Detection Limit

Qualification

When considering which instrument is appropriate for a given application, it is common to consider various performance characteristics. Regulatory guidance documents provide carefully prescribed directions on how to determine these figures of merit. For Detection Limit (DL), often referred to as Limit of Detection (LOD), both ICH and JP 16 offer clear direction.

ICH Q2B Validation of Analytical Procedures: Methodology allows three different approaches to determine Detection Limit:

1. Visual Examination
2. Signal to Noise
3. Standard Deviation of the Response and Slope
   The calculation, as described in Section VII. C. of the Q2B:

   Detection Limit = 3.3σ / S

   Where σ = standard deviation of the response (determined by multiple blank measurements)

   And S = the slope of the calibration curve

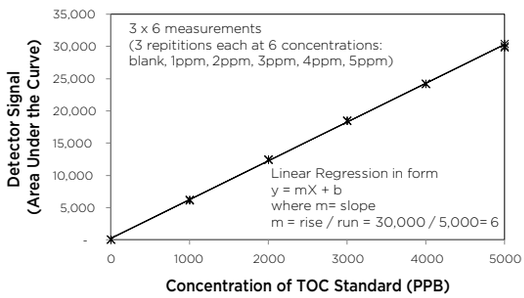
JP 16 Validation of Analytical Procedures (General Information, G1 Physics and Chemistry, Section 2.4. Detection Limit) defines detection limit as:

> *"The lowest amount or concentration of the analyte in a sample that is detectable, but not necessarily quantifiable".*
>
> Unlike ICH, which allows three approaches, JP specifies only one approach to determine the DL:
> **Detection Limit = 3.3σ / slope**

Following the JP 16 approach, the QbD1200 Detection Limit is calculated from a combination of the slope of the calibration curve and the standard deviation observed during multiple measurements of blank water.

The calibration curve for an instrument is always plotted as signal (Y-axis) vs. concentration of a known calibration standard (X-axis). For the QbD1200, an example calibration curve is shown below. As specified in JP 16, the calibration standard used here is KHP (Potassium Hydrogen Phthalate).

Calibration Curve:
Signal vs. Concentration



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