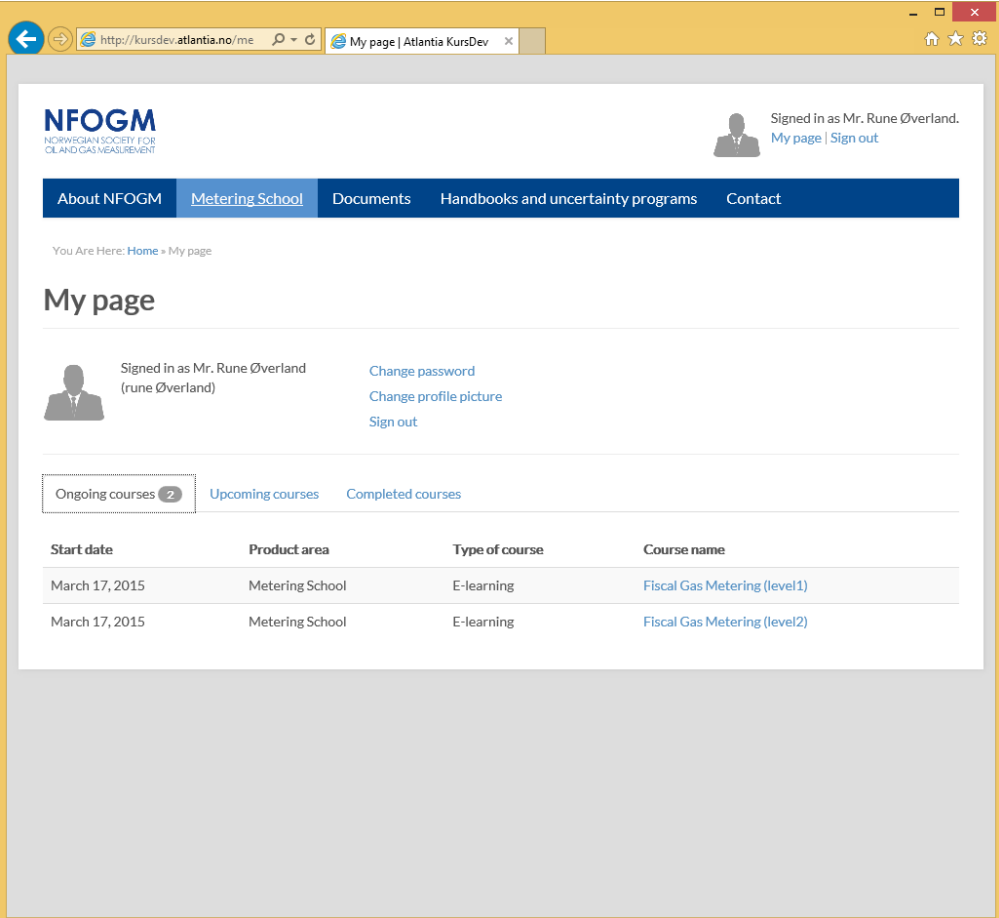
NFOGM Gas metering course

- www.nfoggm.no
 - Metering school
 - Start the application
 - Select Free navigation (select Level 1 or Level 2)
 - or select Course (create account)/ (select Level 1 or Level 2)

The screenshot shows a web browser window with the URL <http://kursdev.atlantia.no/>. The page is titled "NFOGM NORWEGIAN SOCIETY FOR OIL AND GAS MEASUREMENT". A navigation bar includes links for "About NFOGM", "Metering School", "Documents", "Handbooks and uncertainty programs", and "Contact". A message at the top right indicates "Not signed in. Sign in | Register for free". A green banner states "Signed out successfully." The main heading is "Fiscal Gas Metering". Below this, text explains that the course can be launched in two ways: freely or with guided progress. It notes that the free mode does not include a final assessment or diploma, while the guided mode requires registration and includes a final assessment and diploma. The interface is divided into two main sections: "No assessment, jump freely" and "With assessment, guided progress". Under "No assessment, jump freely", there are two options: "Level 1" (Learning level 1 is general; intended for operator and managers etc.) and "Level 2" (Learning level 2 is specific; intended for engineers, measurement technicians etc.). Each has a button to "Launch level X without assessment". The "With assessment, guided progress" section contains a login form with fields for "Login" and "Password", a "Remember me" checkbox, and buttons for "Sign in", "Forgot password?", and "Create account".

NFOGM Gas metering course

- My page
 - Ongoing courses
 - Completed courses (print out of Diplomas)

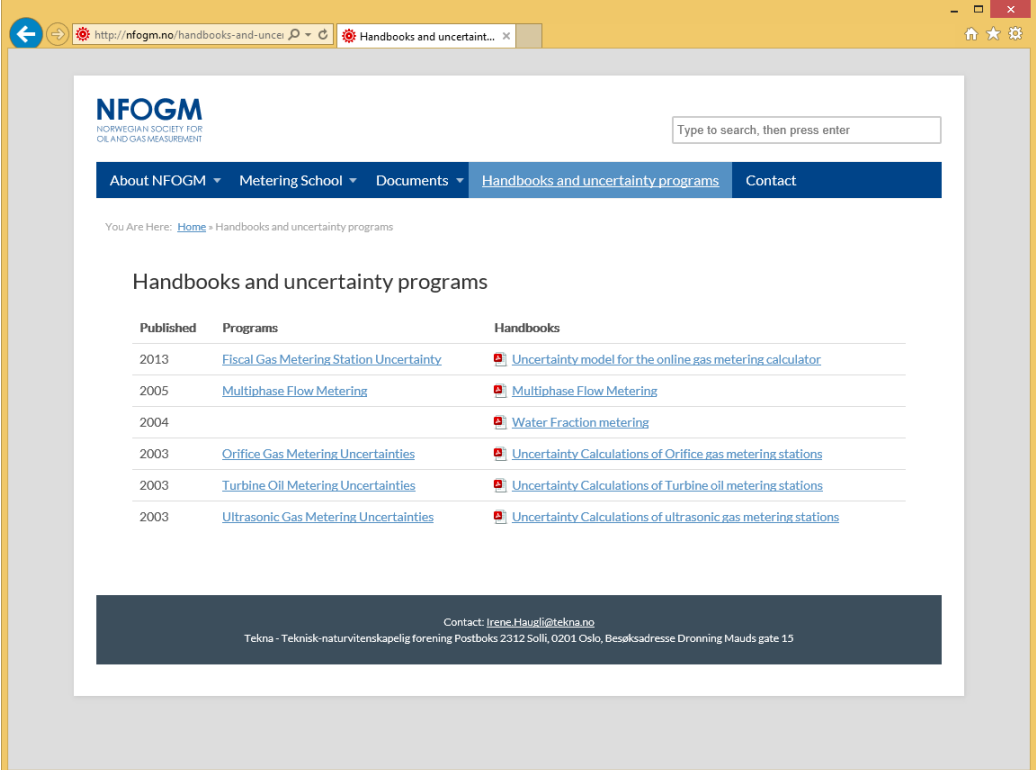


The screenshot shows a web browser window displaying the NFOGM website. The user is logged in as Mr. Rune Øverland. The page title is "My page". Below the user information, there are tabs for "Ongoing courses" (2), "Upcoming courses", and "Completed courses". The "Ongoing courses" tab is selected, showing a table with the following data:

Start date	Product area	Type of course	Course name
March 17, 2015	Metering School	E-learning	Fiscal Gas Metering (level1)
March 17, 2015	Metering School	E-learning	Fiscal Gas Metering (level2)

NFOGM uncertainty tool, and handbooks

- www.nfogm.no
 - Handbooks and uncertainty programs



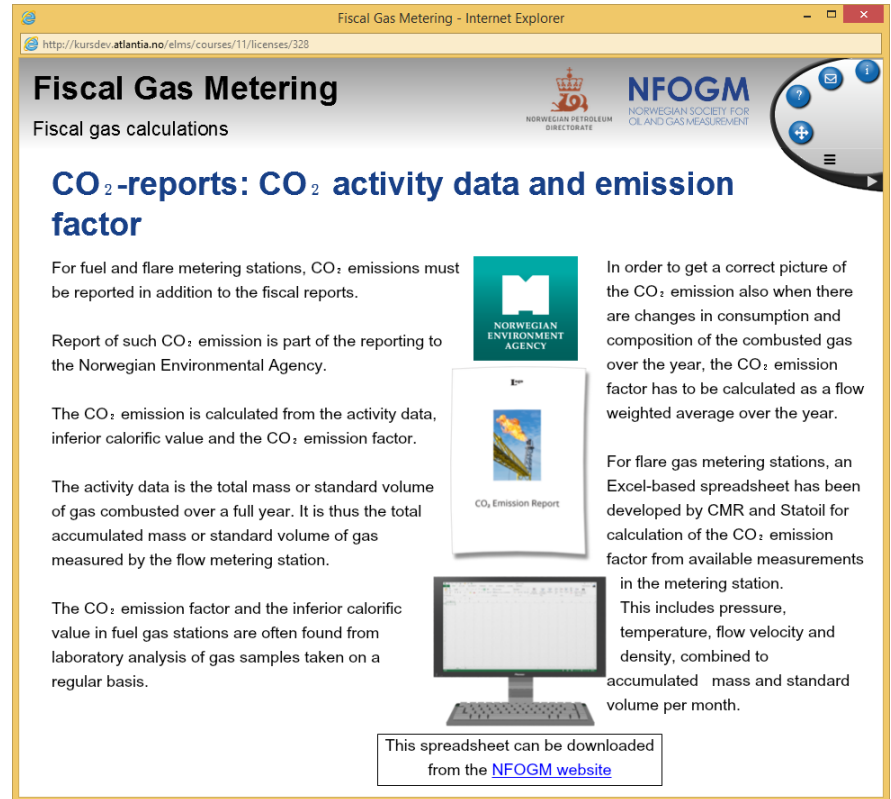
The screenshot shows the NFOGM website interface. The header includes the NFOGM logo (NORWEGIAN SOCIETY FOR OIL AND GAS MEASUREMENT) and a search bar. A navigation menu contains links for 'About NFOGM', 'Metering School', 'Documents', 'Handbooks and uncertainty programs' (which is highlighted), and 'Contact'. Below the navigation menu, a breadcrumb trail reads 'You Are Here: Home > Handbooks and uncertainty programs'. The main content area is titled 'Handbooks and uncertainty programs' and contains a table with three columns: 'Published', 'Programs', and 'Handbooks'. The table lists various documents and their publication years. At the bottom of the page, a dark blue footer contains contact information for Irene Haugli.

Published	Programs	Handbooks
2013	Fiscal Gas Metering Station Uncertainty	Uncertainty model for the online gas metering calculator
2005	Multiphase Flow Metering	Multiphase Flow Metering
2004		Water Fraction metering
2003	Orifice Gas Metering Uncertainties	Uncertainty Calculations of Orifice gas metering stations
2003	Turbine Oil Metering Uncertainties	Uncertainty Calculations of Turbine oil metering stations
2003	Ultrasonic Gas Metering Uncertainties	Uncertainty Calculations of ultrasonic gas metering stations

Contact: Irene.Haugli@tekn.no
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Flare gas metering station: Calculation of the CO₂ emission factor

- www.nfoggm.no
 - Excel spreadsheet can be downloaded free of charge



The screenshot shows a web browser window titled "Fiscal Gas Metering - Internet Explorer" with the URL <http://kursdev.atlantia.no/elms/courses/11/licenses/328>. The page header includes the "Fiscal Gas Metering" title, "Fiscal gas calculations", and logos for the Norwegian Petroleum Directorate and NFOGM (Norwegian Society for Oil and Gas Measurement). The main heading is "CO₂-reports: CO₂ activity data and emission factor".

For fuel and flare metering stations, CO₂ emissions must be reported in addition to the fiscal reports.

Report of such CO₂ emission is part of the reporting to the Norwegian Environmental Agency.

The CO₂ emission is calculated from the activity data, inferior calorific value and the CO₂ emission factor.

The activity data is the total mass or standard volume of gas combusted over a full year. It is thus the total accumulated mass or standard volume of gas measured by the flow metering station.

The CO₂ emission factor and the inferior calorific value in fuel gas stations are often found from laboratory analysis of gas samples taken on a regular basis.

In order to get a correct picture of the CO₂ emission also when there are changes in consumption and composition of the combusted gas over the year, the CO₂ emission factor has to be calculated as a flow weighted average over the year.

For flare gas metering stations, an Excel-based spreadsheet has been developed by CMR and Statoil for calculation of the CO₂ emission factor from available measurements in the metering station. This includes pressure, temperature, flow velocity and density, combined to accumulated mass and standard volume per month.

A graphic shows a "CO₂ Emission Report" document and a computer monitor displaying an Excel spreadsheet. A text box at the bottom states: "This spreadsheet can be downloaded from the [NFOGM website](http://www.nfoggm.no)".

Summary: Fiscal Gas Metering

- Two computer based training courses (Level 1 and Level 2)
- Free of charge
- Available from www.nfoggm.no
- Choose either free navigation or structured course progress

