Interpretation Record #15-1988

Date of Issuance: May 19, 2016

Subject: Parallel Calibration Curve (ASMEPTC19.5-2004; para. 5-4(c)(2))

Question (1)
If a Venturi Nozzle or Orifice flow element is manufactured and calibrated with ASME PTC19.5 specified as the standard, must the calibration curve be parallel to the Theoretical Curve as assessed in Section 5-4 in order to be considered acceptably designed and manufactured to PTC19.5?

Response (1)
A Yes or No response is not applicable as PTC 19.5 does not provide specific acceptance criteria. PTC 19.5 Section 5 applies to nozzles and venturis, and the evaluation of flow calibration data for orifice meter sections is provided in Section 4-13.2. PTC 19.5 Section 5-4 states that the nozzle calibration curve should always maintain the same shape as shown in (Eq. 5-4.2). Deviations from the code should be addressed by mutual agreement of the test parties or an applicable technical specification.

Question (2)
If the calibration data has low scatter yielding confidence limits which do not include zero slope and the calibration curve is not parallel to the theoretical curve, is the flow element still acceptable in accordance with PTC 19.5?

Response (2)
See the response to (1) above. PTC 19.5 Section 5-4 states that if the confidence limits for the slope of the linear regression include zero, the nozzle calibration curve must be accepted as parallel to the theoretical curve. The acceptance of a calibration curve with slope confidence limits that do not include zero for test conditions not bounded by the calibration data is not addressed in the code. This case should be addressed by mutual agreement of the test parties or an applicable technical specification.
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Question (3)

If the calibration data do not meet the parallelism criteria in Section 5-4 can the flow element be used in a PTC 19.5 specified application? With what justification?

Response (3)

Yes, a flow section that does not meet the parallelism criteria in Section 5-4 can be used in a PTC 19.5 specified application so long as it is being applied within the Reynolds number range of the calibration. See response to (2) when extrapolation is necessary beyond the calibration data. The parallelism criteria are applicable whenever an extrapolation is necessary beyond the calibration data to a higher operating Reynolds number during the test.