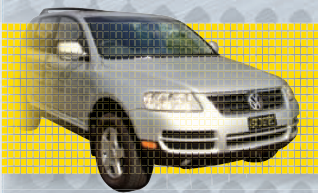
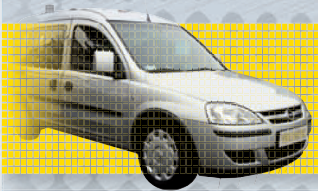




A company of T.D. Williamson, Inc.

## Survey of Natural Gas Networks



# VSR Inspectra<sup>®</sup>

**Network Survey Vehicle  
with Laser Methane Detection System**

**Total methane selectivity**

**1 ppm sensitivity**

**Measuring range 1 - 190 ppm**

**Survey speed up to 40 km/h (25 mph)**

**Traceability of monitoring missions with NGS Software**



The INSPECTRA® VSR developed by GAZOMAT™ makes it possible to survey natural gas distribution networks from a vehicle that is driven above the underground methane pipes. With the exclusive INSPECTRA® laser spectroscopy detector from GAZOMAT™ and NGS Software, the INSPECTRA® VSR is an amazing concentrate of leading-edge technologies. The combination of techniques makes it an impressively effective tool that meets all the productivity, reliability and traceability requirements of gas operators for surveying their low and medium-pressure networks.

#### Fast and efficient detection

- The device comprises a sampling circuit, a laser analyser, a laptop PC, a set of gas cylinders and a GPS receiver. It is installed safely in a vehicle manned by a driver and an operator.
- The samples are taken from the surface of the ground by the suction rail located under the front bumper.
- The atmosphere samples are taken into the measuring chamber for analysis.
- Any trace of methane found in the sample is reported on the on-board computer screen and automatically recorded.
- The response time below 1.5 second<sup>(1)</sup> makes it possible to limit the leak location perimeter.
- All survey data is automatically saved during the mission.
- GAZOMAT™ NGS survey software with integrated GPS ensures leak localization and survey traceability.



#### A unique detection system:

##### Laser spectroscopy

- Total methane selectivity. The detector has a laser diode that is specially adjusted to the absorption wavelength of methane. Benefit: no incorrect measurements due to the presence of hydrocarbons, exhaust gases, water vapour, chemicals or other potential pollutants.
- 1-ppm sensitivity thanks to the pass length of the multipass cell.
- System stability: insensitive to weather and environmental conditions.
- Survey speed up to 40 km/h (25 mph).
- Note: Cannot be used with LPG networks.



#### User-friendly interface

- Fully automated instrumentation checking from a laptop PC.
- Very easy-to-use NGS software developed by GAZOMAT™.
- Intuitive Man-Machine interface with icons, audio and visual messages.



#### Enhanced safety

- No combustible gas on board (no hydrogen).
- Use of two gases only - 50 ppm methane (CH<sub>4</sub>) for operating tests, and nitrogen (N<sub>2</sub>) for flushing the sampling circuit.
- Low daily maintenance.



(1) Response time depends on the model of the vehicle and the configuration of the installation.

All the INSPECTRA® instrumentation is controlled from an on-board laptop PC with the NGS software dedicated to surveying natural gas distribution networks. The software has been designed to simplify survey missions while ensuring full traceability of network monitoring.

**NGS software main screen**

**Ease of use**

- Data entry when a mission is created
- Use of network maps in hard or electronic form
- Downloading in the NGS software of digital maps (to be provided by the customer) in the universal SHAPE format
- Real-time recording of vehicle speed and position as well as of gas concentrations detected
- Comments entered directly by the operator anytime during the mission
- Real-time view of the vehicle route, gas leak indications as well as road network (or of any other network mapping integrated by the customer)
- At the end of each mission, a report is automatically generated in PDF format containing all data entered at the start of the mission and all survey data (leak indications, excess speed, malfunctioning, comments...). To each gas leak indication detected is associated an individual report sheet with relating map showing the leak precise location and recording date.

**Systematic Gas Leak Search, a new dimension**

Combined performances of the INSPECTRA® Laser detection system and NGS software offer new perspectives to network survey:

- Higher productivity with a survey speed up to 40 km/h (25 mph)
- An extremely easy-to-use tool specifically designed to simplify and optimize the operator's work
- Total traceability of survey missions
- A customisable survey solution with the downloading of any mapping data specific to the customer (gas network, valve network, buildings...)
- A multilingual system for use worldwide.

**Survey report**

SurveyNumber	SurveyName
test 2 Speed 20km	test 2 Speed 20km

Date	26/08/2009 08:52	Claude
Operator	Dominique	
City	TALLIN	
Supplier	Test customer	
Provider	Gazomat	
VSR ID	4585BAW57	
Bottle Ref	458e4544	
Emergency Phone	01233456789	
Weather	sunny	
Distance	Survey distance : 3,42km	
Clue detected	17	

Date	Time	Lat	Lon	Event	Comment
26/08/2009	08:52	59.427151	24.794460	Mission Start	Begin of mission
26/08/2009	08:52	59.427151	24.794460	Test - Debut	
26/08/2009	08:52	59.427151	24.794460	Test - Success	
26/08/2009	08:52	59.427151	24.794460	Test - Temp. de recharge	
26/08/2009	08:52	59.427151	24.794460	Test - Temp. de recharge	
26/08/2009	08:52	59.427151	24.794460	Test - Fin	
26/08/2009	08:55	59.428500	24.799980	Pause - Debut	
26/08/2009	08:55	59.428500	24.799980	Pause - Fin	Resumed by operator
26/08/2009	09:07	59.428471	24.799789	Indice accepte	egout
26/08/2009	09:07	59.428471	24.799789	Indice accepte	
26/08/2009	09:08	59.428471	24.799789	Indice accepte	

**Clue**

Information	Date
Location : 1 Maple park Tallinn	26/08/2009 08:52
Latitude : 59.428471	Claude
Longitude : 24.799789	Dominique
Concentration : 6,0PPM	TALLIN
	Operator
	Supplier
	Provider
	Test customer
	Gazomat
	VSR ID
	4585BAW57
	Bottle Ref
	458e4544
	Emergency Phone
	01233456789
	Weather
	sunny

**Comment**

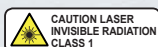
List of events



## TECHNICAL SPECIFICATIONS

# VSR *Inspectra*<sup>®</sup>

- INSPECTRA<sup>®</sup> laser detector:**
- Measuring principle: Laser spectroscopy – multipass cell
  - Total methane selectivity
  - Measuring scale: 1 - 190 ppm (device calibrated and set for methane)
  - Detection limit: 1 ppm
  - Response time: less than 1 second
  - Usage temperature: -15°C to +40°C
  - Storage temperature: -20°C to +50°C
  - Humidity: < 80% relative humidity



Patents No 7352463, No 1647820 and No ZL 02829531.5

**Analyser made up of the following elements:**

- INSPECTRA<sup>®</sup> laser detector
- Suction rail with 8 sample intakes
- Suction pump with a maximum rate of 800 l/hr
- Filters integrated into the sampling circuit
- Probe for detecting the presence of water with automatic triggering of nitrogen flushing
- Solenoid valves and flow meter for the continuous checking of the flow of samples and reference gas
- Nitrogen flushing circuit
- Sensor test circuit with 50 ppm CH<sub>4</sub> reference gas
- System response time: < 1.5 second (variable depending on the vehicle model and the configuration of the installation)
- Optimum survey conditions: dry and frost-free ground, no strong wind
- Installation of the system on all vehicle types (ergonomics and configuration of the installation to be defined with the order).

**Gas used:**

- 50 ppm CH<sub>4</sub> (methane) reference gas to test the detector
- Nitrogen (N<sub>2</sub>) to flush the sampling circuit

**Electrical system:**

- Main power supply from the vehicle alternator to all the instrumentation, the laptop PC, suction pump and reading lamp by switching on the main switch on the fuse panel.
- System power supply:
  - o 150 Watts (in normal use)
  - o 220 Watts minimum (with all the equipment)

**Laptop computer:**

- Of the make recommended by GAZOMAT<sup>™</sup> for its ruggedness and network survey performance.
- Minimum connectors required: 2 USB connectors available

**NGS software:**

- Running with Microsoft<sup>®</sup> Windows<sup>®</sup> XP and Windows<sup>®</sup> 7

**GPS system:**

- GPS receiver specifically dedicated to network survey
- Communication protocol - NMEA standard (may be coupled with a road navigation system)

**Mapping:**

- Digital cards supplied by the customer in two possible formats:
  - SHAPE format (.shp)
  - Or proprietary format (.rsf)



**After-Sales services :** GAZOMAT<sup>™</sup> provides maintenance of all its products both in France and other countries through its many representatives world-wide.

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agent*