This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

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Standard Practice for Validation of the Performance of Process Stream Analyzer Systems[1]

This standard is issued under the fixed designation D3764; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

INTRODUCTION

Operation of a process stream analyzer system typically involves four sequential activities. *(1)* **Analyzer Calibration**—When an analyzer is initially installed, or after major maintenance has been performed, diagnostic testing is performed to demonstrate that the analyzer meets the manufacturer's specifications and historical performance standards. These diagnostic tests may require that the analyzer be adjusted so as to provide predetermined output levels for certain reference materials. *(2a)* **Correlation for the Same Material**—Once the diagnostic testing is completed, process stream samples are analyzed using the analyzer system. For application where the process analyzer system results are required to agree with results produced from an independent (primary) test method (PTM), a mathematical function is derived that relates the analyzer results to the primary test method results (PTMR). The application of this mathematical function to an analyzer result produces a predicted primary test method result (PPTMR), for the same material. *(2b)* **Correlation for Material including Effect from Additional Treatment to the Material**—The PPTMR in *(2a)* can be used as an input to a mathematical model to predict the effect of an additive and/or a blendstock added to a basestock material as measured by a PTM. *(3)* **Probationary Validation**—After the correlation(s) relationship between the analyzer results and primary test method results has been established, a probationary validation is performed using an independent but limited set of materials that were not part of the correlation activity. This probationary validation is intended to demonstrate that the PPTMRs agree with the PTMRs to within user-specified requirements for the analyzer system application. *(4)* **General and Continual Validation**—After an adequate amount of PPTMRs and PTMRs have been accrued on materials that were not part of the correlation activity, a comprehensive statistical assessment is performed to demonstrate that the PPTMRs agree with the PTMRs to within the tolerances established from the correlation activities. Subsequent to a successful general validation, quality assurance control chart monitoring of the differences between PPTMR and PTMR is conducted during normal operation of the process analyzer system to demonstrate that the agreement between the PPTMRs and PTMRs established in the General Validation is maintained. This practice deals with the third and fourth of these activities.

"Correlation for material including effect from additional treatment to the material" as outlined in this standard is intended primarily to be applied to biofuels where the biofuel material is added at a terminal or other facility and not included in the process stream material sampled by the analyzer at the basestock manufacturing facility. The correlation shall be specific for a constant percentage addition of the biofuels material to the basestock for each model. This practice may not apply for physical properties where the source material for the biofuel material or the denaturant/diluent material used with the biofuel material can significantly affect the finished biofuel's physical property. The user of the standard should investigate the effect of changes to biofuels material blend ratios, biofuels material source material, and blendstock material composition when using this practice. Limits to any of these may need to be applied when the correlation is used.

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