



## OFFICE OF TRANSPORTATION AND AIR QUALITY

WASHINGTON, D.C. 20460

October 7, 2024

Mr. Hiren Thakkar  
McCrometer  
6255 West Stet  
Hemet, CA 92545-7799

Dear Mr. Thakkar:

This letter is in response to your alternative measurement protocol (AMP) submission of December 18, 2023, under 40 CFR 80.155(a)(3). In your letter, you requested that the EPA approve the use of McCrometer V-Cone differential pressure flow meters as an alternative to the flow meters specified at 40 CFR 80.155(a)(2).<sup>1</sup>

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 McCrometer V-Cone differential pressure flow meters conduct measurement, listed applicable voluntary consensus standards bodies, described routine maintenance and calibration for McCrometer V-Cone differential pressure flow meters, described the measurement frequency of McCrometer V-Cone differential pressure 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).

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<sup>1</sup> In your December 18, 2023, submission, you described the following McCrometer V-Cone differential pressure flow meters: precision tube V-Cone and the Wafer-Cone flow meters. For purposes of this letter, unless otherwise specified, the term McCrometer V-Cone differential pressure flow meters include all of the flow meter models included in your December 18, 2023, submission.

Based on our review of your December 18, 2023, submission and the voluntary consensus standards listed in your AMP submission, the EPA approves your December 18, 2023, AMP submission and a biogas producer or RNG producer may register its facility to use McCrometer V-Cone differential pressure flow meters 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 McCrometer V-Cone differential pressure 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 AMP approval, please contact Robert Anderson at [anderson.robert@epa.gov](mailto: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 McCrometer V-Cone differential pressure flow meters (Precision tube V-Cone and the Wafer-Cone flow meters) meet the requirements of 40 CFR 80.155(a)(3)(ii)**

### **Summary**

On December 18, 2023, McCrometer submitted an alternative measurement protocol request under 40 CFR 80.155(a)(3)(ii) for McCrometer V-Cone differential pressure flow meters (Precision tube V-Cone and the Wafer-Cone flow meters). 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 December 18, 2023, submission, the EPA has determined that McCrometer V-Cone differential pressure flow meters (Precision tube V-Cone and the Wafer-Cone flow meters) are as precise, accurate, and reliable as meters specified at 40 CFR 80.155(a)(1) so long as a facility installs, operates, calibrates, and maintains the meter consistent with the December 18, 2023, submission.

The following sections describe how the December 18, 2023, submission satisfies the applicable regulatory requirements at 40 CFR 80.135 and 80.155, and how biogas and RNG production facilities using McCrometer V-Cone differential pressure 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. Your December 18, 2023, submission, included a description of the McCrometer V-Cone differential pressure flow meters (Precision tube V-Cone and the Wafer-Cone flow meters) described the following VCSB standards that cover the McCrometer V-Cone differential pressure flow meters:

- API MPMS 22.2 Differential Pressure Measurement Devices
- ISO 5167-5 Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full – Cone meters

Additional standards that apply are:

- ISO 14164 Stationary source emissions – Determination of the volume flowrate of gas streams in ducts – Automated method

- OIML R-137 Gas meters Part 1: Metrological and technical requirements and Part 2: Metrological controls and performance tests
- ASME PTC 19.5 Flow Measurement Performance Test Codes
- ISO 17025 General requirements for the competence of testing and calibration laboratories

Any facility wishing to utilize this AMP approval must note in their registration submission under 40 CFR 80.135 that they are using a McCrometer V-Cone differential pressure flow meter as described in this AMP approval letter and must note in their registration submission under 40 CFR 80.135 which VCSB standards they intend to use for their McCrometer V-Cone differential pressure flow meters installed at their facility.<sup>2</sup>

### **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.

Data shown in your December 18, 2023, submission demonstrate that the McCrometer V-Cone differential pressure flow meters are compliant with accuracy ( $\pm 1.0\%$ ) and repeatability ( $\pm 0.1\%$ ) specifications in OIML R-137. Your December 18, 2023, submission also described reliability and maintenance requirements for the McCrometer V-Cone differential pressure flow meters.

Based on our review of the VCSB standards cited in your December 18, 2023, submission, calibration must be performed according to ISO 5167-5 and API MPMS 22.2 at a competent calibration laboratory (e.g., ISO/IEC 17025). Any facility wishing to utilize this AMP approval must note in their registration submission under 40 CFR 80.135 that the facility intends to meet the calibration specifications in ISO 5167-5, API MPMS 22.2, and ISO/IEC 17025 or describe an alternative maintenance and calibration procedure. If the McCrometer V-Cone differential pressure mass flow meter is calibrated with a fluid not identical to RNG, the equivalency to RNG flow must be demonstrated. 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 you specify should help ensure reliable operation of McCrometer V-Cone differential pressure flow meters if followed. Any facility wishing to utilize this AMP approval must note that they intend to follow the manufacturer recommended maintenance requirements for the McCrometer V-Cone differential pressure flow meters or suggest an alternative maintenance procedure. If utilizing an alternative maintenance procedure, the facility must describe how the alternative will ensure proper operation of the meter in their registration submission. If utilizing an alternative maintenance and/or calibration procedure, the facility must describe how the alternative will ensure proper operation of the meter.

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<sup>2</sup> Note, the facility should not submit copies of referenced VCSB standards as part of 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. According to your December 18, 2023, submission the meter calculates and records flow readings about once per second (1 Hz) depending on the data output protocol. The data output protocols meet the minimum measurement frequency stated<sup>3</sup> consistent with the definition of continuous measurement at 40 CFR 80.2. Based on your submission, facilities that use McCrometer V-Cone differential pressure flow meters should be able to measure and record data within the 40 CFR 80.2 specification.

Any facility wishing to utilize this 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 December 18, 2023, submission, you included information including supporting data that compared the accuracy, precision, and reliability of McCrometer V-Cone differential pressure flow meters and meters specified at 40 CFR 80.155(a)(1).

Based on our review of your December 18, 2023, submission, and the listed VCSB standards, we have determined that McCrometer V-Cone differential pressure flow meters are as accurate, precise, and reliable as flow meters specified at § 80.155(a)(2). Any facility using McCrometer V-Cone differential pressure flow meters covered under this AMP approval should note in their registration submission under 40 CFR 80.135 that they are relying on EPA's determination in this letter to demonstrate the comparison of accuracy, precision, and reliability of McCrometer V-Cone differential pressure flow meters and the meters specified at 40 CFR 80.155(a)(2).

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<sup>3</sup> 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 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."