

EPA Protocol Gas Verification Program

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What are EPA Protocol Gases?

- Compressed gas mixtures assayed using EPA traceability protocol
- Assays are traceable to NIST gaseous reference standards
- Sold by producers and their distributors
- Used for calibrations of air pollution monitors operated by regulated community (government and industry)

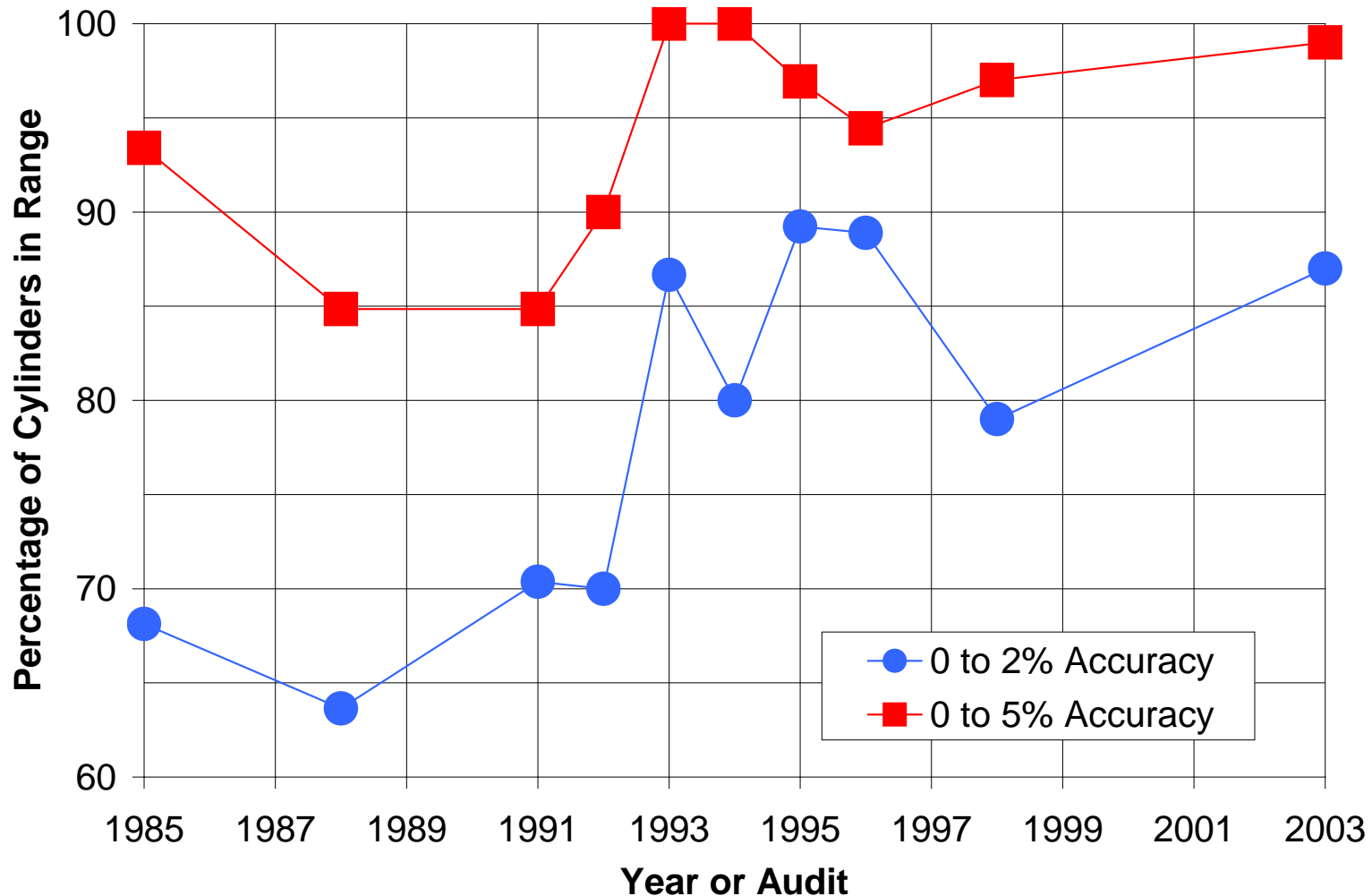
Calibration Gas Requirements in EPA Monitoring Regulations

- Ambient air regulations require EPA Protocol Gases, no accuracy spec
- EPA source methods require EPA Protocol Gases, no accuracy spec
- Acid rain regulations require SRMs, NTRMs or EPA Protocol Gases with +/- 2.0 percent uncertainty

EPA Traceability Protocol

- Developed by EPA, NIST, and producers in 1978
- Balances EPA's need for accurate standards with producers' need for flexibility and low cost
- Specific analytical/statistical method (a recipe)
- Assays of individual cylinders, no batches
- No blanket accreditation of producers
- No blanket certification of products
- No external review of producer's results
- Minimal governmental oversight of producers
- Periodic accuracy assessments of products

Percentage of Audited EPA Protocol Gases within a Given Accuracy Range



2008 Audit by EPA Inspector General

- EPA purchased 87 tri-blend EPA Protocol Gases containing NO, SO₂ and CO₂ in nitrogen at three concentration levels
- Third-party buyer obtained the cylinders from 14 producers
- The cylinders were analyzed by NIST
- Acceptance criterion was EPA acid rain program's ± 2.0 percent uncertainty specification

Results of 2008 IG Audit

[Failures/Total Number (Percent Failures)]

Concentration	NO Component	SO₂ Component	CO₂ Component	All Components
High Level	4/29 (14)	4/29 (14)	0/29 (0)	8/87 (9)
Mid Level	0/29 (0)	4/29 (14)	1/29 (3)	5/87 (6)
Low Level	7/29 (24)	5/29 (17)	3/29 (10)	15/87 (17)
All Levels	11/87 (13)	13/87 (15)	4/87 (5)	28/261 (11)

EPA Inspector General's Recommendations

- Implement oversight program for EPA acid rain program
- Implement oversight program for EPA ambient air program
- Update and maintain EPA traceability protocol

EPA Acid Rain Program Regulations

40 CFR Part 75, Appendix A, Section 5.1.4
EPA Protocol Gases (c)

On and after January 1, 2009, a specialty gas producer advertising calibration gas certification with the EPA Traceability Protocol or distributing calibration gases as "EPA Protocol Gas" must participate in the EPA Protocol Gas Verification Program (PGVP) described in Section 2.1.10 of the EPA Traceability Protocol or it cannot use "EPA" in any form of advertising for these products, unless approved by the Administrator...

EPA Ambient Air Monitoring Regulations

40 CFR Part 58, Appendix A, Section 2.6
Gaseous and Flow Rate Audit Standards

... *Vendors advertising certification with the procedures provided in reference 4 of this appendix and distributing gases as “EPA Protocol Gas” must participate in the EPA Protocol Gas Verification Program or not use “EPA” in any form of advertising.*

Protocol Gas Verification Program

- Separate PGVPs for acid rain program and for ambient air monitoring program
- Emissions verifications performed by NIST
- Ambient air verification by EPA Regions 2 and 7
- PGVP participants do not have to be audited each year and do not have to meet the $\pm 2\%$ accuracy criterion for audit results (no EPA certification)
- PGVP ID number must be listed on certificates
- PGVP results will be publically available

Results of 2010 Emission PGVP

[Failures/Total Number (Percent Failures)]

Concentration	NO Component	SO₂ Component	CO₂ Component	All Components
High Level	3/15 (20)	2/15 (13)	0/15 (0)	5/45 (11)
Mid Level	1/15 (7)	1/15 (7)	1/15 (7)	3/45 (7)
Low Level	3/15 (20)	1/15 (7)	1/15 (7)	5/45 (11)
All Levels	7/45 (16)	5/45 (11)	2/45 (4)	13/135 (10)

Results of 2013 Emission PGVP

[Failures/Total Number (Percent Failures)]

Concentration	NO Component	SO ₂ Component	CO ₂ Component	All Components
High Level	1/20 (5)	0/20 (0)	0/20 (0)	1/60 (2)
Mid Level	1/20 (5)	0/20 (0)	0/20 (0)	1/60 (2)
Low Level	1/40 (3)	2/40 (5)	0/40 (0)	3/120 (3)
All Levels	3/80 (4)	2/80 (3)	0/80 (0)	5/240 (2)

Results of Ambient Air PGVP

[Difference > 2 percent/Total Number (Percent)]

Year (Direct Ship)	NO Standard	SO ₂ Standard	CO Standard	All Standards
2010 (0/42)	0/17 (0)	2/14 (14)	1/17 (6)	3/48 (6)
2011 (20/48)	3/17 (18)	2/16 (11)	0/13 (0)	5/46 (10)
2012 (20/60)	3/25 (12)	4/20 (20)	0/15 (0)	7/60 (12)
2013 (44/59)	3/18 (17)	1/18 (6)	0/21 (0)	4/57 (7)
2014 (29/35)	1/12 (8)	1/11 (9)	1/12 (8)	3/35 (9)
All Years	10/89 (14)	8/79 (12)	1/78 (2)	22/244 (9)

Results of Ambient Air PGVP

[Difference > 5 percent/Total Number (Percent)]

Year (Direct Ship)	NO Standard	SO ₂ Standard	CO Standard	All Standards
Year (Direct Ship)	NO Standard	SO2 standard	CO Standard	All Standard
2010 (0/42)	0/17 (0)	1/14 (7)	0/17 (0)	1/48 (2)
2011 (20/48)	1/17 (6)	0/16 (0)	0/13 (0)	1/46 (2)
2012 (20/60)	0/25 (0)	0/20 (0)	0/15 (0)	0/60 (0)
2013 (44/59)	0/18 (0)	0/18 (0)	0/21 (0)	0/57 (0)
2014 (29/35)	0/12 (0)	0/11 (0)	0/12 (0)	0/35 (0)

Conclusions

- 2008 OIG audit recommended that EPA implement a new program to provide reasonable assurance that EPA Protocol Gases are accurate
- Since 2010, the PGVP has regularly assessed the quality of these reference standards
- PGVP results provide assurance to end users and producers that EPA Protocol Gases are meeting the accuracy requirements of EPA's Acid Rain and Ambient Air Programs.

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