



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
RESEARCH TRIANGLE PARK, NC 27711

June 19, 2020

OFFICE OF  
AIR QUALITY PLANNING  
AND STANDARDS

Ms. Cathe Kalisz  
API  
200 Massachusetts Avenue, NW  
Suite 1100  
Washington, DC 20001-5571

Dear Ms. Kalisz,

I am writing in response to your letter dated February 28, 2020, in which API requested broad approval of ASTM D6378 in place of ASTM D2879 for the measurement of vapor pressure of petroleum and petroleum products, hydrocarbons, and hydrocarbon-oxygenate mixtures for source applicability determination requirements in 40 CFR part 60, Subparts K, Ka and Kb; 40 CFR part 61, Subpart FF; 40 CFR part 63, Subparts G, Y, R, CC, WW, EEEE and GGGGG; and 40 CFR part 65, Subpart C.

You explain that currently these regulations specify the use of API Publication 2517 or ASTM D2879 for determination of vapor pressure of petroleum and petroleum products. You indicate that the API publication relies on the use of a nomograph or alternatively a correlation equation from the nomograph. The API Publication 2517 nomograph and correlation equation were, in turn, based on Reid vapor pressure measurements and correlations developed from a limited set of petroleum stocks. You state that a direct measurement of vapor pressure is preferable. An ASTM study (MNL51-EB19277) found that the procedure in ASTM D2879 is quite complex and because of the complex nature of the test method and the expensive equipment involved, there has not been a sufficient number of organizations to conduct a comprehensive interlaboratory study to determine the precision and bias of the method. In addition, ASTM D2879 requires boiling the sample liquid to remove dissolved nitrogen, oxygen and carbon dioxide; the boiling step in D2879 changes the total vapor pressure of complex mixtures, making the procedure not optimal for samples containing components with different individual vapor pressures.

In April of 2013, API made a similar request and was given broad approval to use ASTM standard test method D6377-10 as an alternative method<sup>1</sup> for the direct measurement of crude oil vapor pressure for petroleum products as specified in 40 CFR part 60, Subparts K, Ka and Kb; 40 CFR part 61, Subpart FF; 40 CFR part 63, Subparts G, Y, CC, EEEE and GGGGG; and 40 CFR part 65, Subpart C.

With this letter, we approve and clarify the application of both ASTM D6377 and ASTM D6378 as alternative test methods for petroleum products and crude oil in 40 CFR part 60, Subparts K, Ka and Kb; 40 CFR part 61, Subpart FF; 40 CFR part 63, Subparts G, Y, CC, WW, EEEE and GGGGG; and 40 CFR part 65, Subpart C. We are not approving the use of these two ASTM Standard Test Methods for 40 CFR part 63, Subpart R because there is no requirement in this subpart to measure vapor pressure. Based on the discussion above, we agree that the direct measurement of vapor pressure offered by ASTM D6377 and ASTM D6378 offers significant advantages. Approval of these methods is contingent on the specific provisos set forth below:

- 1) ASTM D6377-16, Standard Test Method for Determination of Vapor Pressure of Crude Oil:VPCR<sub>x</sub> (Expansion Method) is approved for testing crude oil vapor pressure in samples that exert a vapor pressure between 25 kPa and 180 kPa (3.6 psi and 26 psi) at a vapor-to-liquid ratio of 4:1.
- 2) ASTM D6378-20, Standard Test Method for Determination of Vapor Pressure (VPX) of Petroleum Products, Hydrocarbons, and Hydrocarbon-Oxygenate Mixtures (Triple Expansion Method) is approved for testing petroleum product samples with boiling points above 0 °C (32 °F) that exert a vapor pressure between 7 kPa and 150 kPa (1.0 psi and 21 psi) at a vapor-to-liquid ratio of 4:1.
- 3) Vapor pressure determination using this alternative method approval must be performed at a temperature consistent with the applicable rule requirements or at 37.8 °C (100 °F), if not otherwise specified.
- 4) You must include a copy of this approval letter in each report containing data generated with the approved alternative methods.

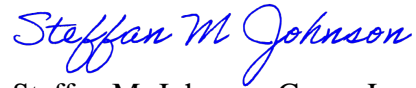
Since this alternative test method approval is appropriate for use at all facilities subject to the vapor pressure determination requirements in 40 CFR part 60, Subparts K, Ka and Kb; 40 CFR part 61, Subpart FF; 40 CFR part 63, Subparts G, Y, CC, WW, EEEE and GGGGG; and 40 CFR part 65, Subpart C, we will post this letter as ALT-137 on EPA's website (at <https://www.epa.gov/emc/broadly-applicable-approved-alternative-test-methods>) and announce that our approval of this alternative is broadly applicable. Should the alternative approvals authorized in this letter be superseded by formal actions to revise the vapor pressure determination requirements in any of the subparts listed above, this approval may be rescinded in part or in full.

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<sup>1</sup> Alt 101 can be found at <https://www3.epa.gov/ttn/emc/approalt/ALT101.pdf>.

This response has been coordinated with EPA's Office of Enforcement and Compliance Assurance. If you have any questions regarding this approval or need further assistance, please contact Ray Merrill at (919) 541-5225 or [merrill.raymond@epa.gov](mailto:merrill.raymond@epa.gov).

Sincerely,



Steffan M. Johnson, Group Leader  
Measurement Technology Group

cc: Marcia Mia, EPA/OECA  
Brenda Shine, EPA/OAQPS/SPPD  
Raymond Merrill, EPA/OAQPS/AQAD  
Regional Testing Contacts