

The background features several overlapping circles and arcs in teal and purple. A large teal circle with a purple-to-teal gradient is the central focus. Other circles in shades of teal and purple are scattered around it, some partially visible. A light gray circle is also present on the left side.

Monitoring Technology Compatibility Assessment

Bridger Photonics

March 2024



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Purpose

The MiQ Foundation, as the Standard holder, has developed this monitoring technology compatibility assessment to streamline market research conducted by Operators and other stakeholders to assess the compatibility of methane monitoring technologies against the requirements in the Monitoring Technology Deployment pillar of the MiQ Standard.

This document does not endorse or reflect the personal views of the MiQ Foundation and is not intended to be exhaustive. The sole aim of this document is to provide stakeholders with an impartial summary mapping the characteristics of methane monitoring technologies and methods to MiQ requirements. This document does not guarantee that a monitoring technology or method will be compliant for a specific deployment of that technology or method. MiQ Auditors may reference the information in this document while conducting MiQ Audits, but still must assess each deployment individually. MiQ encourages Operators to carry out additional independent assessments of technologies and methods for their specific deployments.

MiQ has conducted the following assessment based on best available data, vendor-provided documentation, and published studies at the time of preparation. MiQ reserves the right to make updates to the documentation on a periodic basis to conform with new MiQ Standard updates and updated vendor documentation.

MiQ is not liable for any information provided or technology capabilities guaranteed by the technology provider.

CRITERIA	STANDARD REFERENCE	DESCRIPTION
GENERAL INFORMATION		
Name		Bridger Photonics - Gas Mapping LiDAR™
MiQ Application	Section 3.2.1	Facility Scale Inspection and Source Level Inspection
Deployment Method	Section 4.1 – Table 3 <i>Detection Technology Specification (Bullet 2)</i>	Aerial Surveys - Manned aircraft (helicopter or fixed wing)
Sensor	Section 4.1 – Table 3 <i>Detection Technology Specification (Bullet 1)</i>	Proprietary Gas Mapping LiDAR™ (GMI) technology is used to collect emissions and site data. This technology leverages active, laser-based light detection and ranging (LiDAR) remote sensing instrumentation to measure methane concentration across target areas.
PERFORMANCE SPECIFICATIONS		
Emission Source Coverage	Section 3.2.1- <i>Item 1</i>	GML measures methane emissions within line of sight from the air, including emissions from elevated sources (flares, tank thief hatches, hot compressor exhaust, tanks, etc.) and underground sources (buried pipelines) once methane reaches the atmosphere
Measurement Frequency	Section 3.2.1- <i>Item 1</i>	Periodic – Bridger scans target areas at the frequency specified by the Operator.
Attribution Level	Section 3.2.1- <i>Item 4</i>	Equipment level. Bridger’s algorithm typically identifies emission source geodetic coordinates to within 2 m of true coordinates.
Published Test Protocol	Section 4.1 – Table 3 <i>Detection Technology Specification (Bullet 4)</i>	2022 METEC ADED Survey Protocol: Single Blind Determination using aircraft based LiDAR
MDL @ 90% PoD (Min MiQ MDL requirement is 25kg/hr)	Section 3.2.1- <i>Item 3</i>	3 kg/hr is Bridger’s stated production sector sensitivity. By changing deployment characteristics Bridger can achieve a 0.5 kg/hr (90% PoD) detection sensitivity. See Equivalency Determination below for additional detail

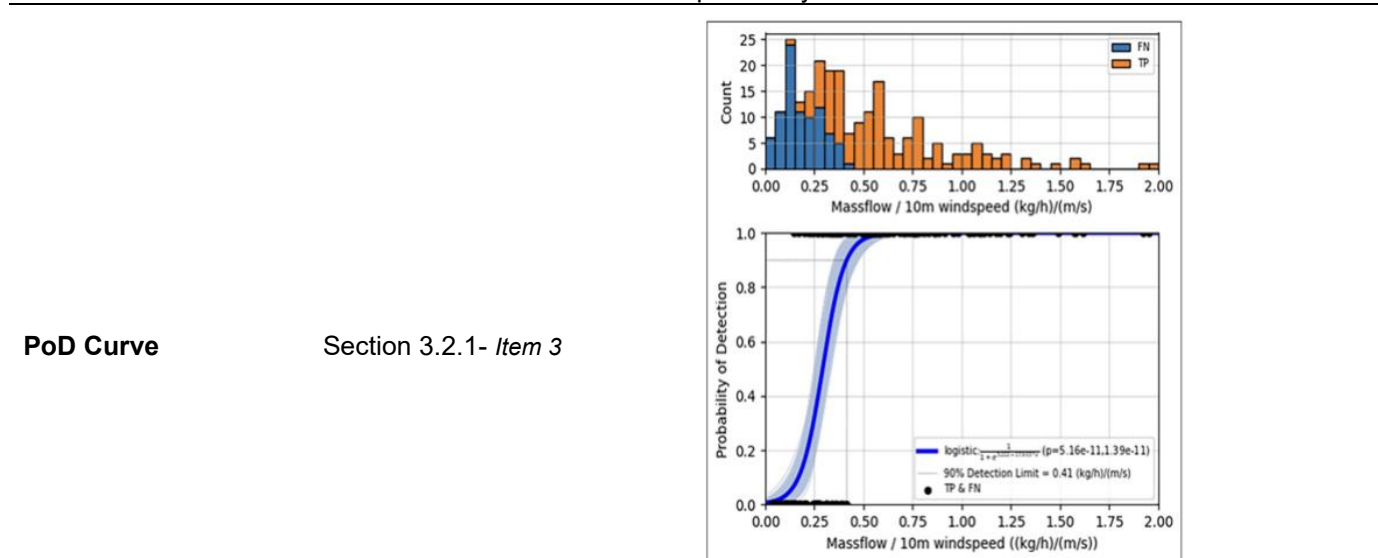


Figure 1. PoD Curve produced using published data collected during 2022 METEC single blind testing.

TECHNOLOGY LIMITATIONS		
Operational Limitations	Section 4.1 – Table 3 <i>Detection Technology Specification (Bullet 3)</i>	Parameters such as flight speed, height above ground level, ground reflectivity and wind speed near the ground impact GML detection sensitivity.
Environmental Limitations	Section 4.1 – Table 3 <i>Detection Technology Specification (Bullet 3)</i>	Presence of high ground wind, standing water and snow influence detection sensitivity. Bridger limits deployment during heavy precipitation and other adverse weather conditions.

EQUIVALENCY DETERMINATION

Bridger's MDL at 90% PoD and spatial resolution meets the requirements for both Facility Scale and Source Level Inspections therefore can be utilized to comply with the pre-defined MTD strategies for either inspection identified in the MiQ Standard.

Applicability

Section 3.2.3

A Producer/Operator utilizing Bridger for MiQ Certification may be able to implement a deployment frequency that differs from the pre-defined strategies by completing an equivalency determination.

Please refer to the [MiQ Equivalency Table](#) for additional Facility Scale Inspection information or contact MiQ for information regarding Source Level compatibility.

RECONCILIATION CONSIDERATIONS

Bridger can attribute individual emission plumes to the equipment-level, allowing operators to attribute emissions to a specific source. Due to the spatial resolution of Bridger's imagery, a follow-up ground inspection may be required to attribute emissions accurately depending on the nature of the detected emission and the resulting data deliverables.

This technology quantifies emission rate using a proprietary process that takes into consideration the environmental conditions and methane plume vertical and lateral profiles.

Reconciliation

MI Section 3.3 - *Item 4*

Bridger assigns "persistent" or "intermittent" labels to detected emissions for Operators that specify a second follow up scan for target areas with detected emissions in their Monitoring Agreement. Follow up scans for target areas with detected emissions is performed within several days of the initial detection event to evaluate persistence of a detected emission event.

Due to the nature of periodic screening technologies, Producers/Operators will need to conduct a Causal Examination using operational and maintenance data to understand the origin, cause, and duration of a detected event.

ADDITIONAL DOCUMENTS

Bridger News and Resources

<https://www.bridgerphotonics.com/scientific-studies-bridgers-capabilities>

Document Status

Table: Version History

Version	Date	Summary of Change
1.0	2023-08 2024-03	First Publication 1 st Paragraph of Applicability section revised to remove ambiguity. Added reference to Source Level Inspection compatibility.