Analysis of Mercury in Materials

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Common Scenario:

- A client calls a chemist and asks, "Can you test for mercury?"
- The chemist's first response will invariably be: "Test for mercury in what?"
- The "what" in this case is the scope of the test
- Let's say the client says, "plastic"
- The chemist will likely search for a standard method, and find none

Risk Assessment

- Metals and alloys: will mercury survive production process?
- Is Hg an ingredient or a part of an ingredient?
- Is Hg used in process?
- Plastic: mercury sulfide (HgS) may be a risk
- Producer can tell if intentionally added

List of EPA Mercury Test Methods

- Method 7470A: [PDF 96KB]
  Mercury in Liquid Waste (Manual Cold-Vapor Technique)
- Method 7471A: [PDF 100 KB]
  Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique)
- Method 7472: [PDF 52 KB]
  Mercury in Aqueous Samples and Extracts by Anodic Stripping Voltammetry (ASV)
- Method 7471B: [PDF 49 KB]
  Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique)
- Method 7473: [PDF 192 KB]
  Mercury in Solids and Solutions by Thermal Decomposition, Amalgamation, and Atomic Absorption Spectrophotometry
- Method 7474: [PDF Format 70 KB]
  Mercury in Sediment and Tissue Samples by Atomic Fluorescence Spectrometry

List of ASTM Mercury Test Methods

- D3223 Standard Test Method for Total Mercury in Water
- E538 Standard Test Method for Mercury in Caustic Soda (Sodium Hydroxide) and Caustic Potash (Potassium Hydroxide)
- D3684 Standard Test Method for Total Mercury in Coal by the Oxygen Bomb Combustion/Atomic Absorption Method
- D6414 Standard Test Method for Total Mercury in Coal and Coal Combustion Residues by Acid Extraction or Wet Oxidation/Cold Vapor Atomic Absorption
- D6722 Standard Test Method for Total Mercury in Coal and Coal Combustion Residues by Direct Combustion Analysis
- E506 Standard Test Method for Mercury in Liquid Chlorine
- D5954 Standard Test Method for Mercury Sampling and Measurement in Natural Gas by Atomic Absorption Spectroscopy
- D6784 Standard Test Method for Elemental, Oxidized, Particle-Bound and Total Mercury in Flue Gas Generated from Coal-Fired Stationary Sources (Ontario Hydro Method)
- D3624 Standard Test Method for Low Concentrations of Mercury in Paint by Atomic Absorption Spectroscopy

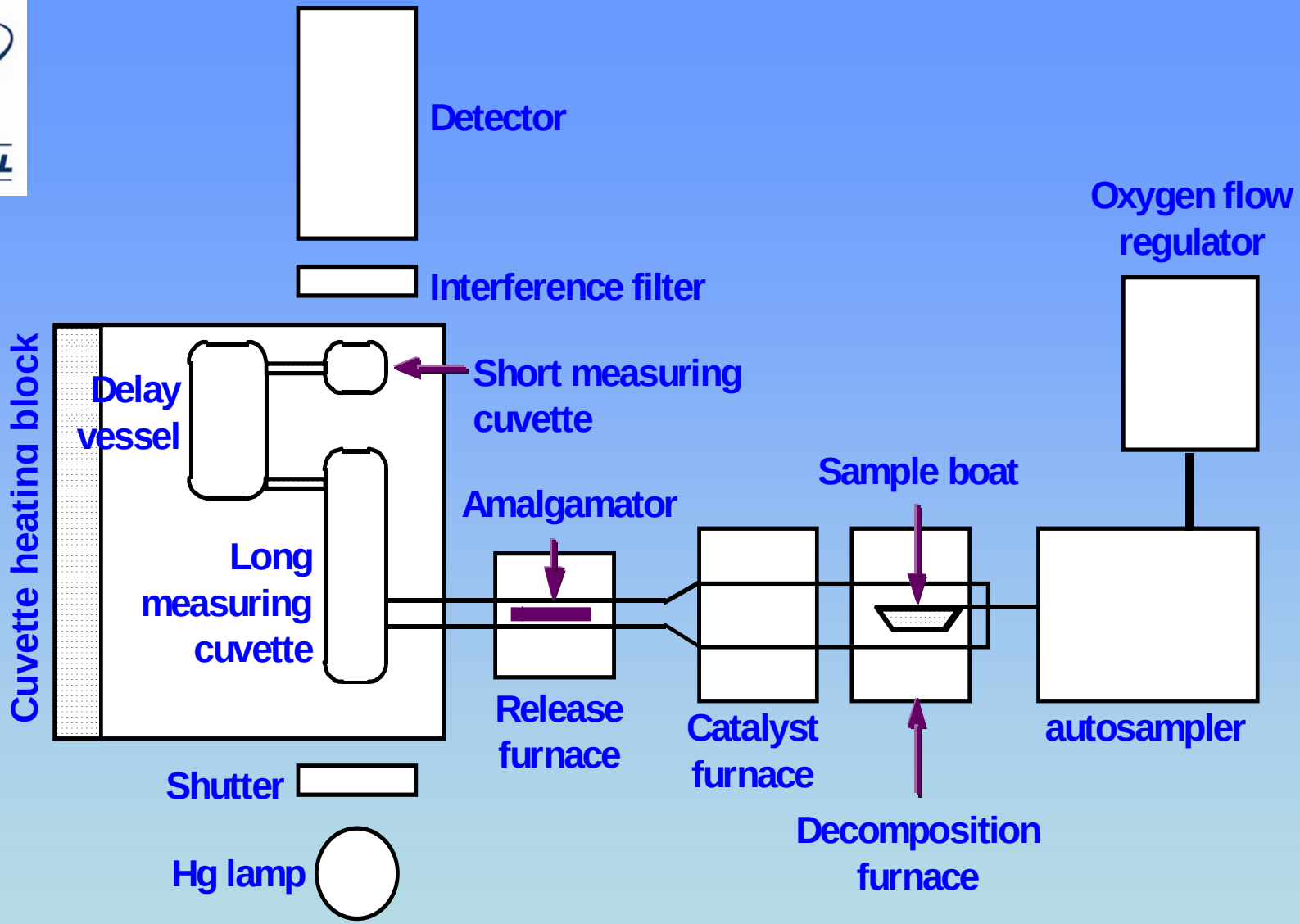
List of ASTM Mercury Test Methods

- E2293 Standard Practice for Drying of Metal Bearing Ores, Concentrates and Related Metallurgical Materials for the Determination of Mercury
- E885 Standard Test Methods for Analyses of Metals in Refuse-Derived Fuel by Atomic Absorption Spectroscopy
- D5198 Standard Practice for Nitric Acid Digestion of Solid Waste

- EPA 7473

Direct Mercury Analysis (DMA)

- Can analyze liquid or solid samples
- Very sensitive: "0.01 ng instrument detection limit"
- Typical range: 0.05 to 600 ng
- Flexible method/not as matrix dependent
- Good for combustible solids and finely divided refractory solids (e.g., rock)
- Quick, easy method; essentially cold vapor AAS



Schematic Diagram of a Direct Mercury Analyzer; Courtesy of Milestone, Inc.

Signal curve "NIST 1633b"

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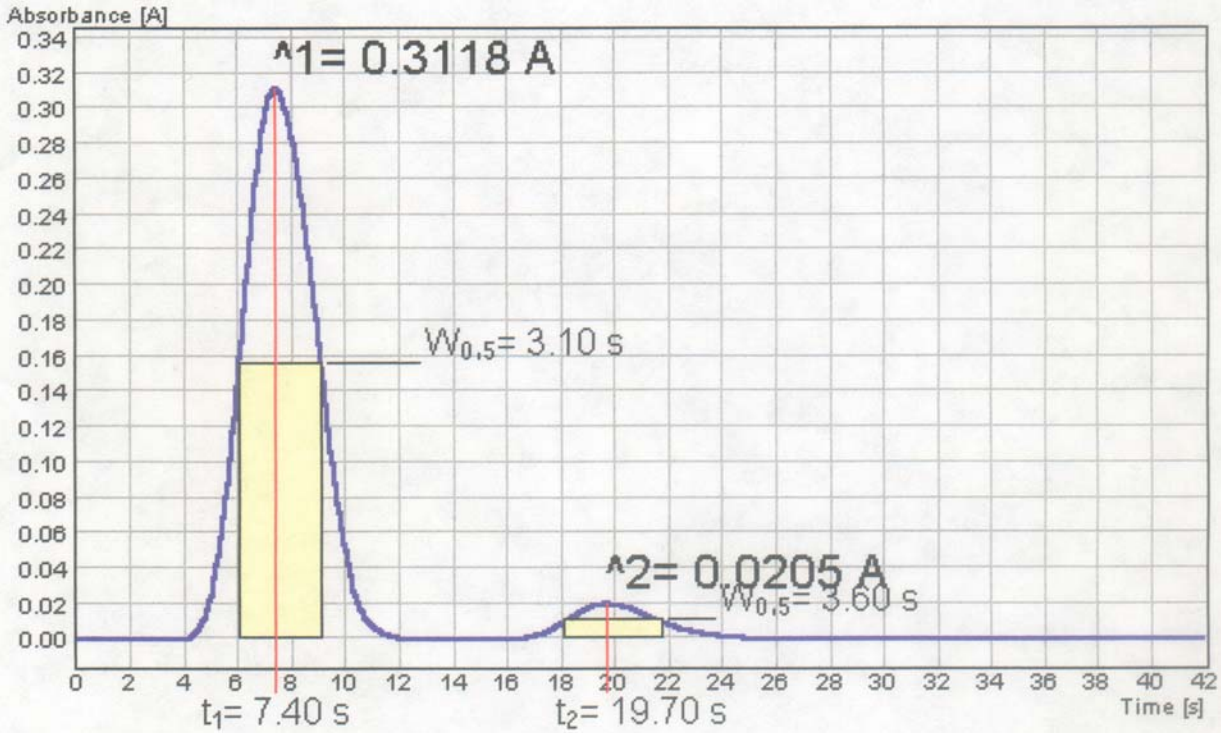

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