TURBIDITY

EiMAS
Institut Alam Sekitar Malaysia
Environment Institute of Malaysia

Turbidity - Outline

- What is Turbidity?
- Turbidity Instrumentation
- Turbidity Standards
- Turbidity Measurement

What is Turbidity?

- A measure of relative water clarity
- A measure of suspended solids
- An indicator of water quality

What is Turbidity?

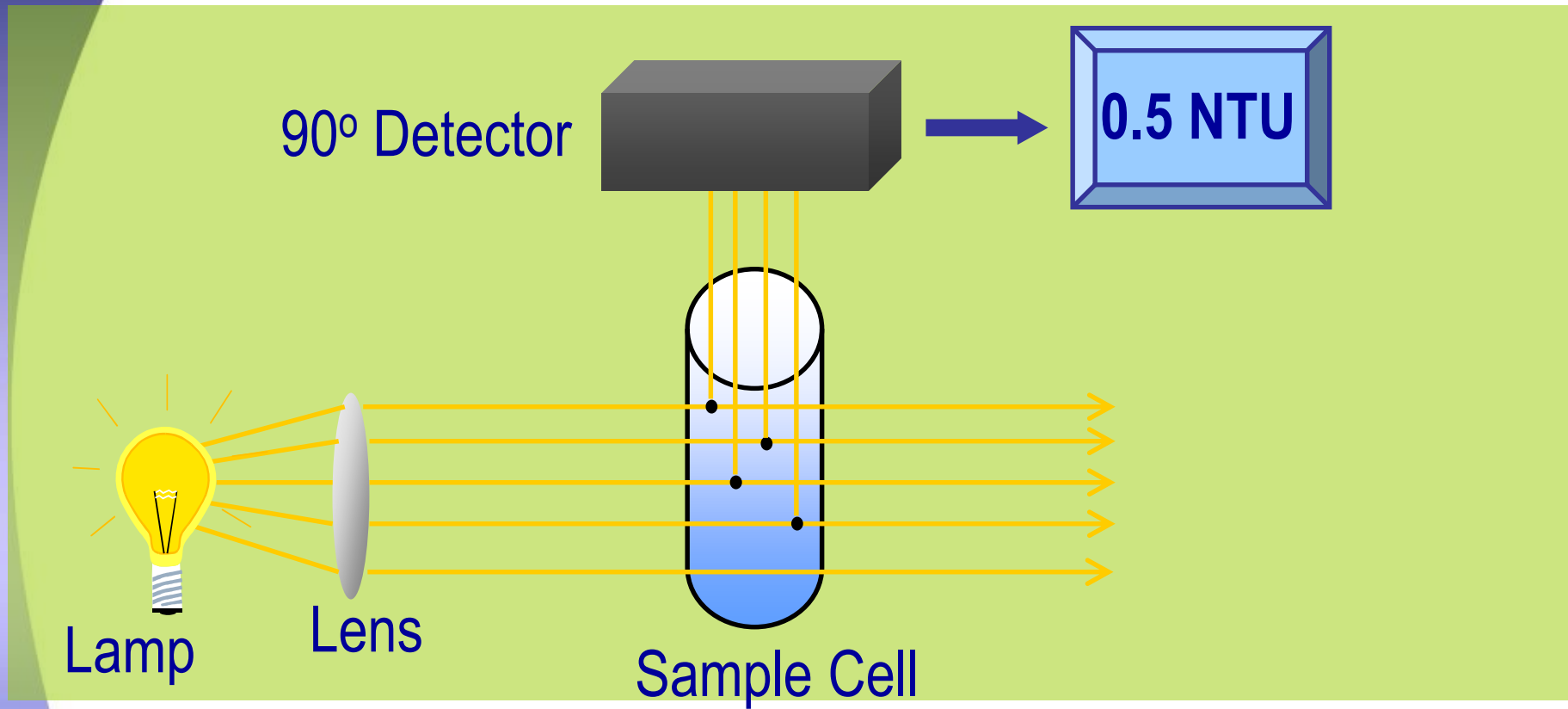
- Suspended particles may include
  - Silt
  - Clay
  - Algae and Other Microorganisms
  - Organic Matter
  - Other Minute Particles

Turbidity Instrumentation

Nephelometer

- Use a 90° design in their optical system
  - Detector 90º from light source
- Results are reported as Nephelometric Turbidity Units (NTU).
- Required for EPA reporting

Basic 90^0 Nephelometer



Turbidity Standards

Turbidity Standards

- Primary Standards - *Formazin, StablCal*
  - High purity material that serves as a reference for measurement comparison

Primary Standards

- Formazin
  - Purchased as a 4000 NTU concentrate or prepared in lab
  - Diluted immediately prior to use
    - Dilutions unstable
  - EPA approved

Primary Standards

- StablCal
  - Purchased at the required NTU value
    - Standards range from 0.3 - 4000 NTU
  - No dilution necessary
  - Stable for 2 years
  - EPA approved

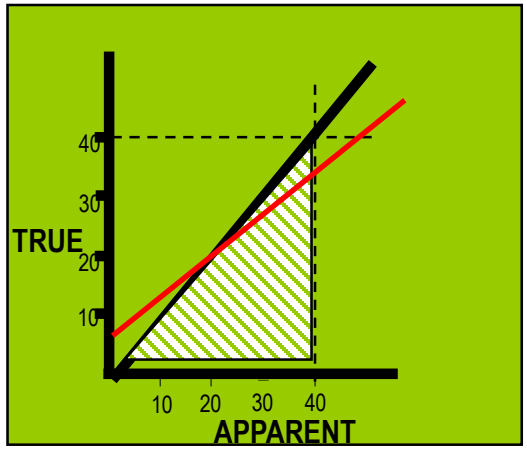
Turbidity Measurement

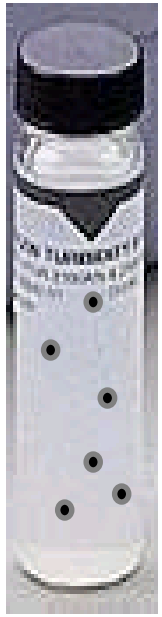
Measuring Turbidity

- Turbidity is just plain different than colorimetry
  - No zero (impossible to measure zero turbidity)
  - Not a comparison measurement
  - Requires calibration on a regular basis

Sources of Error

- Stray Light - Excess light in the system (from any source) contributing to a high turbidity measurement
  - Sample Cells
  - Gas Bubbles
- Improper Calibration





Stray Light - How to Improve

- Stray light allows more light to reach detector = false high turbidity reading
- Sources that affect this is scratches and dust particles
  - Keep sample compartment and optics clean

Sample Cells

- Contaminated cells
  - Dirty sample cells can give a false positive reading
- Scratched cells
  - Scratched cells may scatter light and give a false positive reading

Sample Cells - How to Improve

- Contaminated cells
  - Cells must be meticulously clean
    - Wash with detergent, acid
    - Ultrasonic bath
    - Rinse with filtered deionized water

Turbidity Measurements

- Clean sample cells
- Use silicone oil
- Degas sample
- Maintain instrument
- Follow proper calibration procedure

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