Analyzers: Monitoring Free Chlorine with Improved Accuracy

Gander Safe Drinking Water Seminar - March 2019

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Agenda

- Purpose of an on-line free chlorine Analyzer
- Typical Installation
- Analyzer Models Used in Newfoundland and Labrador
- Typical Maintenance and Why you should do it
- Questions/Wrap up

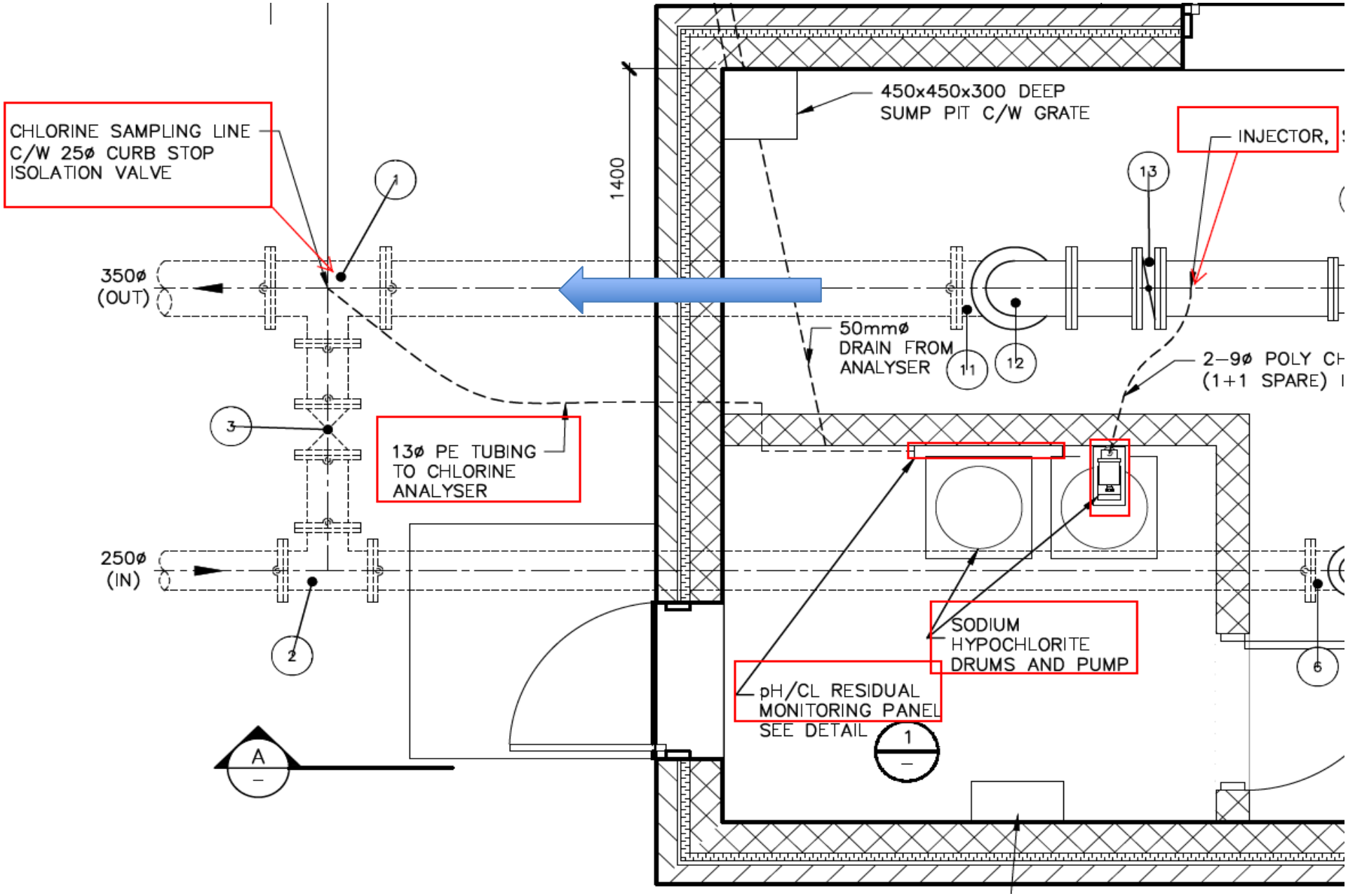
Purpose of an on-line Free Chlorine Analyzer

- Continuously monitor free-chlorine at the outlet of the chlorine building
- Monitoring only
- Monitoring and Control
  - Send signal to chlorination system
    - Metering Pump
    - Gas Chlorinator

Typical Installation

- Sample line connected downstream from Cl_2 injection
- Most time outside building, sometime within the building
- Sample line: Isolation valve, Y-Strainer, PRV, Pressure gauge

Typical Installation



Typical Installation

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Analyzer Technologies

- *3-electrode* w/pH probe compensation
- Membrane *3-electrode* w/pH probe compensation
- *3-electrode* With pH Reagent
- Amperometric

Analyzer Technologies – Pros & Cons

Technology	Pros	Cons	Comments
3-electrode w/pH compensation	Faster sensing No reagent – pH probe Little operational costs	Calibration	➢ Clean/Replace pH probe ➢ Replace Electrolyte ➢ Electrolyte Expiry
Membrane *3-electrode* w/pH compensation	No Reagent – NO pH probe required Little operational costs	Slower Sensing	➢ pH compensation achieved by electrolyte gel in Chlorine sensor
3-electrode w/pH Reagent		Reagent On going operational costs	➢ Reagent expiry ➢ Wears out ➢ Requires freeze protected shipments ➢ Hazardous

Analyzer Models Used in NL

- Evoqua Depolox 3 *plus – 3-electrode + pH Probe*
- Evoqua Micro 2000 – *3-electrode* + Reagent
- Severn Trent – *3-electrode* + Reagent
- Superior – Amperometric + Reagent

Maintenance

As a General Rule:

- *Most analysers drain sample water – make sure free flowing*
- *Sample flow is critical i.e. 500ml/min*

Wallace & Tiernan Depolox 3 *plus*

- With pH probe
- Calibration
  - Cl_2 – Span - daily
  - Cl_2 – Zero – Bi-Monthly
  - pH – no set frequency
- Maintenance
  - Monthly: check Y-strainer
  - Bi-Monthly:
    - Grit – Add half a cap
    - Top up Electrolyte regularly
    - Inspect membranes, replace as required
    - 6-month: remove Cl2 sensor, rince, replace membranes, electrolyte and grit, calibrate, replace membrane if required

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Wallace & Tiernan Micro 2000

- With Reagent
- Calibration
  - Chlorine calibration every 6 months
- Maintenance
  - Reagent (pH 4) use 1 gal every 10 weeks
  - Add Grit as required
  - Check and top up electrolyte level every month
  - Replace electrolyte every 12 months
  - Every 6-12 months, replace…
    - Impeller shaft, and shaft seal
    - Sample and reagent tubing
    - Clean electrodes with clean paper towel

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Superior WaterGuard

- With Reagent
- Calibration
  - Chlorine calibration every 6 months
- Maintenance
  - Clean pre-filter every month
  - (2) Reagent 500ml bottles last 4-8 weeks
  - Reagent pump Heads and Tubes Replacement every 12 months

Severn Trent MicroChem 2

- Chlorine membrane probe CL4000
- Calibration
  - Check weekly and calibrated as needed
- Maintenance
  - Replace electrolyte
  - Every 12 months
    - Replace membrane cap and fill with new electrolyte
    - May require to clean the gold electrode with the blue abrasive paper

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Maintenance and Why You Should Do It

- Critical if used for control
- Follow Manufacturers recommendations
  - Regular calibration to ensure accuracy
    - Chlorine sensor more frequently than pH
  - Top-up/ replace chemicals: Electrolyte, Reagent
  - Clean sensors as recommended by manufacturers
  - Less costly to be preventive then to be sorry