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Technical note regarding the Tisch Environmental TE-PM2.5C Cyclone

Background

On Nov. 4, 2014, the EPA formally approved the Tisch Environmental Model TE-Wilbur2.5 Low-Volume Air Particulate Sampler as a manual Federal Reference Method (FRM) for PM_{2.5} (79 FR 65392). As a designated PM_{2.5} FRM (RFPS-1014-219), this sampler operates at a volumetric flow rate of 16.67 Lpm, uses the approved PM₁₀ inlet (40 CFR Part 50 Appendix L, Figures L-2 thru L-19), and can be equipped with either the WINS PM_{2.5} fractionator or the BGI VSCC™ cyclone. Use of the TE-WilburPM_{2.5} FRM sampler was also subsequently approved as part of a PM₁₀ and PM_{2.5} FRM sampler pair (RFPS-1014-220) for determination of PM_{10-2.5} concentrations.

Following approval of this PM_{2.5} FRM, Tisch submitted an application for a candidate Class II Federal Equivalent Method (FEM) PM_{2.5} sampler. The configuration of this candidate sampler was nearly identical to that of the approved FRM (RFPS-0315-221). The significant difference was that the candidate FEM sampler was configured to use a Tisch Environmental Model TE-PM2.5C cyclone as the principal separator (fractionator) in place of the WINS fractionator or VSCC™ cyclone used in the corresponding FRM sampler. With regards to this new fractionator, EPA's subsequent review of the application concluded that the fractionator design met all reasonable requirements for PM_{2.5} cutpoint and concentration measurement accuracy (per CFR 40 Part 53.64) and fractionator loading (per CFR 40 Part 53.65). On June 5, 2015, the EPA formally approved the Tisch Environmental Model TE-Wilbur2.5 (with TE-PM2.5C cyclone) under designation EQPS-0415-223 as a manual FEM sampler for PM_{2.5} (80 FR 32114). Use of the TE-WilburPM_{2.5} FEM sampler (with TE-PM2.5C cyclone) was also subsequently approved as part of a PM₁₀ FRM and PM_{2.5} FEM sampler pair (EQPS-0415-224) for determination of PM_{10-2.5} concentrations.

This technical note provides guidance in the form of questions and answers (Q&A) related to the use of the TE-PM2.5C cyclone as a component in the approved PM_{2.5} FEM sampler. This technical note also provides guidance to manufacturers (other than Tisch Environmental) who might consider incorporation of the Tisch TE-PM2.5C cyclone into previously designated FRM and FEM samplers, as well as into new PM_{2.5} sampler and analyzer designs. It is EPA's intention to provide future possible updates to this technical note on an as-needed basis.

Q1. What is the recommended cleaning frequency and maintenance procedure for the TE-PM2.5C cyclone?

The recommended cleaning frequency of the TE-PM2.5C is 30 days under typical network operation. More frequent cleaning is recommended in sampling situations characterized by high concentrations of airborne particulates larger than 2.5 micrometers. Specific procedures for use

of the TE-PM2.5C cyclone (i.e., installation, removal, cleaning, and maintenance) is provided in the manufacturer's Operating Manual for the TE-Wilbur2.5 sampling platform, which can be found at www.tisch-env.com

Q2. Can existing Tisch Environmental TE-WilburPM2.5 FRM samplers be converted to use the TE-PM2.5C cyclone?

Yes, a Tisch TE-WilburPM2.5 FRM sampler (RFPS-1014-219) may be converted by replacement of its WINS fractionator or VSCC™ cyclone with a TE-PM2.5C cyclone. It is important to note, however, that the converted sampler can no longer be classified as an *FRM* sampler (under designation RFPS-1014-219). Instead, the converted instrument will be classified as an approved *FEM*, under designation EQPS-0415-223.

Q3. Why does incorporation of the Tisch TE-PM2.5C cyclone into the TE-Wilbur2.5 FRM change its designation from an approved FRM to an approved FEM?

Unlike the WINS fractionator and VSCC™ cyclone, the TE-PM2.5C cyclone has not been formally approved by the EPA as a component of a PM_{2.5} FRM sampler. Consideration of such an approval for the TE-PM2.5C would only follow its widespread introduction into nationwide SLAMS networks, a multi-year review of data collected with PM_{2.5} samplers equipped with the TE-PM2.5C cyclone, and formal revision of the definition of the PM_{2.5} reference method through the process of peer-review, notice and public comment, and approval by the EPA Administrator. The timetable by which this consideration might be made cannot be accurately anticipated at this time. In the meantime, though, the TE-PM2.5C cyclone can be successfully incorporated into monitoring instruments as part of approved FEM samplers and analyzers for PM_{2.5} and PM_{10-2.5}.

Q4. What administrative steps does the owner/user of the TE-WilburPM2.5 FRM need to make in order to substitute the TE-PM2.5C cyclone for the WINS fractionator or VSCC™ cyclone? Does the FRM's owner/user need to submit a formal Reference and Equivalent method application or modification request to EPA for this approval?

Because the converted sampler configuration is already approved under FEM designation EQPS-0415-223, EPA does not need to be administratively involved in the conversion of the Tisch Environmental TE-WilburPM2.5 FRM sampler to an FEM sampler. Existing owners/users of the Tisch TE-WilburPM2.5 FRM should purchase the TE-PM2.5C cyclone from Tisch Environmental, who will also furnish installation, conversion, operation, and maintenance instructions for the TE-PM25C cyclone, as well as a new equivalent method identification label to be placed on the sampler. If the conversion is intended to be permanent, the original designation reference method label should be removed from the sampler and replaced with the new designated equivalent method label. In the instance where a converted sampler may need to be restored later to its original FRM configuration (such as for a sampling application specifically requiring a reference method) by re-installation of the WINS fractionator or the VSCC™ cyclone, the new equivalent method label may be installed on the sampler without removing the original reference method label, such that the sampler bears both designation labels. In this instance, the sampler shall be clearly and conspicuously marked by the operator to indicate its configuration (i.e., WINS, VSCC™ cyclone, or TE-PM2.5C cyclone) so that the monitoring method is correctly identified and the correct method code is used when reporting monitoring data obtained with the sampler.

Q5. What steps would instrument manufacturers (other than Tisch Environmental) need to take in order to incorporate the Tisch TE-PM2.5C cyclone into previously designated FRM or FEM samplers and/or analyzers which include the WINS or VSCC™ cyclone?

Manufacturers of previously designated PM_{2.5} sampler and/or analyzers who wish to replace the instrument's existing WINS fractionator or VSCC™ cyclone with the TE-PM2.5C cyclone should contact EPA's Reference and Equivalent (R&E) Methods Designation Program in writing with their intent. Based on the sampler or analyzer under consideration, EPA R&E Program will issue guidance regarding what experimental and administrative steps need to be taken in order to successfully incorporate the hardware modification. In general, though, a written modification request will need to be submitted to the R&E Methods Designation Program which demonstrates that the TE-PM2.5C cyclone's installation does not adversely affect the instrument's ability to achieve and maintain the required volumetric flow rate, and that the instrument successfully passes the required leak check under 40 CFR Part 53.52. Regardless of whether the originally designated instrument was classified as an FRM or an FEM for PM_{2.5}, EPA's subsequent approval of the modification would result in an FEM designation. In addition, a new designation number would be issued and modified instruments would be required to display the new FEM designation label on the front of the instrument.

Q6. Is it possible for an instrument user (rather than a manufacturer) to submit a modification request to incorporate the Tisch TE-PM2.5C cyclone into previously designated FRM or FEM samplers and/or analyzers which include the WINS or VSCC™ cyclone?

At this time, EPA will only accept and process such modification requests from the manufacturers of the originally designated instruments, rather than from individual users. Any subsequent approvals of modification requests would thus globally apply to all such configured instruments, rather than to a single instrument typically associated with a modification request submitted by an individual user.

Q7. What steps would instrument manufacturers (other than Tisch Environmental) need to take in order to incorporate the Tisch TE-PM2.5C cyclone as part of a newly developed PM_{2.5} sampler or analyzer?

Manufacturers of newly developed samplers or analyzers which incorporate the Tisch TE-PM2.5C cyclone would submit written applications to EPA's R&E Methods Designation Program per the usual process for review. For reasons detailed above, these candidate instruments would be subsequently reviewed as candidate PM_{2.5} FEMs rather than as candidate PM_{2.5} FRMs.

For further information, contact: Robert Vanderpool, Reference and Equivalent Methods Designation Program, Human Exposure and Atmospheric Sciences Division (MD-D205-01), National Exposure Research Laboratory, U.S. EPA, Research Triangle Park, North Carolina, 27711: Email: Vanderpool.Robert@epa.gov