QUALITY CONTROL / QUALITY ASSURANCE

Data
- Assessing data quality
  - Control charts
  - Acceptance limits
  - Evaluation of a control chart
- Reporting data
  - Measurement uncertainty
  - Qualifiers
Assessing data quality

- Control charts:
  - Shewhart charts as
    - Avg.-charts
    - recovery rate charts
  - Range control charts

- Acceptance limits:
  - Upper & lower control limits
  - Upper & lower warning limits

- Evaluation of a control chart
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- **Control charts:**
  - Avg. charts & range control samples
    - pure standard solutions
    - synthetic samples
    - reference samples
    - certified reference material
  - Recovery Rate Samples
    - spiked natural samples / matrix influences
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➢ Control charts:

➢ Avg. charts equations
  \[ \text{%CV} = \frac{\text{standard deviation}}{\text{mean (avg.)}} \times 100 \]
  \[ \text{% Bias} = \frac{\text{measured x} - \text{known x}}{\text{known value}} \times 100 \]

➢ Recovery rate samples
  \[ \text{RR} = \left( \frac{\text{actual increase of x}}{\text{expected increase}} \right) \times 100\% \]
  \[ = \left( \frac{x_{\text{spiked}} - x_{\text{unspiked}}}{\Delta x_{\text{expected}}} \right) \times 100\% \]
  \[ \text{RR} = \frac{X_{\text{act}}}{X_{\text{exp}}} \times 100\% \]
Control charts:

Range control charts

\[ R_i = \text{largest value} - \text{smallest value of a subgroup} \]
\[ \text{consisting of } n \text{ single measurements} \]

\[ R = \frac{\sum R_i}{N} \]
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