

Gas testing: challenging the industry

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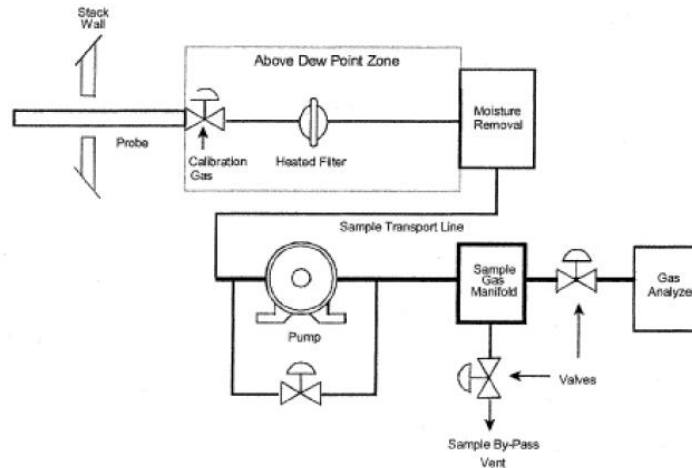
Context

- Background
 - Increasing focus on data quality
 - Revised MES
 - Customers hiring external auditors
 - Inter-laboratory comparisons
 - Liability for engineering design

Review 7e

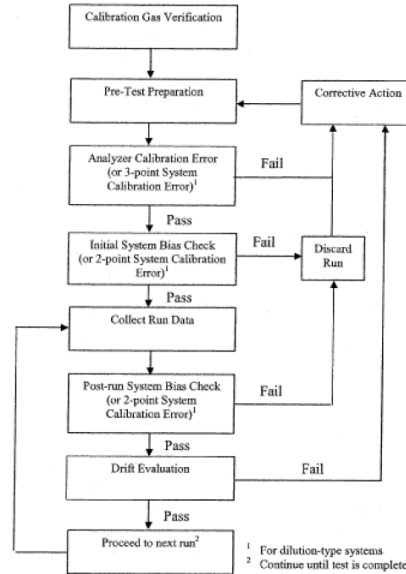
- 7e (NO_x) is the basis for gas testing
- 6c and 10 refer to 7e

Review of USEPA 7e



7e Test Protocol

Figure 7E-2. Testing Flow Chart



Uncertainty constraints

extract

S	Particulate Removal	Filter inertness	Pass system bias check	Each bias check.
M	Analyzer & Calibration Gas Performance	Analyzer calibration error (of 3-point system calibration error for dilution systems)	Within ± 2.0 percent of the calibration span of the analyzer for the low-, mid-, and high-level calibration gases	Before initial run and after a failed system bias test or drift test.
			Alternative specification: ≤ 0.5 ppmv absolute difference	
M	System Performance	System bias (or pre- and post-run 2-point system calibration error for dilution (Systems))	Within $\pm 5.0\%$ of the analyzer calibration span for low-sacle and upscale calibration gases	Before and after each run.
			Alternative specification: ≤ 0.5 ppmv absolute difference	

Our challenge

- Understand and state our uncertainties
- Manage the uncertainty lower
- Gas conditioning
- Equipment and facility change