



DIRECT MEASUREMENT FOR DEFENSIBLE METHANE QUANTIFICATION

Using High-Volume Sampling to Validate Leak Rates and Repair Impacts

3rd Methane Regulation & Emission Mitigation Conference 2026
Berlin, Germany

Milton Heath · AddGlobe

AddGlobe Gas Flow Meter 3.0

Five acts, thirty minutes

1

Why this matters now

The compliance clock is running on both sides of the Atlantic

2

Why the allowed alternatives fall short

Estimates can miss by orders of magnitude

3

Direct measurement via high-volume sampling

How the GFM 3.0 quantifies what estimates can't

4

From detection to defensible repair impact

The same tool proves a repair actually worked

5

The differentiator is the technician

Certified people, not just calibrated equipment

The compliance clock is already running

Aug 2025

First EU source-level reports due

Using at least generic emission factors — a floor, not an end state (Art. 12(1))

Feb 2026 / 2027

Direct measurement becomes the default

“Where direct measurement is not possible... specific emission factors based on source-level quantification or sampling” (Art. 12(2))

Feb 2027 / Aug 2028

Site-level reconciliation required

Operated / non-operated assets — the EU's own Level-5-equivalent milestone (Art. 12(3))

3–5 years

OGMP Gold Standard clock

From OGMP membership to Level 4/5 on material assets — operated / non-operated

“Direct measurement” is the regulation's own vocabulary

Generic emission factor

A standardised factor applied per emission-source type.

Art. 2(17)

Specific emission factor

One derived from direct measurement.

Art. 2(18)

“Where direct measurement is not possible, reporting shall involve the use of specific emission factors based on source-level quantification or sampling.”

EU Regulation (EU) 2024/1787, Article 12(2)

Not marketing language — the regulation's own legal definitions.

The detection-and-repair bar, in exact numbers

Survey type	Frequency*	Repair trigger threshold	Repair timeline
Type 1 survey	At least every 12 months and as little as 4 months for compressor stations	7,000 ppmv or 17 g/hr	Immediate; else 5-day attempt / 30-day completion
Type 2 — aboveground	At least every 6-8 months	500 ppmv or 1 g/hr	Immediate; else 5-day attempt / 30-day completion
Type 2 — underground (2nd step)	At least every 12 months	1,000 ppmv or 5 g/hr	Same as above
Offshore, below sea level	At least every 24 months	7,000 ppmv or 17 g/hr	Same as above

If neither immediate repair nor the 5/30-day path is achievable, the operator must notify the competent authority within 12 days with a justified schedule.

Source: EU Regulation (EU) 2024/1787, Art. 14(8)–(9), Annex I Part 1



2

Why the Allowed Alternatives Fall Short

Every method on the list can technically qualify — but they are not equally defensible.



The method landscape operators are choosing among

Generic / default emission factors

A published, standardised factor per source type — no site-specific measurement at all

Correlation equations

Screening concentration (ppm) converted to a mass rate via a fixed correlation curve

Engineering calculations / simulation

Modeled from equipment specifications and process conditions

OGI-camera quantification software

Optical gas imaging video processed into an estimated rate

Direct measurement (high-volume sampling)

The actual gas volume is captured and measured at the source

Increasing defensibility →

When correlation-equation estimates go wrong

3–4

orders of magnitude of variability

A compressor-station operator's 1994–96 experience using organic vapor analyzers with Method 21 correlation equations — which also “tend to understate the size of the largest leaks.”

“...inaccuracy for any given leak may be two orders of magnitude.”

GRI compressor-station study

The operator could not reliably determine how much gas its own repairs had saved until it switched to a high-volume sampler.

Both findings: EPA/GRI-funded primary research, not a vendor claim.

To be precise: Level 4 doesn't require direct measurement

“Level 4 does not explicitly require the use of source-level direct measurement technologies.”

OGMP 2.0, “Use of Site-level Technology and Acceptable L4 Methods,” approved Feb. 2026

So what's the honest differentiator?

Not: “direct measurement is the only way to reach Level 4.”

Instead: among Level-4-qualifying methods, direct measurement is the more defensible, lower-uncertainty, auditable one — because it isn't a model of the leak, it's a measurement of it.

3

Direct Measurement via High-Volume Sampling

Introducing the AddGlobe GFM 3.0 — built specifically for EU and OGMP 2.0 compliance.



Introducing the AddGlobe GFM 3.0.

A high-volume sampler that physically captures a source's total gas flow directly into a sampling hose or through a capture bag accessory and measures the precise flow rate and methane specific concentration to accurately calculate the precise leak rate. — not a model, not a correlation, an actual measurement.

- Purpose-built for EU and OGMP 2.0 compliance
- A technology evolution built upon Addglobe's Gas Flow Meter 2.0
- *"Supports measurement programs aligned with OGMP 2.0 Level 4, the EU Methane Regulation, and applicable U.S. EPA requirements" — AddGlobe*
- Designed for maximum maneuverability in a typical natural gas compressor station



Marketing Driven to be the best in Direct Measurement Hi Flow Sampling technology.

Our Clients:

We are proud to work with leading companies around the world.

The logos below represent only a small selection of our valued clients.



SHELL



KINDER MORGAN

Delivering Energy. Improving Lives.



TALANZA



ENERGY TRANSFER



socrate

WORKING FOR SUSTAINABILITY



Sequitur

ENERGY RESOURCES LLC

enviTek

XOSS ENVIRO



expand



WAPITI ENERGY



VEMA CARBON



CMS ENERGY



TARGA

ONEOK

Korsa

NAM



KODA



A measurement envelope built for this exact legal line

0.28 g/hr

Minimum Detectable
Leak Rate

±5%

Accuracy of reading
across the range

≈28 Kg/hr

Range, up to (validated
to ≈ 25 Kg/hr)

Field testing reveals comparison measurements in these
upper ranges using a 3 CFM measurement Bag with
similar results =/- 10%

0.28 g/hr is well below the EU's own repair-trigger threshold

The EU's Type 2 aboveground repair threshold is 1 gram per hour (Art. 14(8)(b)(i)). GFM 3.0 quantifies leaks on both sides of that legal line — a screening tool that only flags “there's a leak” can't tell you that.

Named, by name, in OGMP's own technical guidance

Pneumatics TGD

Lists “High flow sampler” among accepted Level 4 measurement solutions for controllers, pumps and instruments.

Reciprocating Compressors TGD

Recommends a “High-volume sampler” specifically for open distance-piece emissions.

Scoped precisely

The Leaks TGD — component fugitive leaks, the core LDAR use case — stays generic and does not name the equipment specifically.

This citation is strongest for vent/purge and compressor rod-packing quantification, a real and substantial part of a facility's methane profile — distinct from component-level LDAR.

In the field



GFM 3.0 crews on compressor stations, well pads, and pipeline sites — domestic and international.

GFM 3.0 allows LDAR / Measurement Techs maximum maneuverability around a typical natural gas compressor stations. They can collect accurate source level quantification data as they find the leaks with their chosen screening tools.

Reporting and Deliverables for Defensible Quantification Data

Fugitive Measurement Report

20/05/2025 13:03:01

Test Values

Parameter	Value
GFM 2.0 Serial Number	2201120
Asset Location	Addglobe
Comment	office
Operator name	Milton Heath
Measurement date	20/05/2025
Measurement start time	12:57:01
Measurement end time	13:01:33
Temperature Celsius	33.89 °C
Temperature Fahrenheit	93.00 °F
Pressure (mmHg)	760 mmHg
Pressure (Pa)	101325 Pa

Calibrations

Date	Time	Channel	High/Low	Complete
No data	No data	Leak	Low	No data
No data	No data	Leak	High	No data
No data	No data	Back	Low	No data
No data	No data	Back	High	No data

Page 1

Daily Test Audit Data

Date	Time	Channel	Test Gas Concentration	Concentration	Percent Difference
Current Date Test Data					
No data	No data	Back	No data	No data	No data
No data	No data	Back	No data	No data	No data
No data	No data	Leak	No data	No data	No data
No data	No data	No data	No data	No data	No data
Previous Test Data					
No data	No data	Back	No data	No data	No data
No data	No data	Back	No data	No data	No data
No data	No data	Leak	No data	No data	No data
No data	No data	Leak	No data	No data	No data

Statistics

Parameter	Minimum	Average	Maximum
CH4 Concentration	40.48 %	40.99 %	41.47 %
Flow Rate	5.16 cfm	5.25 cfm	5.33 cfm
Leak Rate	2.10 cfm	2.15 cfm	2.19 cfm
Mass Leak Rate CO2e (GWP-100 = 28)	627.47 MT/year	642.74 MT/year	654.37 MT/year
Mass Leak Rate CO2e (GWP-20 = 81)	1815.19 MT/year	1859.37 MT/year	1892.99 MT/year
Standard Mass Leak Rate CO2e (GWP-100 = 28)	583.58 MT/year	597.78 MT/year	608.59 MT/year
Standard Mass Leak Rate CO2e (GWP-20 = 81)	1688.20 MT/year	1729.29 MT/year	1760.56 MT/year

Page 2

Test Results

Parameter	Value
Average value back (1 minute)	0.00 %
Average leakage value for the first minute	2.18 cfm
Average leakage value for the second minute	2.13 cfm
Average leakage value for the third minute	2.15 cfm
Percentage	2.46 %
EPA passed (<10% per EPA requirement)	True
Average leakage value for three minute	2.15 cfm

Test Results, standartized

Parameter	Value
Standard average leakage value for the first minute	2.18 scfm
Standard average leakage value for the second minute	2.13 scfm
Standard average leakage value for the third minute	2.15 scfm
Standard average leakage value for three minute	2.15 scfm

Page 3

CH4 Concentration Chart

Elapsed seconds (s)	CH4 Concentration (%)
0	40.48
20	40.50
40	40.52
60	40.55
80	40.58
100	40.60
120	40.62
140	40.65
160	40.68
180	40.70

Flow Rate Chart

Elapsed seconds (s)	Flow rate (cfm)
0	5.16
20	5.18
40	5.20
60	5.22
80	5.24
100	5.25
120	5.26
140	5.27
160	5.28
180	5.30

Leak Rate Chart

Elapsed seconds (s)	Leak rate (cfm)
0	2.10
20	2.11
40	2.12
60	2.13
80	2.14
100	2.15
120	2.15
140	2.16
160	2.17
180	2.19

Page 4



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	Date	Time	Latitude	Longitude	Asset location	Operator name	Battery	Temperature	Pressure	Meas	Active	Comment	Leak r	Flow rate	Concentration leak	Leakage rate	Standard leakage rate	Leak Rate scfh
2	22/04/2026	7:19:50 PM	42.66723	-84.19611	Test Site 1	Milton Heath	80	84.16	734.8	MOS	RUNNING	zone to test 19	cfm	8.9	6.135	0.554	0.609	36.54
3	22/04/2026	7:19:54 PM	42.66723	-84.19611	Test Site 1	Milton Heath	80	84.18	734.8	MOS	RUNNING	zone to test 19	cfm	8.83	6.123	0.548	0.603	36.18
4	22/04/2026	7:20:03 PM	42.66723	-84.19611	Test Site 1	Milton Heath	80	84.2	734.8	MOS	RUNNING	zone to test 19	cfm	8.86	6.147	0.553	0.608	36.48
5	22/04/2026	7:25:25 PM	42.66721	-84.1961	Test Site 1	Milton Heath	79	85.62	734.7	MOS	RUNNING	zone to test 20	cfm	8.86	12.406	1.132	1.253	75.18
6	22/04/2026	7:25:32 PM	42.66721	-84.1961	Test Site 1	Milton Heath	79	85.62	734.7	MOS	RUNNING	zone to test 20	cfm	8.86	12.374	1.129	1.25	75
7	22/04/2026	7:25:36 PM	42.66721	-84.1961	Test Site 1	Milton Heath	79	85.62	734.7	MOS	RUNNING	zone to test 20	cfm	8.93	12.33	1.134	1.255	75.3
8	22/04/2026	7:30:14 PM	42.66724	-84.19611	Test Site 1	Milton Heath	78	87.04	734.7	MOS	RUNNING	zone 1 test 21	cfm	8.72	15.763	1.428	1.59	95.4
9	22/04/2026	7:30:16 PM	42.66724	-84.19611	Test Site 1	Milton Heath	78	87.08	734.7	MOS	RUNNING	zone 1 test 21	cfm	8.79	15.729	1.436	1.599	95.94
10	22/04/2026	7:30:18 PM	42.66724	-84.19611	Test Site 1	Milton Heath	78	87.12	734.7	MOS	RUNNING	zone 1 test 21	cfm	8.86	15.675	1.442	1.606	96.36
11	22/04/2026	7:39:55 PM	42.66719	-84.19613	Test Site 1	Milton Heath	77	87.57	734.6	MOS	RUNNING	zone one test 22	cfm	8.86	9.165	0.83	0.925	55.5
12	22/04/2026	7:39:59 PM	42.66719	-84.19613	Test Site 1	Milton Heath	77	87.57	734.6	MOS	RUNNING	zone one test 22	cfm	8.83	9.183	0.828	0.923	55.38
13	22/04/2026	7:40:05 PM	42.66719	-84.19613	Test Site 1	Milton Heath	77	87.57	734.6	MOS	RUNNING	zone one test 22	cfm	8.9	9.121	0.829	0.924	55.44
14	22/04/2026	7:50:52 PM	42.66722	-84.19611	Test Site 1	Milton Heath	75	87.15	734.5	MOS	RUNNING	Zone 2 test 23	cfm	8.93	19.413	1.817	2.026	121.56
15	22/04/2026	7:51:01 PM	42.66722	-84.19611	Test Site 1	Milton Heath	75	87.33	734.5	MOS	RUNNING	Zone 2 test 23	cfm	8.86	19.551	1.816	2.027	121.62
16	22/04/2026	7:56:10 PM	42.66722	-84.19614	Test Site 1	Milton Heath	75	88.79	734.5	MOS	RUNNING	zone to test 24	cfm	8.83	13.941	1.272	1.426	85.56
17	22/04/2026	7:56:13 PM	42.66722	-84.19614	Test Site 1	Milton Heath	75	88.83	734.5	MOS	RUNNING	zone to test 24	cfm	8.97	13.896	1.288	1.444	86.64
18	22/04/2026	7:56:15 PM	42.66722	-84.19614	Test Site 1	Milton Heath	75	88.84	734.5	MOS	RUNNING	zone to test 24	cfm	9.04	13.787	1.288	1.443	86.58
19	22/04/2026	8:08:10 PM	42.66718	-84.19611	Test Site 1	Milton Heath	73	87.08	734.5	MOS	RUNNING	zone to test 27	cfm	8.86	7.605	0.686	0.763	45.78
20	22/04/2026	8:08:18 PM	42.66718	-84.19611	Test Site 1	Milton Heath	73	87.12	734.5	MOS	RUNNING	zone to test 27	cfm	8.83	7.623	0.685	0.762	45.72
21	22/04/2026	8:18:54 PM	42.66722	-84.19614	Test Site 1	Milton Heath	72	88.14	734.5	MOS	RUNNING	zone two test 30	cfm	8.83	10.66	0.965	1.078	64.68
22	22/04/2026	8:19:01 PM	42.66722	-84.19614	Test Site 1	Milton Heath	72	88.21	734.5	MOS	RUNNING	zone two test 30	cfm	8.83	10.535	0.953	1.066	63.96
23	22/04/2026	8:19:07 PM	42.66722	-84.19614	Test Site 1	Milton Heath	72	88.29	734.5	MOS	RUNNING	zone two test 30	cfm	8.76	10.577	0.95	1.062	63.72
24	22/04/2026	8:28:08 PM	42.66722	-84.19614	Test Site 1	Milton Heath	71	91.35	734.5	MOS	RUNNING	zone to test 33	cfm	8.79	8.111	0.727	0.821	49.26
25	22/04/2026	8:28:17 PM	42.66722	-84.19614	Test Site 1	Milton Heath	71	91.45	734.5	MOS	RUNNING	zone to test 33	cfm	8.83	8.109	0.73	0.825	49.5
26	22/04/2026	8:28:27 PM	42.66722	-84.19614	Test Site 1	Milton Heath	71	91.58	734.5	MOS	RUNNING	zone to test 33	cfm	8.83	8.076	0.727	0.822	49.32
27	22/04/2026	8:37:01 PM	42.66723	-84.19612	Test Site 1	Milton Heath	71	89.76	734.5	MOS	RUNNING	zone to test 34	cfm	8.83	9.869	0.892	1.002	60.12
28	22/04/2026	8:37:12 PM	42.66723	-84.19612	Test Site 1	Milton Heath	71	89.85	734.4	MOS	RUNNING	zone to test 34	cfm	8.86	9.808	0.89	1	60
29	22/04/2026	8:52:24 PM	42.66724	-84.19612	Test Site 1	Milton Heath	68	90.59	734.4	MOS	RUNNING	zone to test 36	cfm	8.16	6.729	0.558	0.628	37.68
30	22/04/2026	8:52:34 PM	42.66724	-84.19612	Test Site 1	Milton Heath	68	90.73	734.4	MOS	RUNNING	zone to test 36	cfm	8.19	6.741	0.561	0.633	37.98
31	22/04/2026	8:52:38 PM	42.66724	-84.19612	Test Site 1	Milton Heath	68	90.81	734.4	MOS	RUNNING	zone to test 36	cfm	8.23	6.744	0.564	0.636	38.16
32	22/04/2026	8:52:44 PM	42.66724	-84.19612	Test Site 1	Milton Heath	68	90.88	734.4	MOS	RUNNING	zone to test 36	cfm	8.3	6.756	0.57	0.643	38.58
33	22/04/2026	9:17:07 PM	42.66722	-84.19614	Test Site 1	Milton Heath	65	89.73	734.2	MOS	RUNNING	Zone 2 test 25	cfm	8.79	15.79	1.442	1.623	97.38
34	22/04/2026	9:17:13 PM	42.66722	-84.19614	Test Site 1	Milton Heath	65	89.73	734.2	MOS	RUNNING	Zone 2 test 25	cfm	8.83	15.866	1.455	1.637	98.22
35	22/04/2026	9:17:18 PM	42.66722	-84.19614	Test Site 1	Milton Heath	65	89.73	734.2	MOS	RUNNING	Zone 2 test 25	cfm	8.9	15.868	1.466	1.651	99.06
36	22/04/2026	9:22:21 PM	42.66724	-84.19614	Test Site 1	Milton Heath	65	89.97	734.1	MOS	RUNNING	zone to test 26	cfm	8.82	14.415	1.217	1.485	80.1

GFM 3.0 Data Collection Example



Capturing the sources that matter

98–99%

of fugitive methane emission sources typically found within a natural gas facility — AddGlobe product literature



Pneumatic controller leak



Pneumatic valve leak



Valve stem packing leak

Real field footage, infrared camera (OPGAL)

Pneumatic controllers and valve stem packing are two of the most common EPA Subpart W / OGMP 2.0 fugitive and vented emission source categories — exactly the sources shown here.

Certification, independent testing, and a real track record

Certification Testing			3 rd Party Testing	
ATEX	UL (US / Canada)	Australian Ex	CSU-METEC testing	GERG/NPL testing
Expected Oct 2026	Planned in Q2 2027	Planned in Q1 2027	Expected Q4 2026	Underway

Following the same path as the GFM 2.0.

A track record that predates GFM itself

AddGlobe has been delivering direct-measurement services since 2005 — supporting 35+ carbon-offset projects with a combined 85M+ tCO2e portfolio. Today's client base spans Shell, Kinder Morgan, Energy Transfer, Woodside, Marathon, Targa, Oneok, Snam, and others across six continents.



4

From Detection to Defensible Repair Impact

The same instrument, the same technician, the same method — before and after a repair.



Verification is required. Quantification makes it real.

“If LDAR is performed, all repairs should be verified using a leak detection method to ensure the component has been properly repaired and no longer releases gas.”



Same instrument. Same technician. Same method — used to prove a repair actually worked and to size the emissions reduction, not just confirm the leak is “gone.”

5

The Differentiator Is the Technician, Not Just the Tool

01

Product Introduction

Orientation to the instrument and workflow — no certification

20+

certified operators

02

Certified Operator

Theory, hands-on work, field measurement,
individual assessment → manufacturer certificate +
Training Register entry

~10

specialists at trainer level

03

Train-the-Trainer

Advanced methodology, field/classroom defense →
qualified trainers

1–5 days

full program, by level & group size



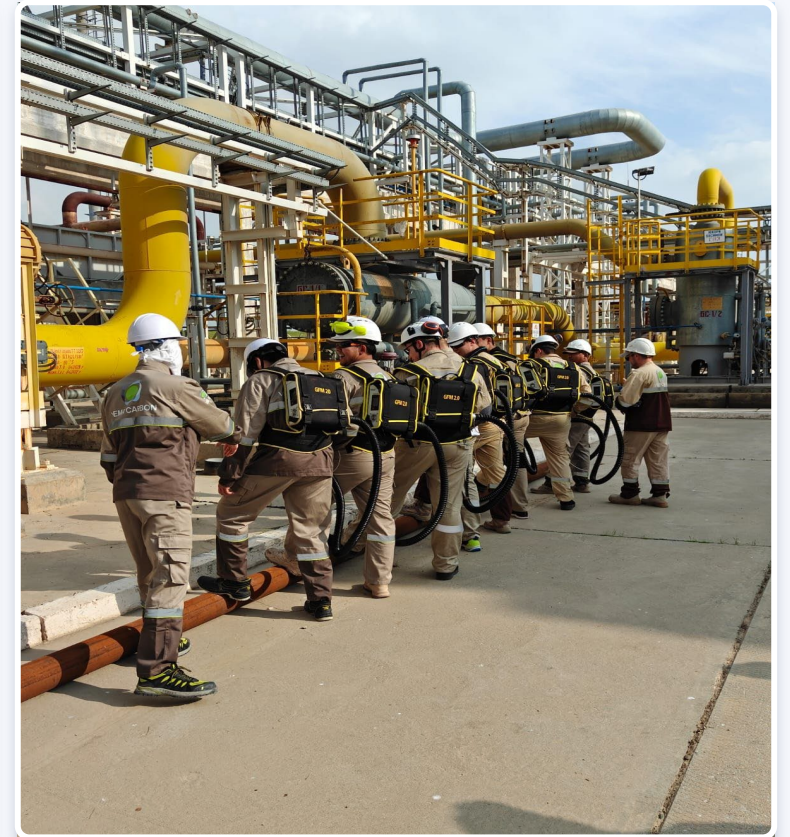
Training and certification in the field



A certification cohort on site



Hands-on field instruction



Field measurement exercise, GFM 2.0



The bar has moved from screening to quantification.

- 1 EU 2024/1787 and OGMP 2.0 both expect source-level, defensible data — and the compliance clock is running
- 2 Correlation-based estimates can miss by orders of magnitude; the GFM 3.0 measures at $\pm 5\%$, down to 0.28 g/hr
- 3 The same instrument, in the same technician's hands, detects, quantifies, and verifies repair impact

Next step: align on the training/certification scope and schedule your team's GFM 3.0 deployment.



Thank you

Milton W. Heath III
Director, Sales & Service
AddGlobe, LLC
Houston, Texas
561-985-7523
Milton@Addglobe.com

