



OFFICE OF TRANSPORTATION AND AIR QUALITY

WASHINGTON, D.C. 20460

October 7, 2024

Jonathan Fiedler
KROHNE, Inc.
55 Cherry Hill Road
Beverly, MA 01915

Dear Mr. Fiedler:

This letter is in response to your alternative measurement protocol (AMP) submission of April 9, 2024, under 40 CFR 80.155(a)(3). In your letter, you requested that the EPA approve the use of ultrasonic flow meters that meet the voluntary consensus standard body method ISO 17089-2 as an alternative to the flow meters specified at 40 CFR 80.155(a)(2).

The regulations at 40 CFR 80.155(a) specify that the volume of biogas, renewable natural gas, and renewable compressed natural gas or liquefied natural gas must be continuously measured using specified flow meters. The regulations allow for the EPA to approve an alternative measurement protocol under 40 CFR 80.155(a)(3) if a party demonstrates that they are unable to continuously measure using the specified methods and the party demonstrates that the alternative measurement protocol is at least as accurate and precise as the specified methods. The regulations at 40 CFR 80.135(c)(3)(iii) and (d)(3)(iii) outline the requirements for biogas production and RNG production facilities, respectively, to request an alternative measurement protocol under 40 CFR 80.155(a)(3).

Your submission included information that described how ultrasonic flow meters that meet ISO 17089-2 conduct measurement, listed applicable voluntary consensus standards bodies, described routine maintenance and calibration for ultrasonic flow meters, described the measurement frequency of ultrasonic flow meters, and included a comparison with supporting data between the accuracy, precision, and reliability of the alternative measurement protocol and the requirements specified in 40 CFR 80.155(a)(2).

Based on our review of your April 9, 2024, submission and the voluntary consensus standards listed in your AMP submission, the EPA approves your April 9, 2024, AMP submission and a biogas producer or RNG producer may register its facility to use ultrasonic flow meters that meet ISO 17089-2 under 40

CFR 80.155(a)(3) so long as the producer meets the conditions specified in the attachment and all other applicable regulatory requirements at 40 CFR part 80, subpart E.

We note that your submission and this AMP approval do not address whether a specific facility satisfies the criteria for the approval of an AMP under 40 CFR 80.155(a)(3)(i). A facility that intends to use ultrasonic flow meters covered under this AMP approval must address this criterion in its registration submission as described in the regulations at 40 CFR 80.135(c)(3)(iii)(A) or (d)(3)(iii)(A), as applicable.

If you have any questions related to this general AMP approval, please contact Robert Anderson at anderson.robert@epa.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Byron Bunker", is positioned above the typed name.

Byron Bunker, Director
Implementation, Analysis and Compliance Division
Office of Transportation and Air Quality

EPA Determination that ultrasonic flow meters that meet ISO 17089-2 meet the requirements for an alternative measurement protocol under 40 CFR 80.155(a)(3)(ii)

Summary

On April 9, 2024, KROHNE, Inc. submitted an alternative measurement protocol request under 40 CFR 80.155(a)(3)(ii). The regulations at 40 CFR 80.155(a) specify that the volume of biogas, renewable natural gas (RNG), and renewable compressed natural gas (CNG) or liquefied natural gas (LNG) must be continuously measured using specified flow meters. The regulations allow for the EPA to approve an alternative measurement protocol under 40 CFR 80.155(a)(3) if a party demonstrates that they are unable to continuously measure using the specified methods and the party demonstrates that the alternative measurement protocol is at least as accurate and precise as the specified methods. The regulations at 40 CFR 80.135(c)(3)(iii) and (d)(3)(iii) outline the requirements for biogas production and RNG production facilities, respectively, to request an alternative measurement protocol under 40 CFR 80.155(a)(3).

Based on EPA staff review of the April 9, 2024, submission the EPA has determined that ultrasonic flow meters are as precise, accurate, and reliable as meters specified at 40 CFR 80.155(a)(2) so long as a facility installs, operates, calibrates, and maintains the meter consistent with ISO 17089-2.

The following sections describe how the April 9, 2024, submission satisfies the applicable regulatory requirements at 40 CFR 80.135 and 80.155, and how biogas and RNG production facilities using ultrasonic flow meters must submit as part of their registration submissions under 40 CFR 80.135.

Description and VCSB standards

The regulations at 40 CFR 80.135(c)(3)(iii)(B)-(C) and 80.135(d)(3)(iii)(B)-(C) require a description of how measurement would be conducted under the alternative measurement protocol and a description of any standards or specifications that apply for the measurement of biogas and RNG, respectively. Any ultrasonic flow meter submission under ISO 17089-2, must include a description of the specific ultrasonic flow meters and data that demonstrate how the meter meets specification in ISO 17089-2 and any other flow meter standards. A list of standards could include:

- ISO 17089-1 Measurement of fluid flow in closed conduits – Ultrasonic meters for gas – Part 1: Meters for custody transfer and allocation measurement
- ISO 17089-2 Measurement of Gas by Multipath Ultrasonic Meters
- ASME MFC-5.1 Measurement of Liquid Flow in Closed Conduits Using Transit-Time Ultrasonic Flowmeters
- ASME PTC 19-5 Flow Measurement Performance Test Codes
- OIML R-137 Gas meters Part 1: Metrological and technical requirements and Part 2: Metrological controls and performance tests
- API MPMS CHAPTER 21.1 Flow Measurement Using Electronic Metering Systems - Section 1: Electronic Gas Measurement
- ISO /IEC 17025 General requirements for the competence of testing and calibration laboratories

Any facility wishing to utilize this general AMP approval must note in their registration submission under 40 CFR 80.135 that they are using an ultrasonic flow meter as described in this AMP approval letter and must note in their registration submission under 40 CFR 80.135 that they intend to use ultrasonic flow meters that meet at a minimum ISO 17089-2 installed at their facility.¹

Calibration and maintenance

The regulations at 40 CFR 80.135(c)(3)(iii)(D) and 80.135(d)(3)(iii)(D) require a description of all routine maintenance and the frequency that such maintenance will be conducted for an alternative measurement protocol.

Calibration should be performed according to ISO 17089 Parts 1 and 2, ASME MFC-5.1, ASME PTC 19-5, and OIML R-137 Parts 1 and 2. Additionally, the calibration laboratory should meet requirements for a competent laboratory, such as ISO/IEC 17025. If the Ultrasonic flowmeter is calibrated with water or other fluid not identical to RNG, the equivalency to RNG flow must be demonstrated. Based on our review of the VCSB standards cited in your April 9, 2024, submission, calibration must be performed according to procedures in ISO 17089-2 or a similar standard such as ASME PTC 19-5, ASME PTC 19.5-2022, or OIML R-137 parts 1 and 2 at a competent calibration laboratory (e.g., ISO/IEC 17025). Any facility wishing to utilize this general AMP approval must note in their registration submission under 40 CFR 80.135 that the facility intends to meet the calibration specifications in ISO 17089 Parts 1 and 2, ASME MFC-5.1, ASME PTC 19-5, and OIML R-137 Parts 1 and 2, and ISO/IEC 17025 or describe an alternative maintenance and calibration procedure. If utilizing an alternative calibration procedure, the facility must describe how the alternative will ensure proper operation of the meter in their registration submission.

Based on our review of your submission, the maintenance procedures specified in ISO 17089 Parts 1 and 2, ASME MFC-5.1, ASME PTC 19-5, and OIML R-137 Parts 1 and 2 should help ensure reliable operation of ultrasonic flow meters if followed. Any facility wishing to utilize this AMP approval must note that they intend to follow the ISO 17089 Parts 1 and 2, ASME MFC-5.1, ASME PTC 19-5, and OIML R-137 Parts 1 and 2 specifications. If utilizing an alternative maintenance procedure, the facility must describe how the alternative will ensure proper operation of the meter in their registration submission.

Measurement frequency

The regulations at 40 CFR 80.135(c)(iii)(E) and 80.135(d)(iii)(E) require facilities to submit a description of the frequency of all measurements and how often such measurements will be recorded under the alternative measurement protocol. ISO 17089-2 does not state a frequency of measurement protocol. Producers utilizing ISO 17089-2 for acceptance for use of an ultrasonic flow meter must demonstrate in their registration submissions that their ultrasonic flow meter(s) can measure and record data at a minimum of every one (1) second consistent within the definition of continuous measurement at 40 CFR 80.2.²

¹ Note, the facility should not submit copies of referenced VCSB standards as part of their registration submission.

² The regulations at 40 CFR 80.2 define “continuous measurement” as “the automated measurement of specified parameters of biogas, treated biogas, or natural gas as follows: (1) For in-line GC meters, automated measurement must

Any facility wishing to utilize this general AMP approval must include a description of the frequency of measurement and how often such measurements will be recorded as part of their registration submission under 40 CFR 80.135. If the facility intends to meet the frequency specified in the definition of continuous measurement at 40 CFR 80.2, the facility should note that. If the facility wishes to use a less frequent measurement or recording frequency, the facility must specify what that frequency is and include a demonstration over how that frequency will result in measurement equivalent or better than the specified measurement and recording rates for continuous measurement at 40 CFR 80.2.

Accuracy, precision, and reliability comparison

The regulations at 40 CFR 80.135(c)(3)(iii)(F) and 80.135(d)(3)(iii)(F) require a comparison between the accuracy, precision, and reliability of the alternative measurement protocol and the requirements specified in 40 CFR 80.155(a)(1) and (2), as applicable, including any supporting data. In your April 9, 2024, submission, you included information including supporting data that compared the accuracy, precision, and reliability of ultrasonic flow meters and meters specified at 40 CFR 80.155(a)(2).

Based on our review of your April 9, 2024, submission, the listed VCSB standards, and other submissions requesting AMPs for ultrasonic flow meters, we have determined that ultrasonic flow meters that meet ISO 17089 Parts 1 and 2, ASME MFC-5.1, ASME PTC 19-5, and OIML R-137 Parts 1 and 2 are as accurate, precise, and reliable as flow meters specified at § 80.155(a)(2) as long as the producer demonstrates that the ultrasonic flow meters are selected for use, as per the guidelines in ISO 17089 Parts 1 and 2, ASME MFC-5.1, ASME PTC 19-5, and OIML R-137 Parts 1 and 2, and are compliant with the minimum accuracy and repeatability specifications in ISO 17089 Parts 1 and 2, ASME MFC-5.1, ASME PTC 19-5, and OIML R-137 Parts 1 and 2.

Any facility using ultrasonic flow meters covered under this AMP approval should note in their registration submission under 40 CFR 80.135 that they are relying on the EPA's determination in this letter to demonstrate the comparison of accuracy, precision, and reliability of ultrasonic flow meters that meet ISO 17089 Parts 1 and 2, ASME MFC-5.1, ASME PTC 19-5, and OIML R-137 Parts 1 and 2 and the meters specified at 40 CFR 80.155(a)(2) and describe how their ultrasonic flow meters comport with ISO 17089 Parts 1 and 2, ASME MFC-5.1, ASME PTC 19-5, and OIML R-137 Parts 1 and 2.

occur and be recorded no less frequent than once every 15 minutes. (2) For flow meters, automated measurement must occur no less frequent than once every 6 seconds, and weighted totals of such measurement must be recorded at no more than 1 minute intervals. (3) For all other meters, automated measurement and recording must occur at a frequency specified at registration."