Benefits of Automated Sample Pre-treatment

Al Yates
Regional Manager – Eastern Region

NEMC

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What is the name of the molecule CH_2O?

Seawater

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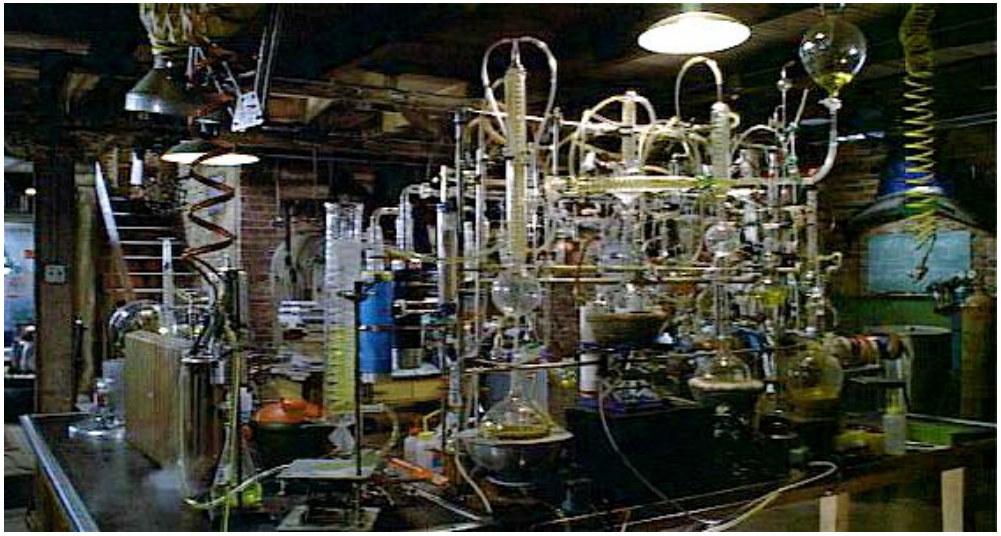

1. Flow analyzer applications
2. Robotic Platform applications

Safety First !!

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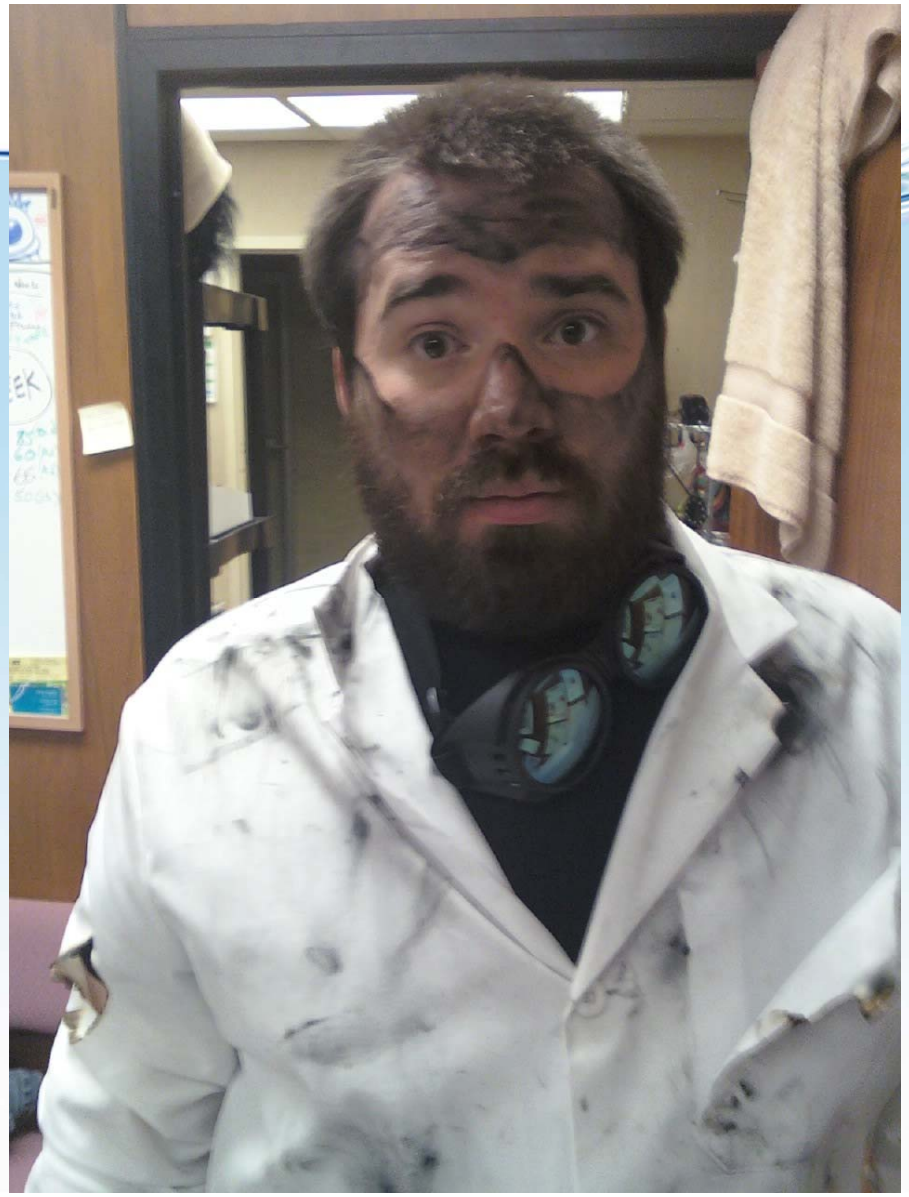

I thought that was the vac line…

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Automated methods for flow analysis:

1. Distillation
2. Extraction
3. Gas Diffusion
4. Digestion

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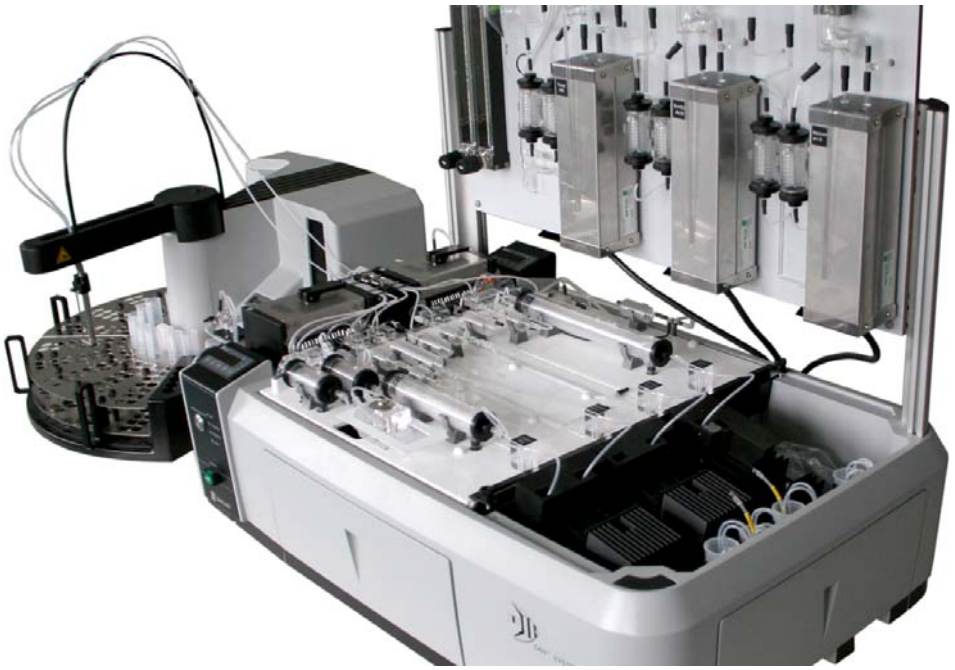
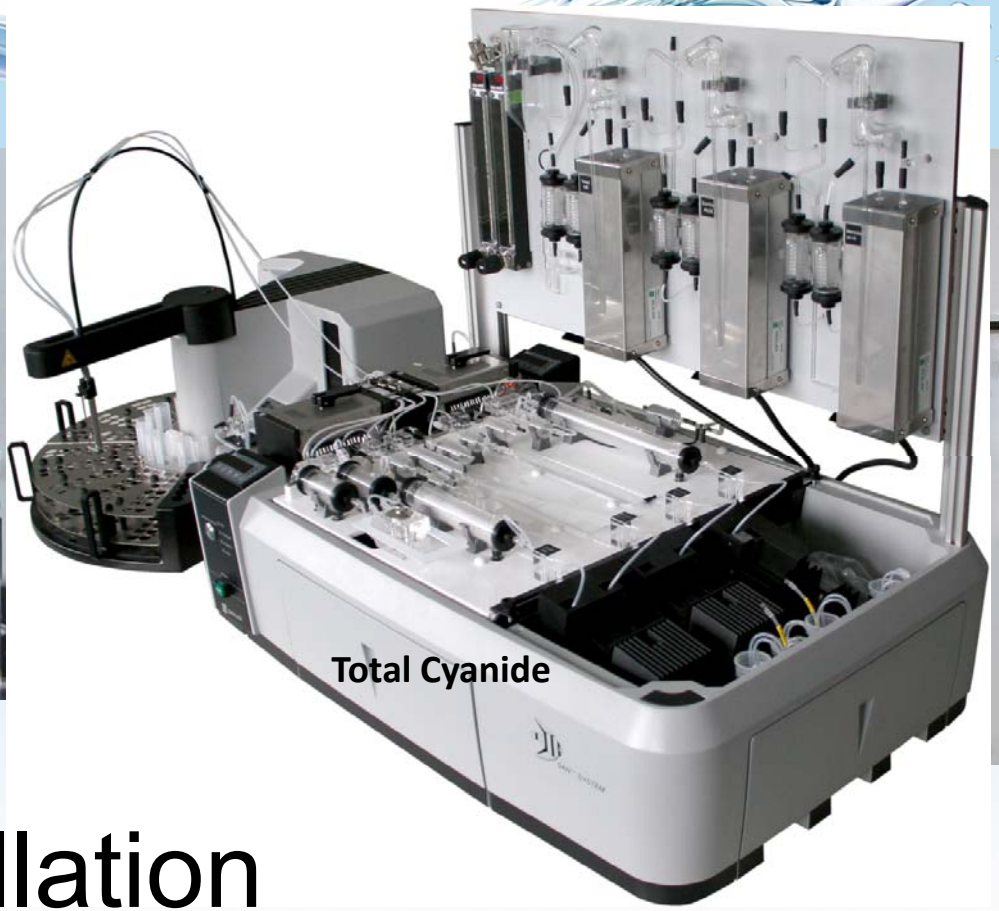


Manual vs Automated Distillation



Total Cyanide

Total Phenols

Inline Distillation

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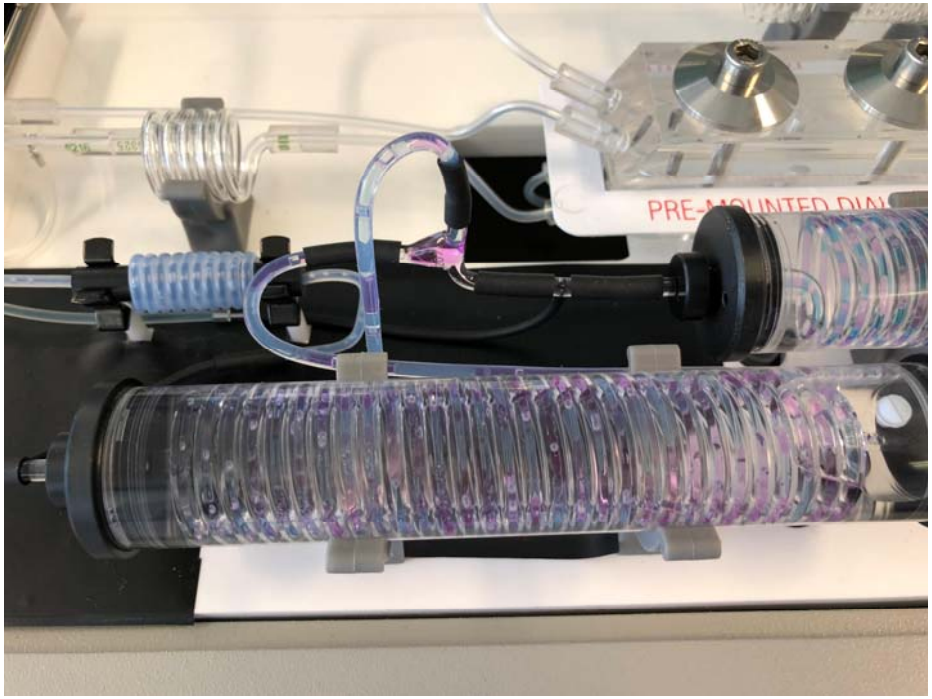
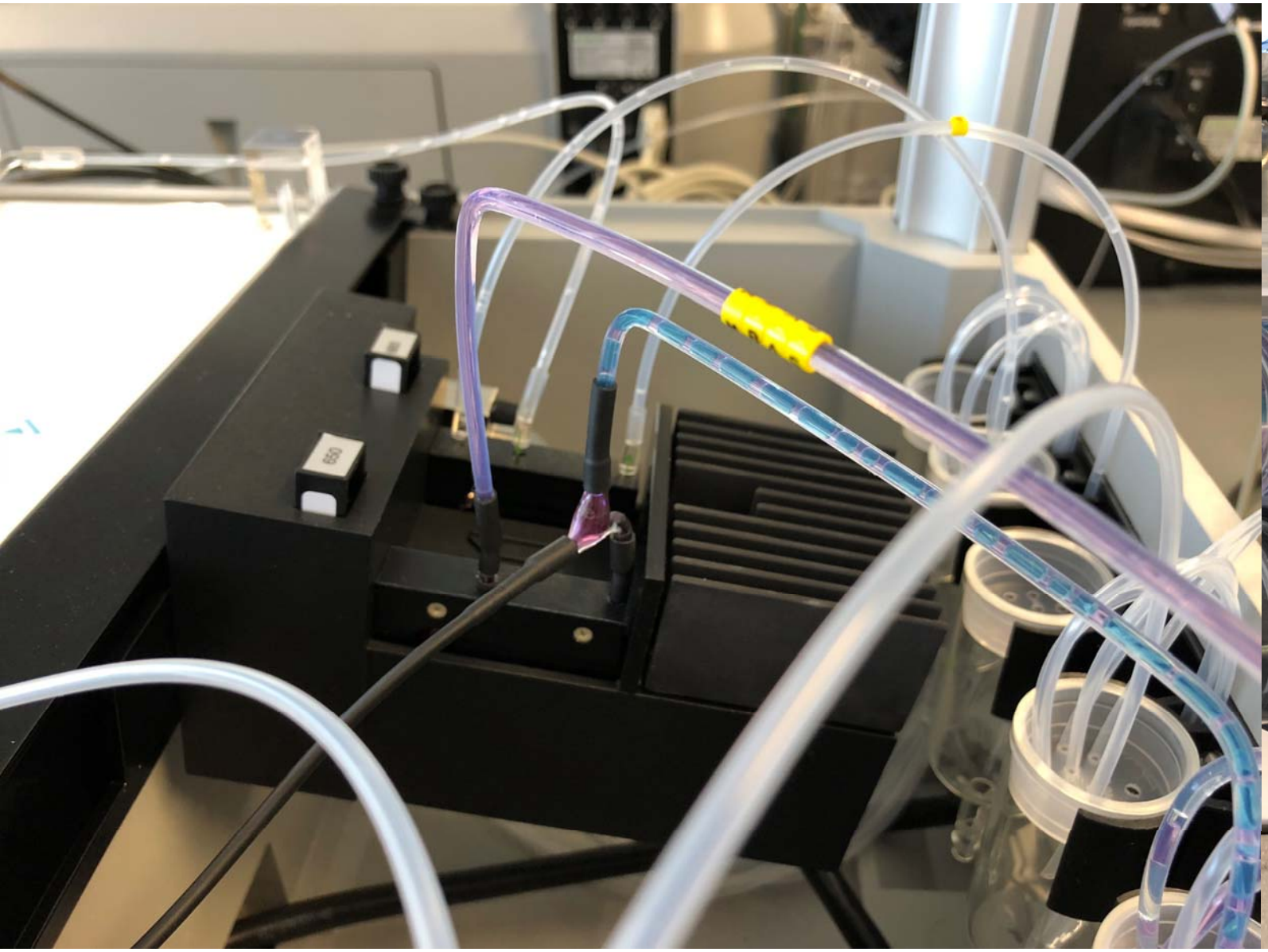


Manual vs Automated Extraction



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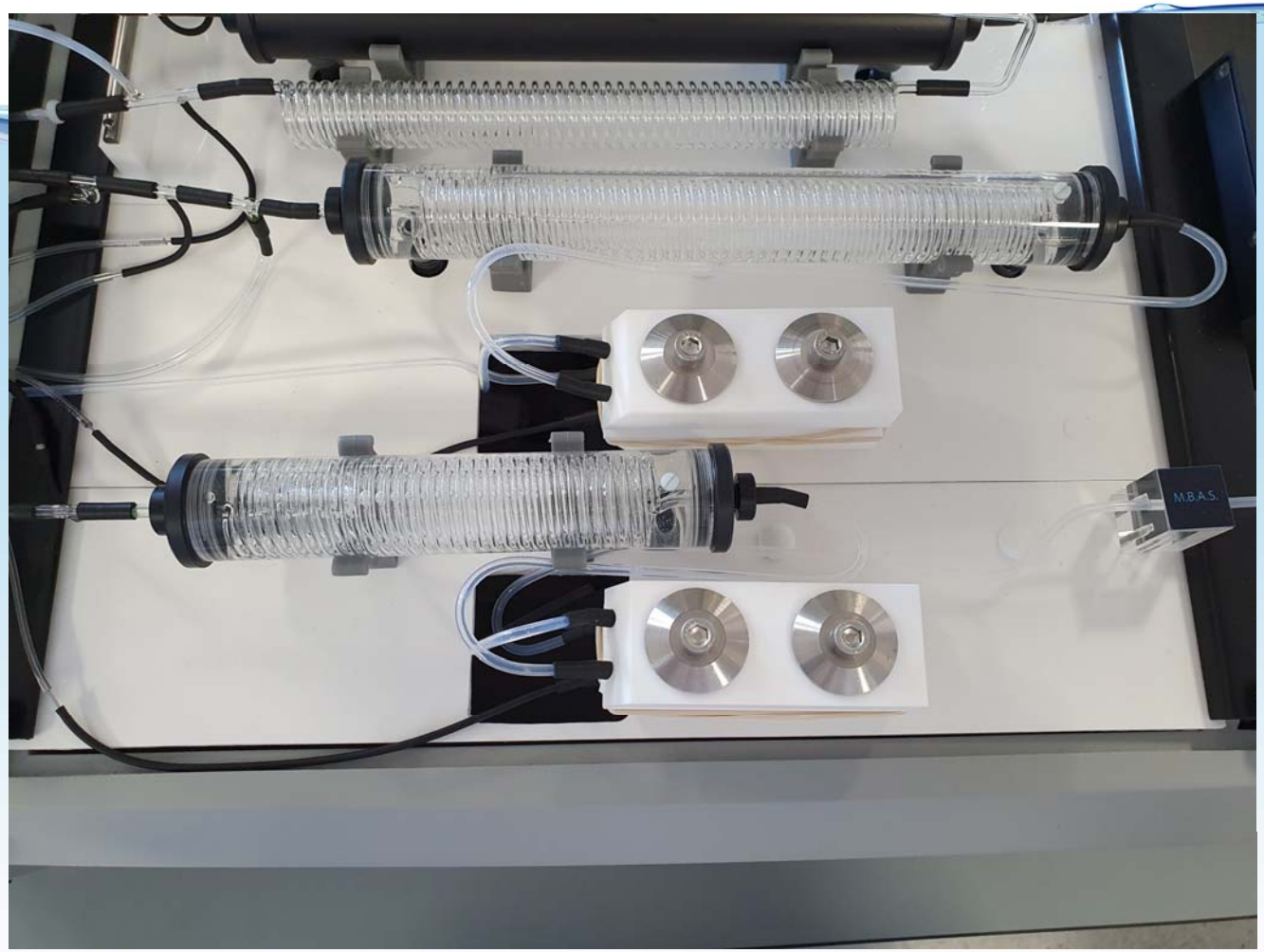

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Ammonia and Cyanide via gas diffusion

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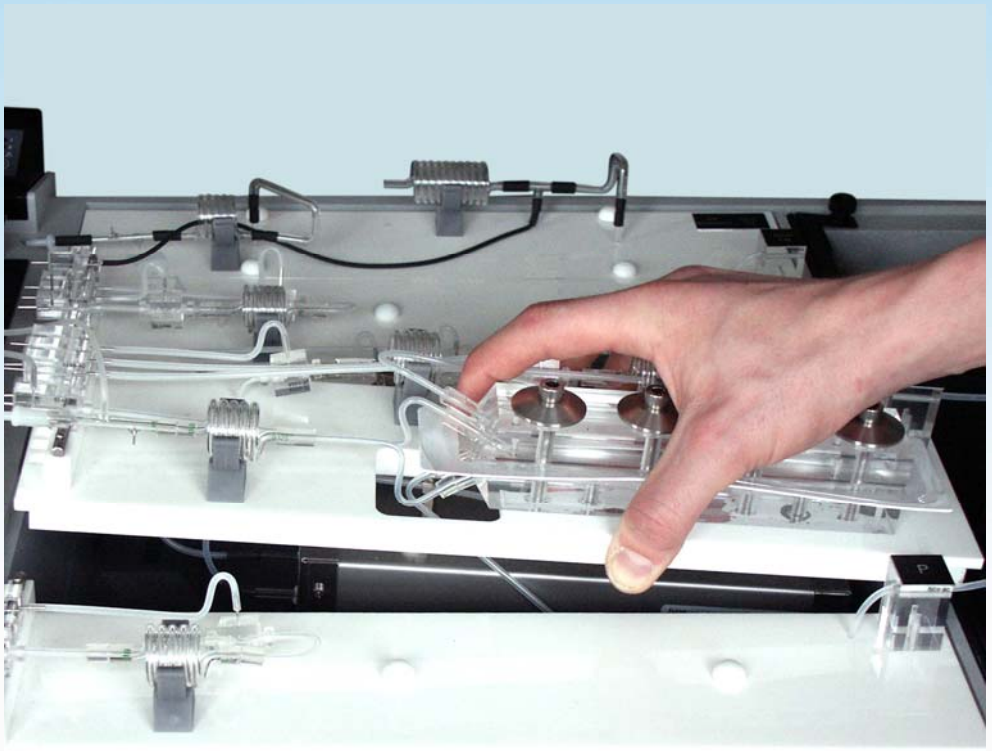
Inline digestion for Total Phosphate and Nitrogen



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Recovery Checks for Inline Digestion

The efficiency of the automatic in-line digestion for TN and TP is well within the pre-defined acceptance criteria of the ISO standard regulation. QC standards were used in accordance with the ISO standard regulations and some other recovery standards used by different laboratories. The compounds mentioned are analyzed at 50% and 100% of the total range and the recovery criteria are +/- 5%.

Maximum range of 5 ppm N		
Glycine 5 ppm	5.10	102.00%
Urea 5 ppm	5.10	102.00%
NH_4Cl 5 ppm	5.01	100.20%
Glycine 2.5 ppm	2.55	101.80%
Urea 2.5 ppm	2.54	101.60%
NH_4Cl 2.5 ppm	2.52	100.60%
Maximum rang of 50 ppm N		
EDTA 25 ppm	24.73	98.92%
EDTA 50 ppm	49.41	98.82%

Maximum range of 10 ppm P		
Tripolyphosphate 10 ppm	10.44	102.00%
Pyrophosphate 10 ppm	10.45	102.00%
Pyridoxalphosphate 10 ppm	5.01	100.20%
Cocarboxylase 10 ppm	2.55	101.80%
Maximum rang of 1.0 ppm P		
Sodium hexametaphosphate 0.5 ppm	491.16	98.92%
Sodium hexametaphosphate 1.0 ppm	975.02	97.50%
Beta glycerophosphate 0.5 ppm	504.62	100.92%
Beta glycerophosphate 1.0 ppm	999.17	99.92%

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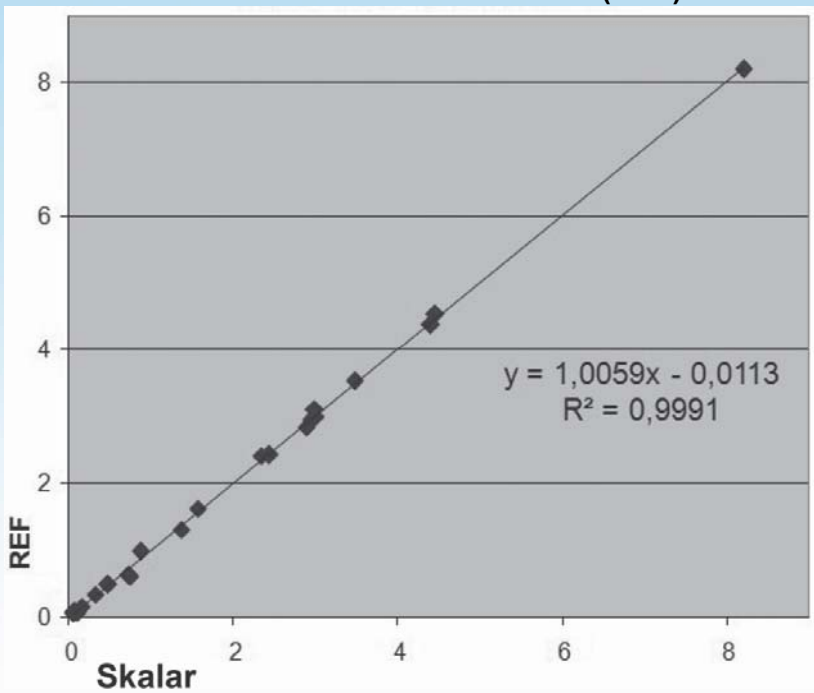
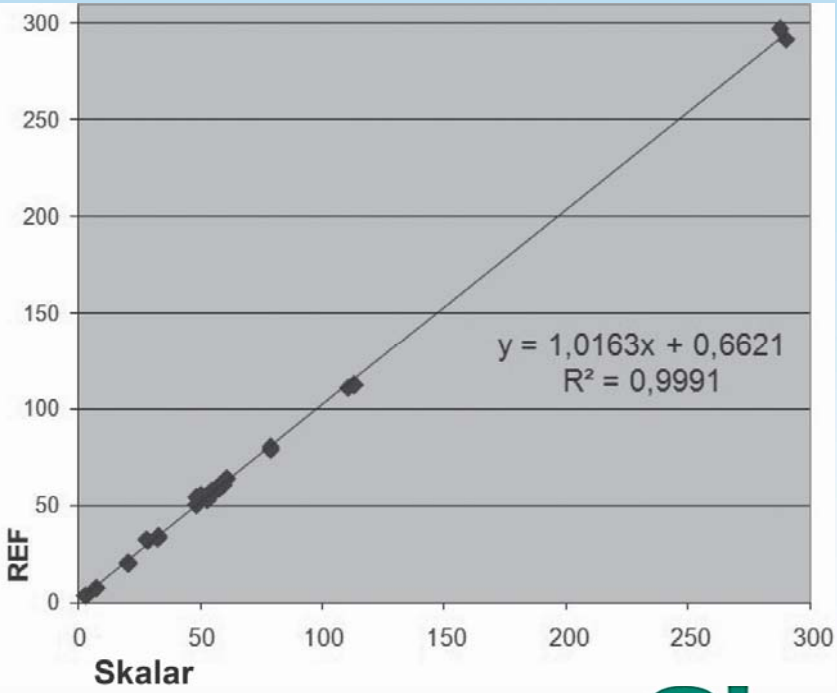
Comparison on real-world samples with the manual methods

Skalar Total Phosphate method vs Manual reference method (REF)



Skalar Total Nitrogen method vs Manual reference method (REF)



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Benefits of Inline automation on flow analysis

1. Safety
2. Reduction of chemical use and hazardous waste
3. Money, cost of distillation tubes
4. Consistent data
5. Time savings
6. Not limited to numbers in batch
7. Lower detection limits

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Automated methods using Robotics Platforms

1. BOD Automation
2. COD and test kit Automation
3. Sample prep stations
4. pH/Alkalinity applications

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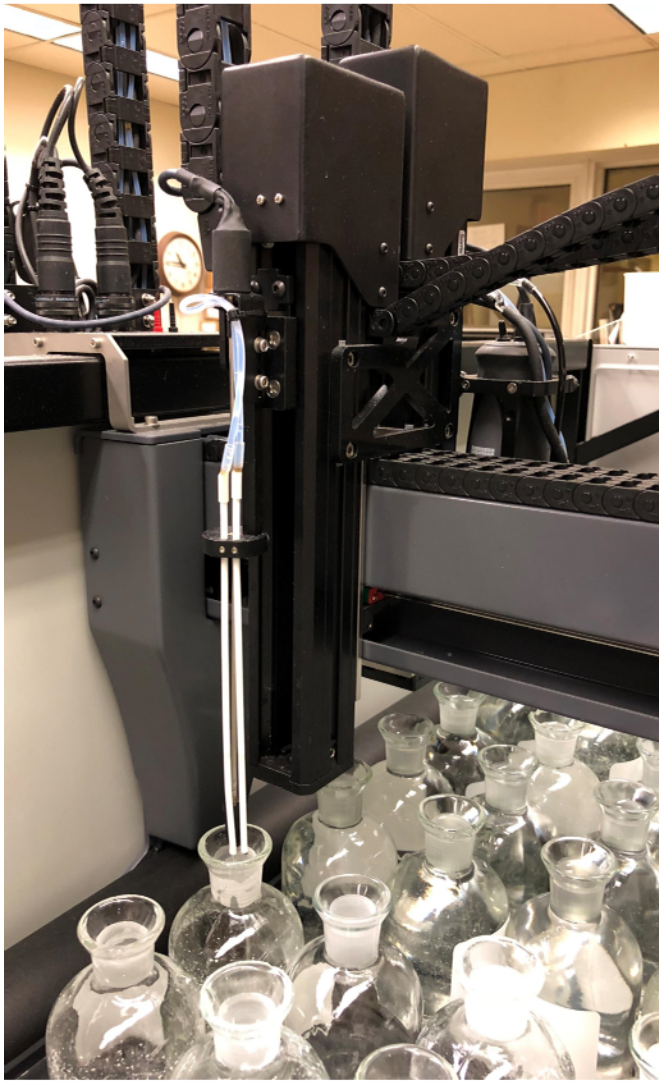
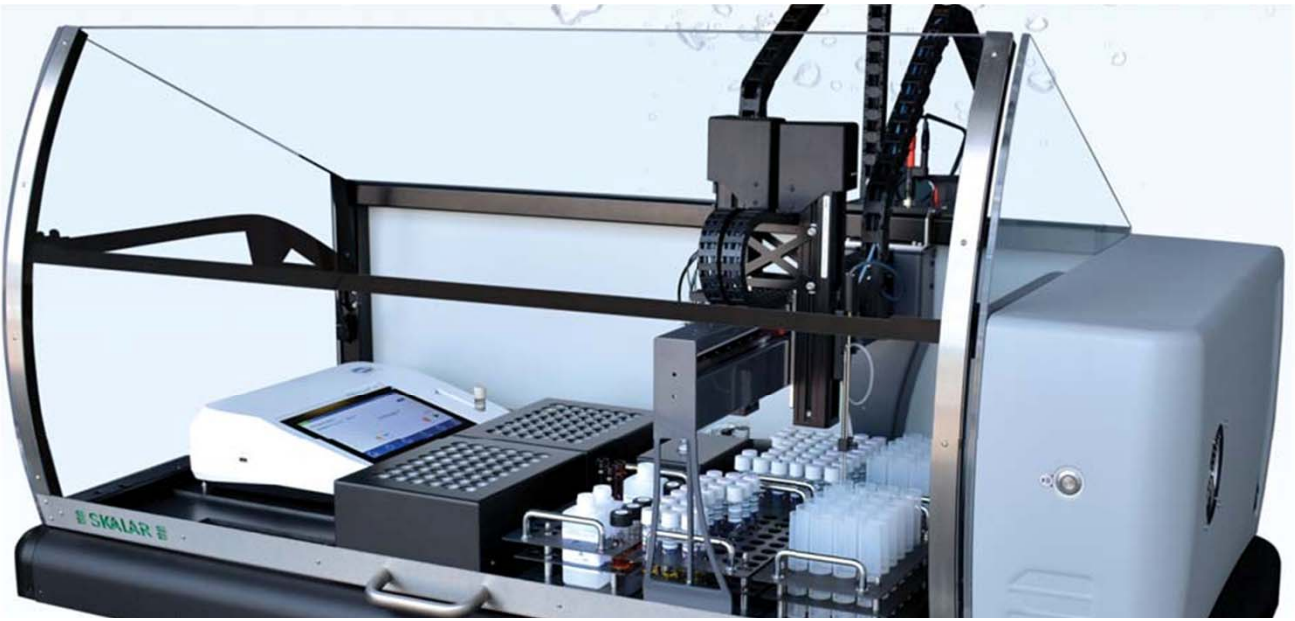
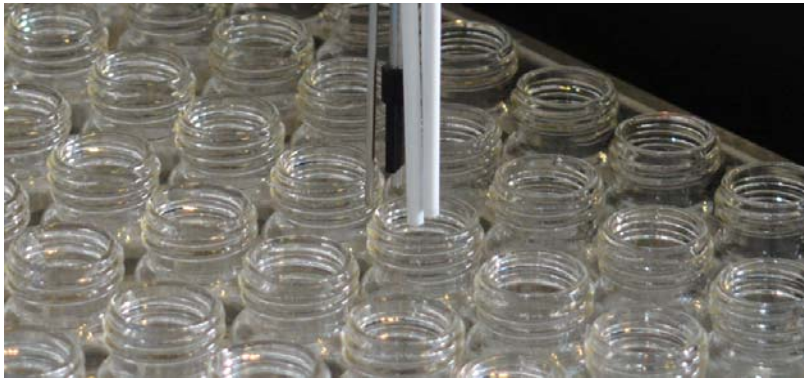
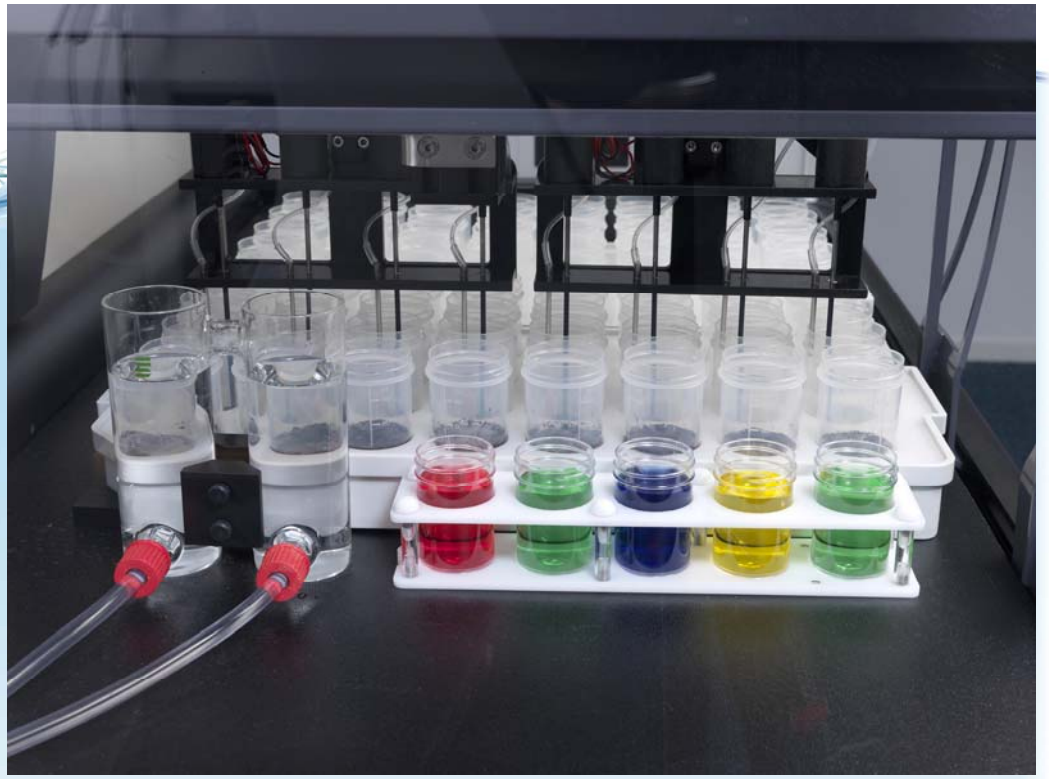




Test Kit Automation

Sample prep and processing





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Benefits of automation on robotics

1. Safety
2. Workplace injuries
3. Money
4. Consistent data
5. Time savings
6. Data integrity
7. System work unattended overnight

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Questions ??

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Thank you !!

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