

Nubo Sphere

Supporting Information

Application for Periodic Screening Alternative Technology Approval

Version 1.0 from July 12th, 2024

1 Validation Data Overview

We provide three main categories of validation data to demonstrate that the Nubo Sphere meets the performance criteria as a periodic screening technology according to 40 CRF part 60.

1. Demonstration of a detection threshold of <2 Kg/h with 90% probability of detection based on a blinded 3rd party-controlled release study on the METEC test site as part of the ADED 2024 campaign.
2. Field data from operation on customer oil and gas sites in different representative basins across the US. The field data encompasses emissions reported to operators, for which an on-site AVO or OGI follow-up by the operator has been performed.
3. Basic performance characterization of the laser-based photo-acoustic methane sensor including accuracy, long-term stability and cross-sensitivity.
4. Operating Conditions of the Nubo Sphere emissions monitoring system.

We also provide several additional data sets that support specific aspects of the main categories mentioned above.

An overview of all validation data documents is shown in the table below.

Main category	data set	description	Document reference
Detection threshold	Detection threshold ADED 2024	confirmation of the detection <2 Kg/h with 90% probability of detection based on controlled release testing at the METEC test site as part of the ADED 2024 campaign	CBI - SCS Nubo Sphere Alt Tech 2 Kgh - Validation Data - Detection Threshold
	3 rd party study: very small emission rates	3 rd -party validated controlled release testing study to determine the detection limit of 17 g/h at 20m distance from the emission source.	SCS - VITO - 17gh Test Nubo Sphere - Final Report
Field Data	Confirmed emission detections from operated sites	Cases study with reported emissions with on-site follow-ups by the operators	CBI - SCS Nubo Sphere Alt Tech 2 Kgh - Validation Data - Field Data Case Studies
Performance characterization	Lab testing sensor performance	Performance characterization of the laser-based photoacoustic sensor. Tested parameters: accuracy, cross-sensitivity, detection limit, stability. Field test of sensor stability based on bump testing performed by a 3 rd party,	CBI - SCS Nubo Sphere Alt Tech 2 Kgh - Sensor Performance
Operating conditions	Field data-controlled release testing and operated sites	Environmental conditions, wind conditions, types of sites	CBI - SCS Nubo Sphere Alt tech 2 Kgh - Operating Conditions