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Service Note

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HIGH LEVEL NO_2 CONVERTER CHECKS

I. PURPOSE:

The following is a guideline for how to check the converter efficiency. One of the methods to use is NO_2 gas with a balance of nitrogen.

II. TOOLS:

Bottled gas - NO_2 balance of N_2

III. PARTS:

N/A

IV. PROCEDURE:

Please follow the EPA guidelines attached. For this procedure to work properly, do not allow the NO_2 delivery to exceed 45 minutes, as oxygen would then be required.

ACCEPTABLE ALTERNATIVE PROCEDURE TO SECTION 5.6.1 OF METHOD 20 IN APPENDIX A OF 40 CFR PART 60, (ALSO REQUIRED BY METHOD 7E IN APPENDIX A), TO PERFORMANCE CHECK THE EFFICIENCY OF THE NITROGEN DIOXIDE (NO2) TO NITRIC OXIDE (NO) CONVERTER.

INTRODUCTION

Method 7E, Determination of Nitrogen Oxides Emissions from Stationary Sources, Instrumental Analyzer Procedure (Appendix A, Part 60), requires that on efficiency check be performed on the NO2 to NO converter as specified in Section 5.6 of Method 20. The efficiency check procedure described in Section 5.6.1 of Method 20 involves the injection, into the NOx measurement system, of a gas mixture of NO in N2 and purified air that has been prepared on-site in a Tedlar bag. The NO2 to NO converter is considered acceptable if the NOx analyzer response decreases by no more than 2% from the highest peak response over a period of 30 minutes. The 30-minute period begins (after the Tedlar bag is attached to the injection port) when the system response reaches its highest peak NO value. For each emission source, the efficiency check is to be conducted at the start or restart of each emission test program, and only after the NOx measurement system has been shown to meet the Measurement System Performance Specifications described elsewhere in the Method for all applicable calibration and bias checks.

ALTERNATIVE PROCEDURE TO CHECK NO2 TO NO CONVERTER EFFICIENCY - APPLIES TO BOTH METHODS 7E AND 20.

As noted in Section 5.6.2 of Method 20, alternative procedures may be acceptable.

An acceptable alternative to the Section 5.6.1 procedure of Method 20 for checking NO2 to NO converter efficiency can be the use of a cylinder of NO2 in N2 calibration gas. As compared to the Tedlar bag procedure in Section 5.6.1 of Method 20, the use of NO2 cylinder gas can provide a direct measurement of converter efficiency.

To be acceptable, the cylinder gas procedure must use NIST/EPA-approved certified reference material, standard reference material or Protocol 1 calibration gases certified by the vendor to be within 2% of the tag value. The concentration of NO2 is to be between 40 and 60 ppm.

Although Section 5.6.1 of Method 20 specifies that the tester is to "...attach the bag outlet to the calibration valve assembly and begin operation of the sampling system...", the Tedlar bag procedure is only intended to performance check the NO2 to NO converter itself, and not the entire assembled NOx measurement system, or any other portion thereof, such as the moisture removal system. Substitution of the NO2 cylinder gas procedure will still only check the efficiency of the converter. Consequently, it is now found acceptable for the tester to introduce either the NO2 in N2 gas or the gas prepared as described in Section 5.6.1 of the NO2 in N2 gas or the gas prepared as described in Section 5.6.1 of Method 20 at any point upstream of the NO2 to NO converter, including the injection port at the back of the monitor.

The tester is to direct the NO2 in N2 gas to the NOx analyzer (operating in the NOx mode) until the concentration reading stabilizes. Then, the tester records the instrument response, and calculates the converter efficiency. If the instrument response indicates at least 90 percent NO2 to NO conversion, the converter is acceptable. If the instrument response indicates less than 90 percent NO2 to NO conversion, the converter is unacceptable, and repair or replacement is required before repeating the check.