WEBINAR

Increasing demands in treating wastewater management in our region.

WELCOME

Time	Programme Outline	Presented by
4.00pm	Opening & Housekeeping rules	Singapore Water Association
4.05pm	Welcome Address	Singapore Water Association
4.15pm	Increasing demands in treating wastewater management in our region: Overcoming pain points and boosting efficiencies.	**Mr Stefan Hein** Director Business Unit Digitalization & Industry 4.0 ProMinent GmbH Germany & **Mr Joshua Arlusamy** Technical Manager ProMinent Singapore and Malaysia
4.45pm	Q & A	ProMinent
4.55pm	Closing	Singapore Water Association

DECEMBER 8

Tuesday
SGT:4:00 pm
GMT: +8:00
Virtual (Webex)

Organised by:

enquiry@swa.org.sg
T: (65) 6515 0812

SWA SINGAPORE WATER ASSOCIATION

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Housekeeping

- ✓ To ensure a smooth session, please mute your microphone and turn off the camera. You may communicate with us after the event.
- ✓ Please share your questions in the chat where we will try to provide answers where possible in the Q & A Segment.
- ✓ Do identify yourself so we can respond to any unanswered questions.
- ✓ We will be recording this session and reserve the rights to the video.
- ✓ Please complete a post event survey which upon return, we will forward the recording and presentation deck to the respondents.

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Welcome Address

Mr Tse Yau Shing

Singapore Water Association

Council Member

Director, Projects

Black & Veatch (SEA) Pte Ltd

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Keynote Speakers

Increasing demands in treating wastewater management in our region:

Overcoming pain points and boosting efficiencies.

Mr Stefan Hein

Director Business Unit Digitalization & Industry 4.0
ProMinent GmbH Germany

&

Mr Joshua Arlusamy

Technical Manager, ProMinent Singapore and Malaysia

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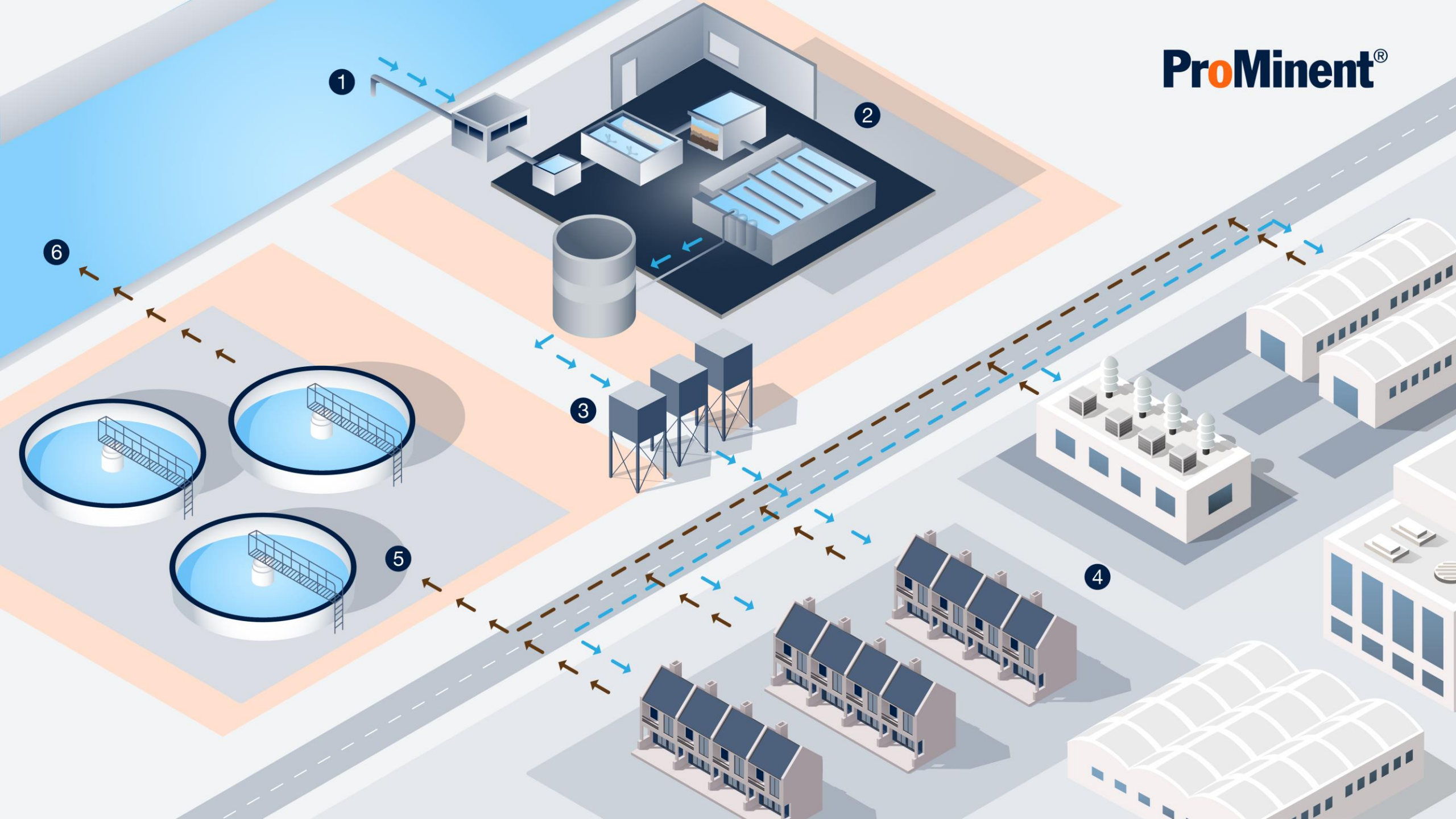
SWA Singapore Water Association

December 8th, 2020 | Joshua Arlusamy & Stefan Hein | ProMinent Group

SMART Solutions for Water & Wastewater Treatment

60 1960 | 2020 ProMinent®

Enabled with DULCOnneX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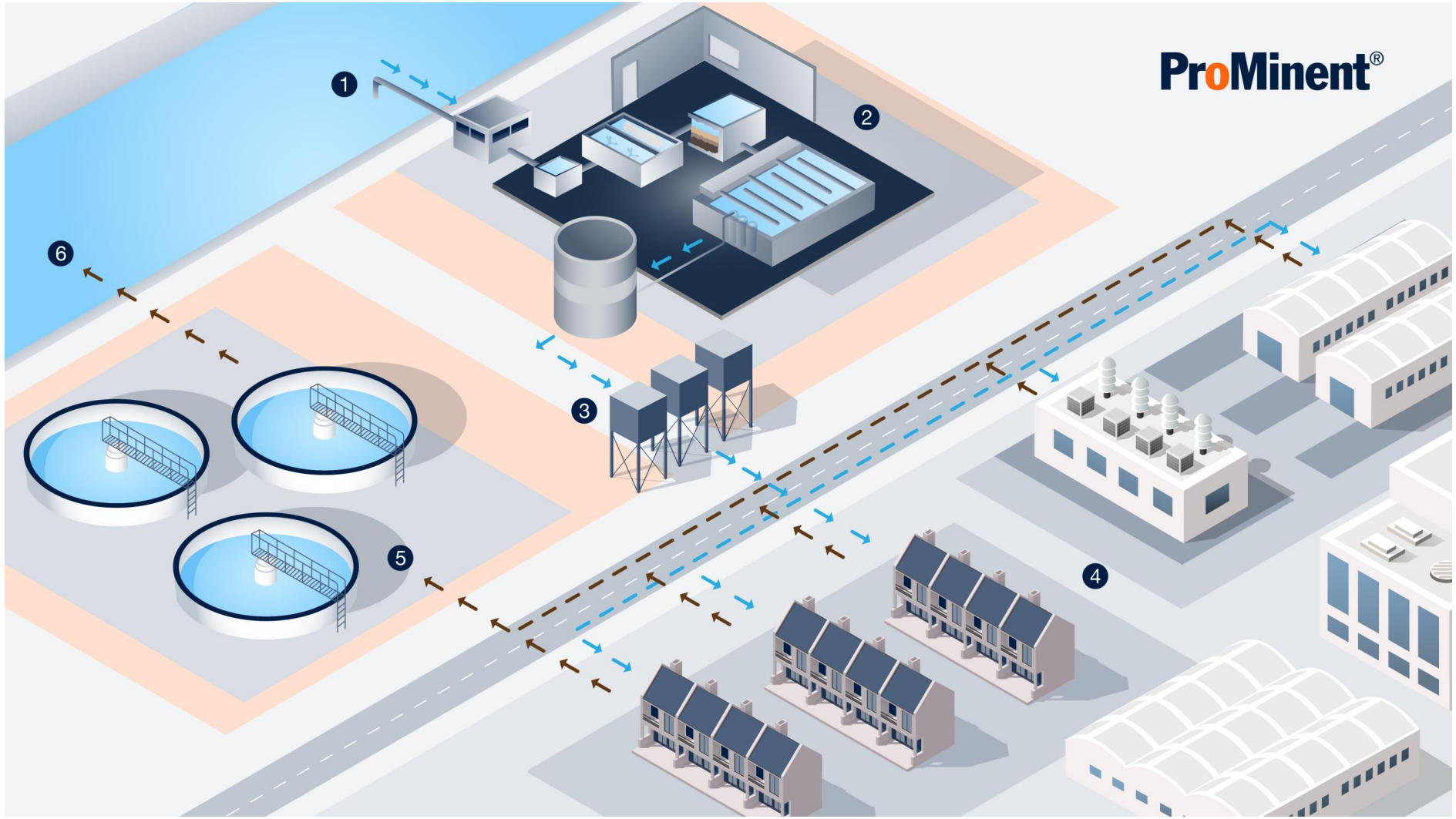
Water & Waste Water Cycle - Overview

Phases:

1. raw water extraction
2. potable water treatment
3. storage & distribution
4. agricultural, domestic & industrial use
5. waste water treatment
6. recycling & discharge



Wastewater Treatment - the Silent Emergency / Crisis

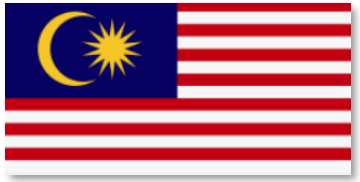
Key Important Notes

- According to the UN, Wastewater Treatment is the “key to solving global water crisis”.
- Did you know that over 80% of all wastewater from homes and industries find its way back to nature without being treated or even re-used.
- For example, in Indonesia alone – more than 75% of the rivers monitored are highly polluted and only 49% comply with the standards for good river quality[3].
- In Philippines, millions of cubic meters of untreated wastewater is dumped into Manila Bay and Laguna Lake. In 2018, in the Manila Bay area alone, 5,228 out of 10,168 industries (51.4%) were served with Notices of Violation for failure to acquire permits to discharge wastewater. Of those with permits, many did not meet regulation standards.[4]
- In Malaysia, recent repeated illegal industrial wastewater effluent discharge has contaminated water sources resulting in water shortages and public-outcry.
- Governments are now turning their efforts and focus in managing and monitoring Industrial Wastewater Discharge through increased legislation and more punitive fines but many still struggle due to differing reasons
- Especially for Industries it is left to individual companies and it is in our joint interest to work together to improve these situations and challenges

3. “ Wastewater_management_and_resource_recovery_in_Indonesia
4. ARCOWA 2018.Wastewater Management and Resource Recovery in the Philippines: Current status and opportunities. GEF, UNDP, PEMSEA
Environmental Management Bureau. 2014. National Water Quality Status Report. 2006-2013

Regional Insights - Regulatory per country (1/2)

- Trade effluent of the following cannot be discharged:
  - pH less than 6 and more than 9 at the point of its entry into the public sewer
  - Temperature of which exceeds 45° Celsius at the point of entry into the public sewer
  - Caustic alkalinity more than 2,000 mg of calcium carbonate per liter at the point of its entry into the public sewer
- Based on Interviews: Most of the data is still being recorded manually via chart paper and/or saved via USB
- There is an interest in real-time monitoring not solely for regulation purposes, but also for the ability to react faster, improve efficiencies and reduce wastage
- Government grants are available for high water consumption industries to reduce water or wastewater discharge by 5%



- A 2007 report states that 55% of all rivers in Malaysia are either slightly or significantly polluted – with the percentage projected to increase unless active steps are being taken
- The biggest stated challenge is enforcement:
  - In 2003, the Department of Environment (DOE) conducted 2,656 inspections of 1,957 industrial premises for compliance
  - A total of 1,249 written notices were issued in that period
  - DOE acknowledges that there is insufficient resources / technical tools and skills to effectively monitor polluters
- Most of the offences were due to either poorly designed plants and or poorly trained operators
- The penalties of illegal discharge include incarceration of up to 5 years including punitive fines of more than MYR 100,000
- Government has also given special tax incentives for plant upgrades and the installation of Pollution control equipment

5. Data on file

Regional Summary per Country (2/2)

- According to the National Quality Report based on BOD loadings, Industrial and Agriculture industries account for 56% of all Water Pollution in the country
- Internal records currently show that of all the 492,000 industries that are monitored in the Manila Bay area, only 45% meet national effluent standards. The struggles again lie with monitoring and the knowledge of the local companies and operators
- Detailed regulatory requirements on approved parameters for wastewater discharge per individual industrial sectors are available, but not widely known
- Monitoring is left to individual companies – while samples are supposed to be tested and recorded daily, the department of Environment and Natural Resources requires quarterly testing and submissions
- Punitive measures for pollution due to negligence: Imprisonment for not less than 2 years / fines of not less than pHp 100,000 per day of violation

- Focused industries for Wastewater Treatment (36 industries in total) including:
  - Pulp & Paper with capacity of >300,000 tons of pulp/year
  - Upstream Petrochemical Industry
  - Shipyards
  - Food & Beverage (Milk powder manufacturing, beer, fish, etc.)
  - Palm Oil / Rubber
- Monitoring must be done once a month ; submission to ministry once every 6 months
- For key industries above – pH, BOD and COD must be monitored and tested daily
- Authorities have the right to access and collect effluent anytime
- Enforcement is hard and many industries only discharge illegal effluent late at night or during flood seasons
- Ministry has implemented online monitoring of certain rivers for effluent pollution ; results will determine the way forward

6. Data on file

Standard methods - Examination of Water & Wastewater

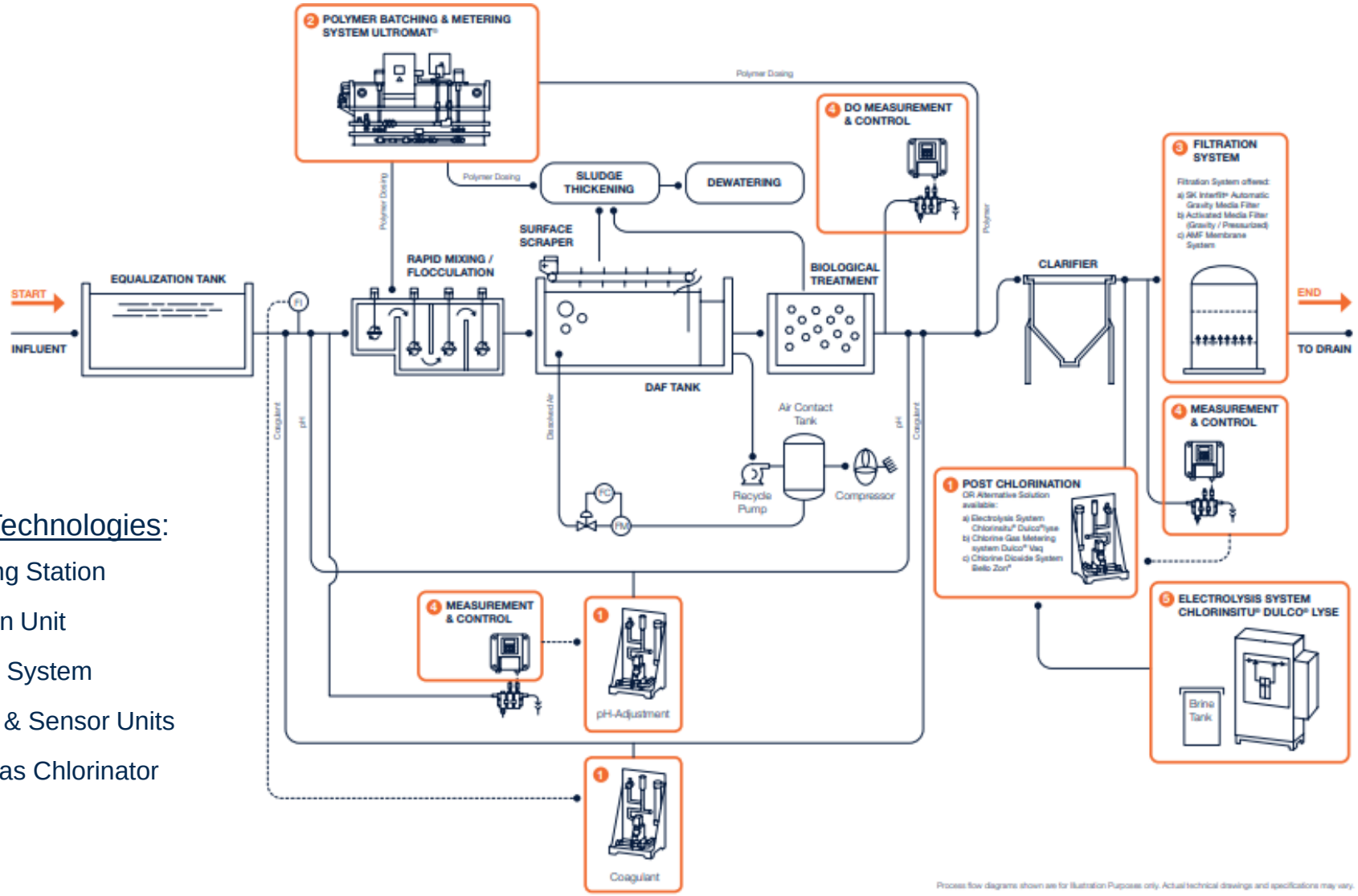
Guidelines for testing of samples at laboratories (some examples)

TABLE II—REQUIRED CONTAINERS, PRESERVATION TECHNIQUES, AND HOLDING TIMES

Parameter number/name	Container[1]	Preservation[2 3]	Maximum holding time[4]
9. Biochemical oxygen demand	P, FP, G	Cool, ≤6 °C[18]	48 hours.
17. Chlorine, total residual	P, G	None required	Analyze within 15 minutes.
21. Color	P, FP, G	Cool, ≤6 °C[18]	48 hours.
28. Hydrogen ion (pH)	P, FP, G	None required	Analyze within 15 minutes.
46. Oxygen, Dissolved Probe	G, Bottle and top	None required	Analyze within 15 minutes.
69. Temperature	P, FP, G	None required	Analyze within 15 minutes.
73. Turbidity	P, FP, G	Cool, ≤6 °C[18]	48 hours.

- **Some of these max. holding times are hard to achieve in remote places with less advance laboratories available**

Wastewater Treatment - Applications within a typical process flow



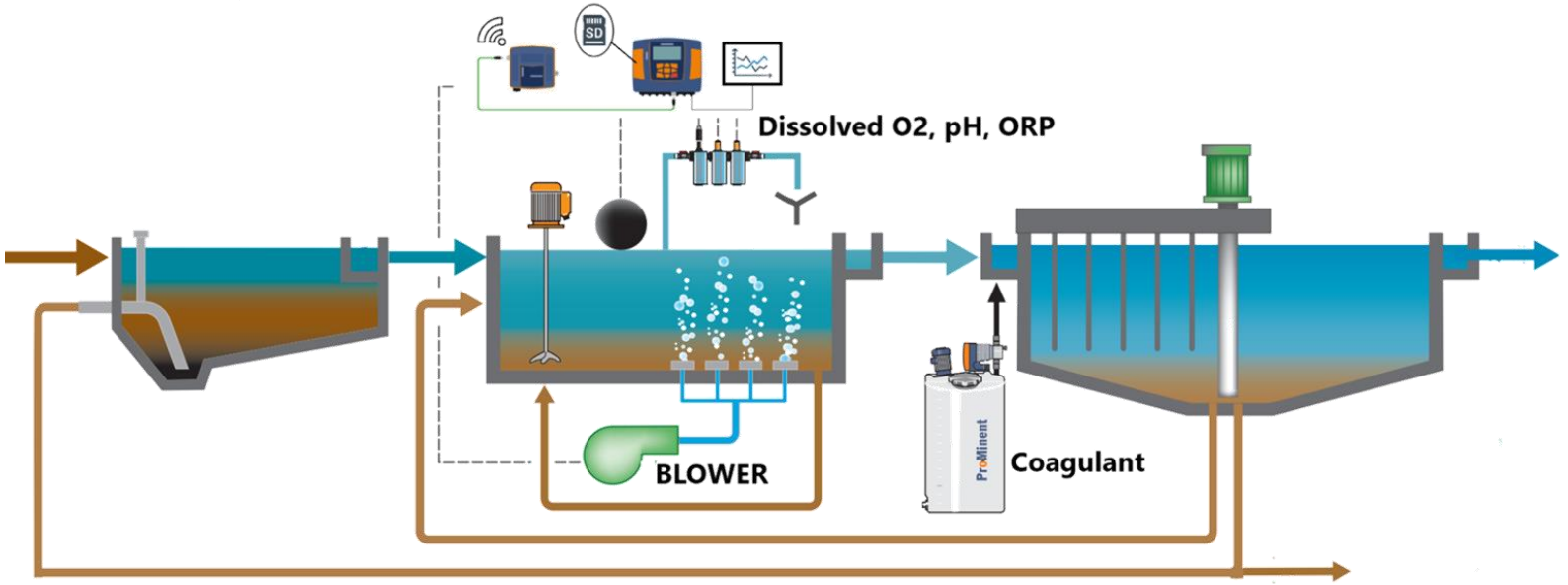
Applied ProMinent Technologies:

1. Dosing Skid / Dosing Station
2. Polymer Preparation Unit
3. Automatic Filtration System
4. Measuring, Control & Sensor Units
5. Salt Chlorinator / Gas Chlorinator

Application 1): Biological Treatment Stage

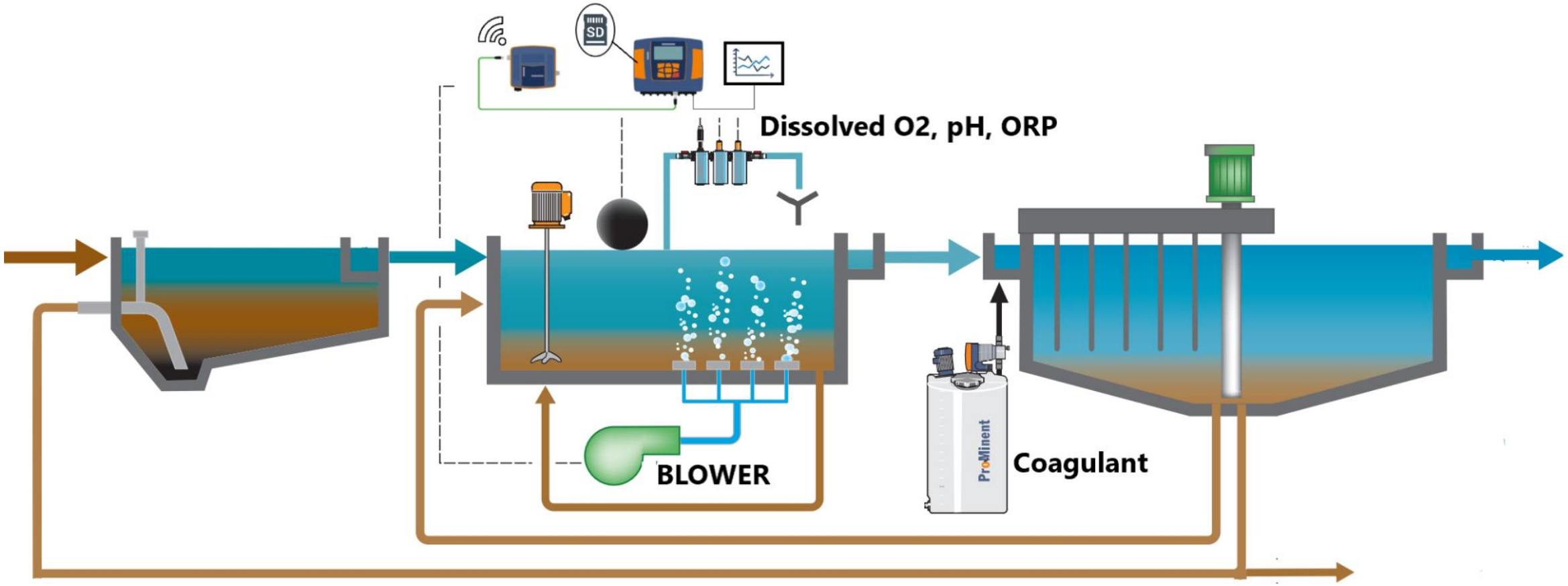
Key Challenges

- Monitoring and control of Oxygen content
- Efficient operation of the blower system
- Suitable sensor for wastewater application
- Optimization of the biological process



Application 1): Biological Treatment Stage

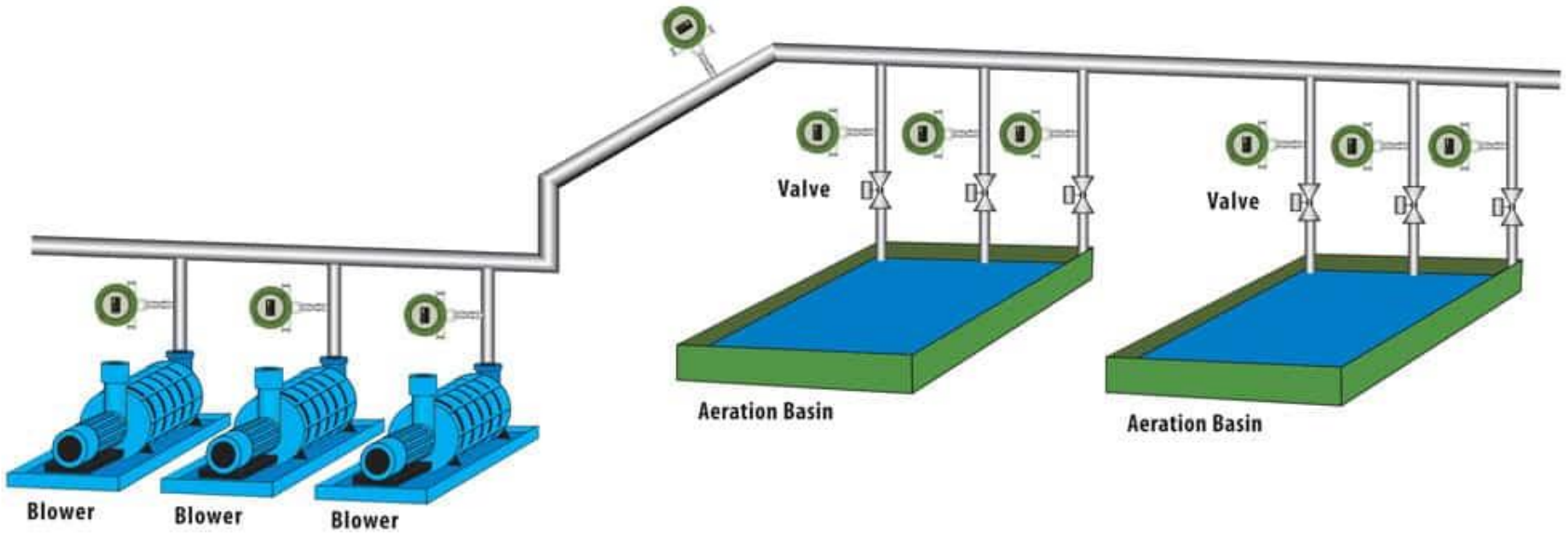
DO Monitoring & Control



Application 1): Biological Treatment Stage

Blower Operation

- Inefficient operation of blower system and compressed air network increases:
  - **energy consumption**
  - **operational costs**
  - **risk of performance drop**



Application 1): Biological Treatment Stage

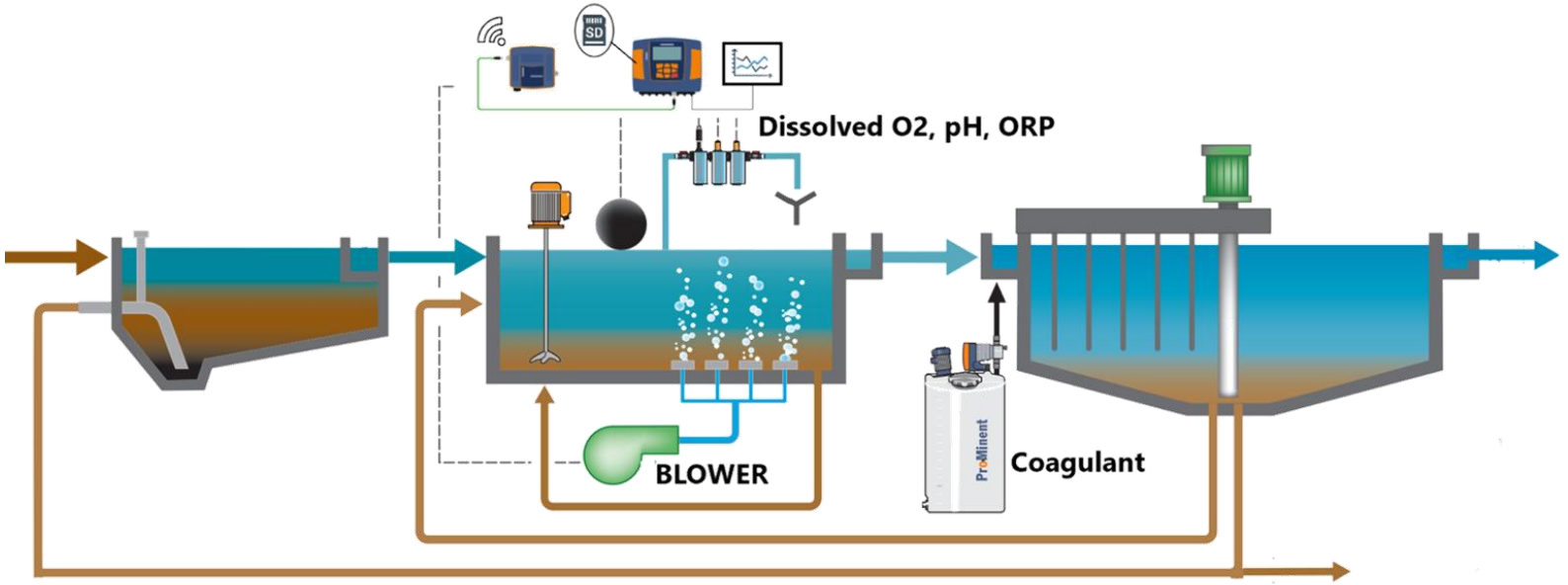
Performance Risks

- Under aeration aside, over aeration is also a serious issue for process quality
- Even 1-2mg/L above the required DO range can be wasteful
- Over aeration can break up flocs creating pin flocs which prevents them from settling
- Denitrification can be inhibited, because bacteria will rather use the available DO then consume the Oxygen bound to the Nitrate
- This then affects the alkalinity and pH which over time will lead to increase chemical consumption in order to keep these parameters within the acceptable range

Application 1): Biological Treatment Stage

Technical Solution

- Dissolved Oxygen sensor that is dirt resistant with simple maintenance and calibration
- Easy installation and simplified maintenance by immersed or bypass fittings
- Controls blower for feeding atmospheric oxygen into the biological treatment stage
- Seamless data monitoring for continuous optimization of biological treatment process



Application 1): Biological Treatment Stage

What can we do with the data of DO Monitoring?

- Control the air flow to the basin
  - Variable speed drives for the blower
  - Control valves
- Air flow alone cannot be used to control the blower as air flow does not have a direct relationship with DO
- Direct DO monitoring and control leads to:
  - higher control efficiency
  - Increased process quality
  - lower energy costs

Application 1): Biological Treatment Stage

Key Benefits

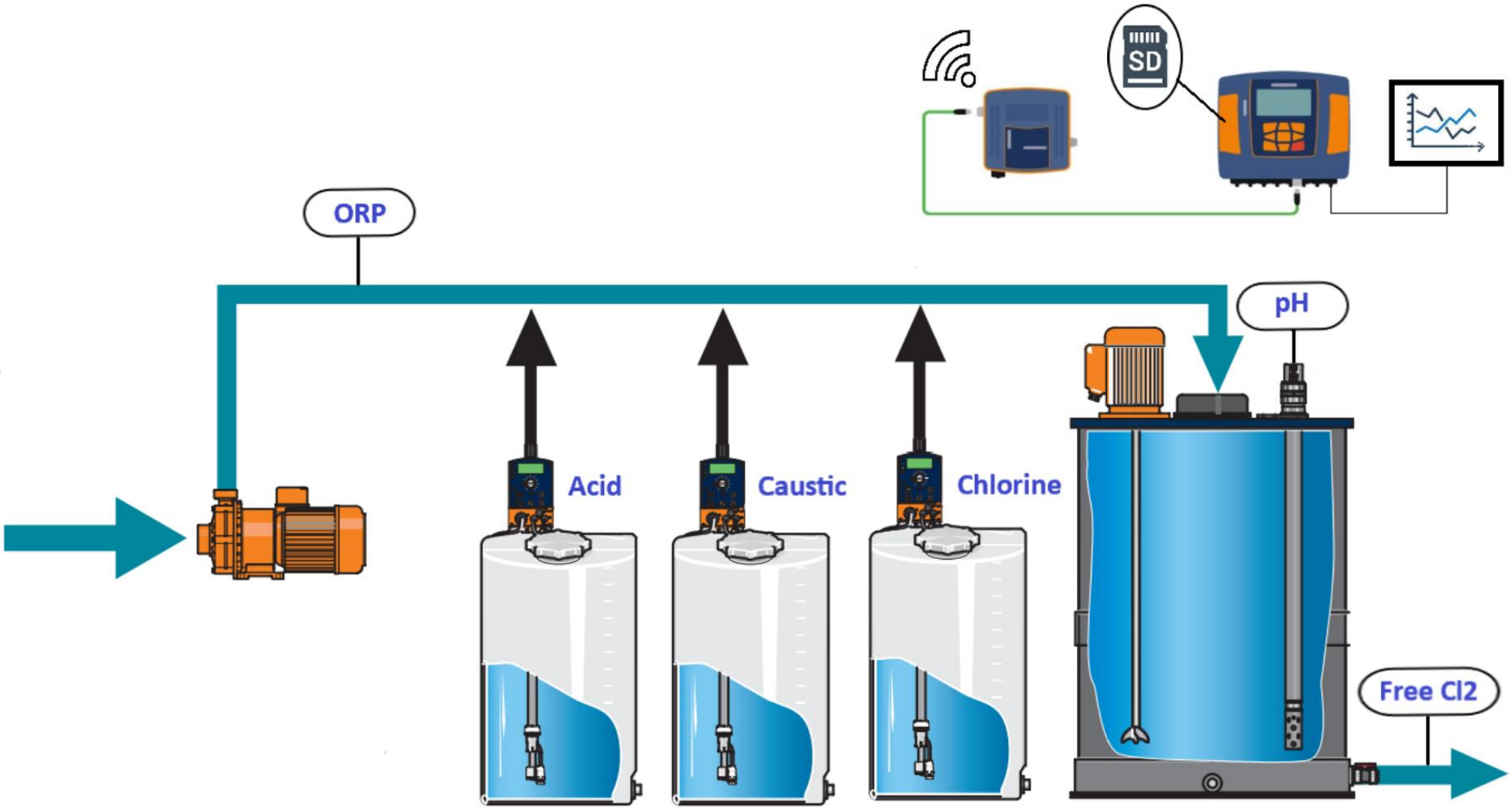
- Reduced energy and operating cost as the blower is DO-dependent and not manually ON all the time
- Long operation life of blower system
- Quality assurance through seamless documentation of all parameters
- Trouble-free and virtually maintenance-free operation through optimally matched components

Application 1): Biological Treatment Stage

Plan, Do, Check, Act

- Data needs to be substantial to be useful
- Data of DO needs to be plotted over a week first to observe the trend before adjusting the controls
- If the DO is over or under, reprogram the controls to increase or decrease the aeration or even turn off the aeration at a high setpoint
- Where the probe located also matters, and again all these can be viewed from the data recorded
- Power logger on the blower will also help to tell the cost savings on the energy used
- Make small changes – changes require frequent monitoring
- Check other parameters such as ORP and alkalinity to make sure on track

Application 2): pH Neutralisation and Chlorination



Application 2): pH Neutralisation and Chlorination

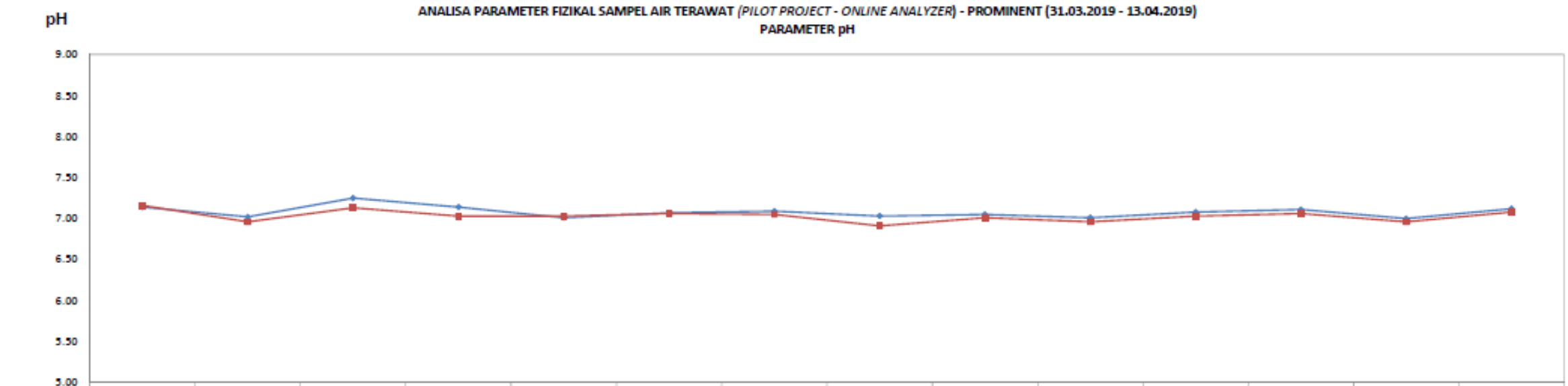
Key challenges

- Wastewater from production and CIP (clean in place) has wide pH values that varies over time
- Can even fluctuate between pH 2-12
- Required to regulate between pH 6-9 before discharge (refer to local regulations)
- Fully automatic plant operation with data monitoring and linked to control room

Application 2): pH Neutralisation and Chlorination

Continuous Online Measurement

- Online measurement tallies with acceptable tolerance to Lab Instrument Measurements

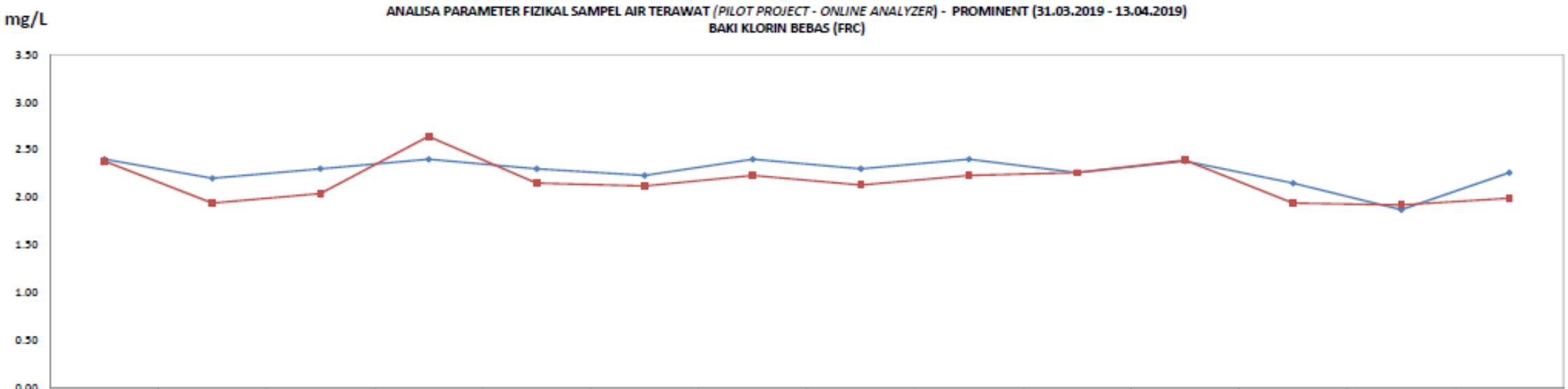


	31.03.2019	01.04.2019	02.04.2019	03.04.2019	04.04.2019	05.04.2019	06.04.2019	07.04.2019	08.04.2019	09.04.2019	10.04.2019	11.04.2019	12.04.2019	13.04.2019
HACH	7.14	7.02	7.25	7.14	7.01	7.07	7.09	7.03	7.05	7.01	7.08	7.11	7.00	7.12
PROMINENT	7.16	6.96	7.13	7.03	7.03	7.06	7.05	6.91	7.01	6.96	7.03	7.06	6.96	7.08

Application 2): pH Neutralisation and Chlorination

Chlorine Measurement

- Chlorine levels varies with pH ; Lab instruments buffer the pH when measuring Chlorine
- Online measurements with built-in pH compensation can comply to lab measurements despite not requiring to buffer the pH



	31.03.2019	01.04.2019	02.04.2019	03.04.2019	04.04.2019	05.04.2019	06.04.2019	07.04.2019	08.04.2019	09.04.2019	10.04.2019	11.04.2019	12.04.2019	13.04.2019
HACH	2.40	2.20	2.30	2.40	2.30	2.23	2.40	2.30	2.40	2.26	2.38	2.15	1.87	2.26
PROMINENT	2.38	1.94	2.04	2.64	2.15	2.12	2.23	2.13	2.23	2.26	2.39	1.94	1.92	1.99

Application 2): pH Neutralisation and Chlorination

Technical Solution

- Complete solution from a single source, with components matched to one another:
  - a pH control station,
  - a pH measurement station for final monitoring – each with measurement/control instruments and sensors, suitable for use in wastewater, fitted in the by-pass
  - Preliminary neutralisation in a stainless steel tank, overflow into the actual neutralisation tank, controlled dosing of acid or caustic soda, pH final monitoring
  - Transmission of all measurement signals and operational statuses
  - Seamless documentation of data

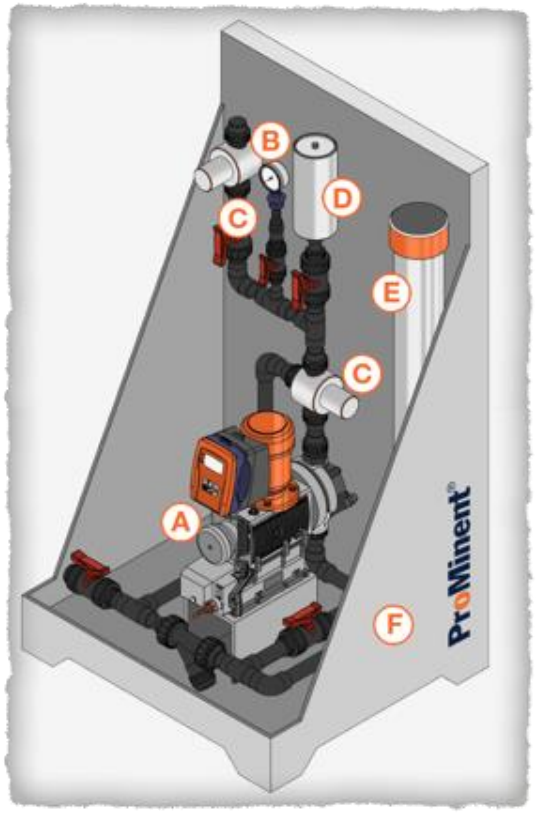
Application 2): pH Neutralisation and Chlorination

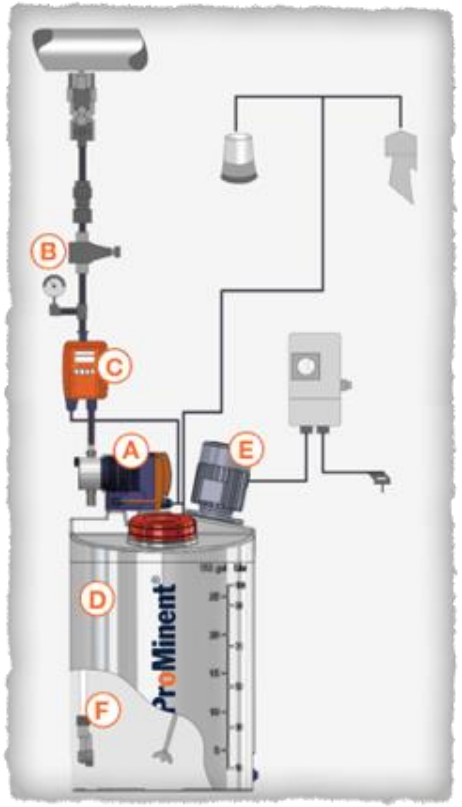
Key Benefits

- Safe compliance with statutory requirements
- Cost savings on wastewater discharge levies
- Trouble-free and virtually maintenance-free operation through optimally matched components
- High efficiency of the plant through preliminary neutralisation
- Chemical savings through pH dependent dosing instead of manual dosing
- Proof of compliance through documentation of parameters

Dosing Skid/Station

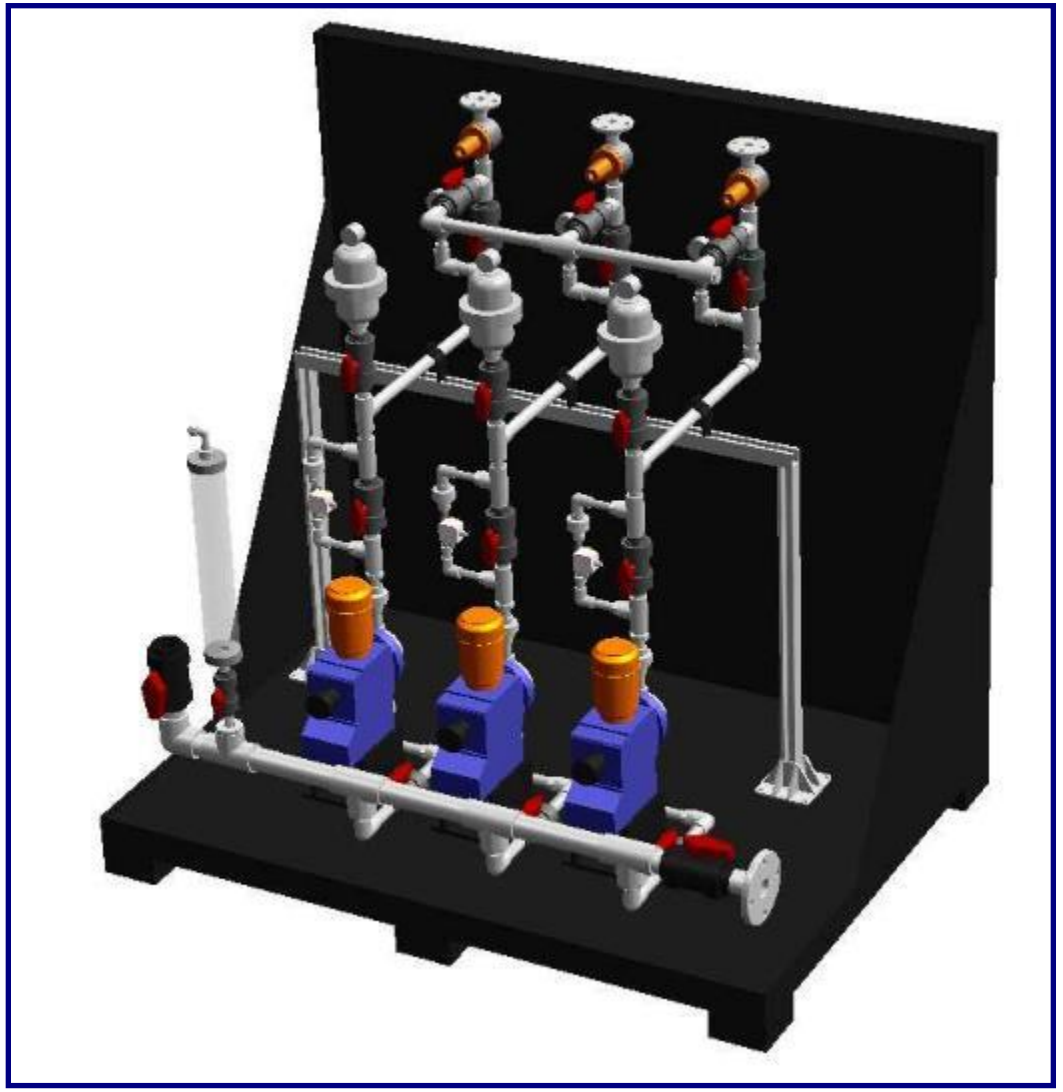
Fully Factory Assembled & Tested | Immediate Plug & Play System





Dosing Skid/Station

What's all this?

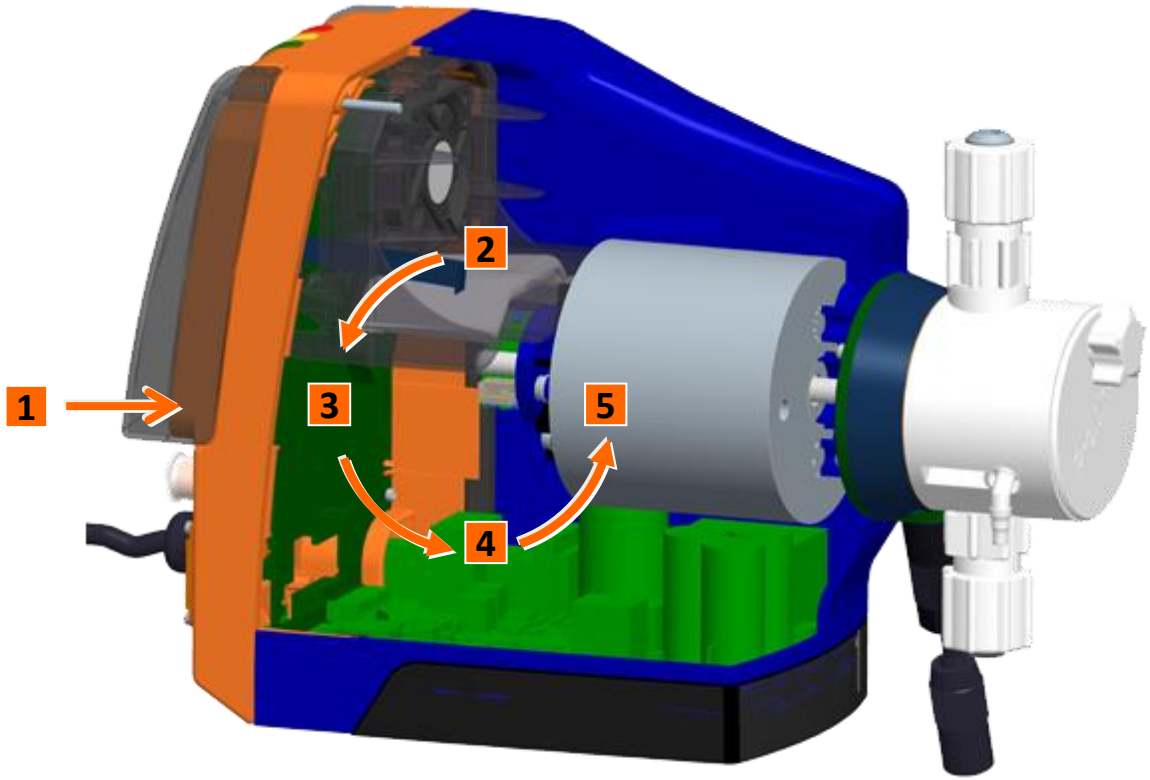


Metering Pump System Hydraulics and Application of Accessories

- The metering pump system design, the fluid pumped, and the accessories installed all play a vital role in system safety, repeatability and reliability.

- Key Concept: *Metering Pump System*

Precise SMART Metering Pumps – gamma/ X



1 Set dosing parameters
2 Stroke position sensor
3 Controller
4 Booster
5 Solenoid

Precise SMART Metering Pumps – gamma/ X

Simpler and More Reliable Operation

X-tremely clever: reduction of down-time

- Integrated pressure measurement and indication without any sensor in the dosing head
- Detection of hydraulic problems as:
  - Overpressure
  - No pressure (broken discharge line)
  - Gas in the dosing head
- Alarm on display or via relay or fieldbus to the PLC

Precise SMART Metering Pumps – gamma/ X

Simpler and More Reliable Operation

Controlled solenoid drive allows

- Setting of different dosing profiles
  - Suction and/or discharge stroke can be performed fast or slow
  - Optimal adaption on high viscous or outgassing liquids
- Electronic setting of stroke length resp. stroke volume
  - Total remote control of pump parameters from PLC

Precise SMART Metering Pumps – gamma/ X

Simpler and More Reliable Operation

Controlled solenoid drive allows

- Setting of different dosing profiles
  - Suction and/or discharge stroke can be performed fast or slow
  - Optimal adaption on high viscous or outgassing liquids
- Electronic setting of stroke length resp. stroke volume
  - Total remote control of pump parameters from PLC

Precise SMART Metering Pumps – gamma/ X

Simpler and More Reliable Operation

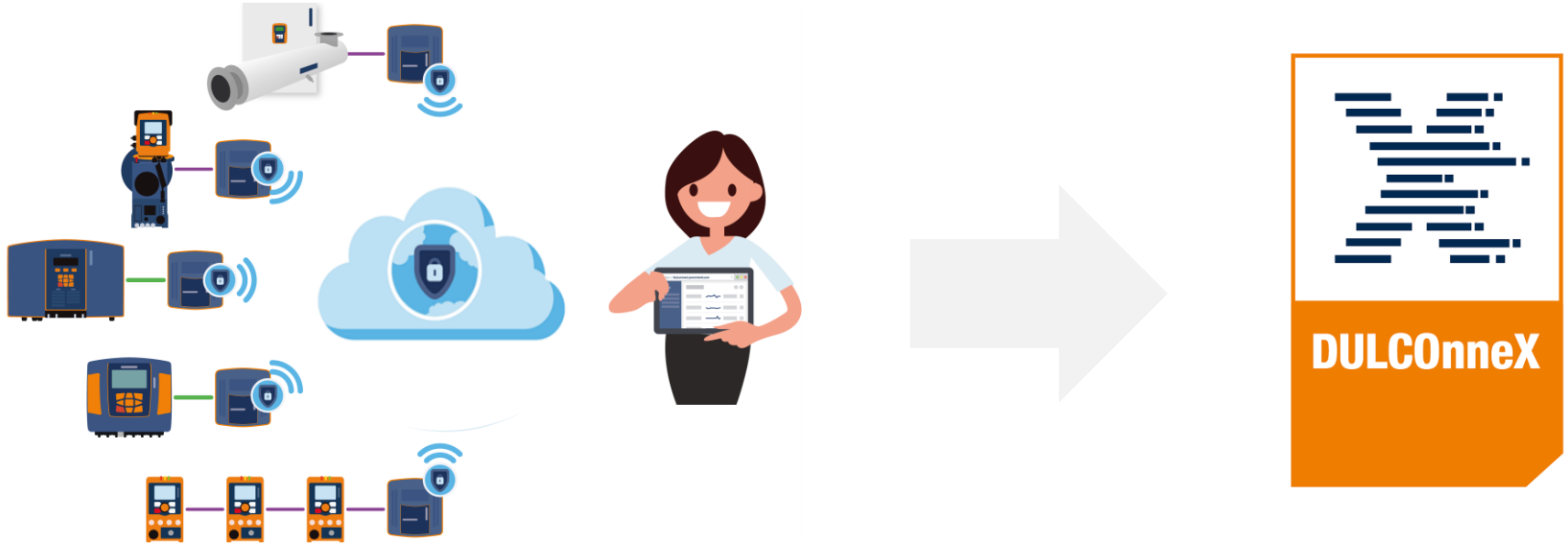
Controlled solenoid drive allows

- Standard mode
  - Capacity setting in l/h or via stroke length and –frequency
- Automatic mode
  - Capacity setting in l/h, pump selects stroke length and frequency, no cavitation and overload with lowest possible energy consumption

Precise SMART Metering Pumps – gamma/ X

Connected to DULCOnneX

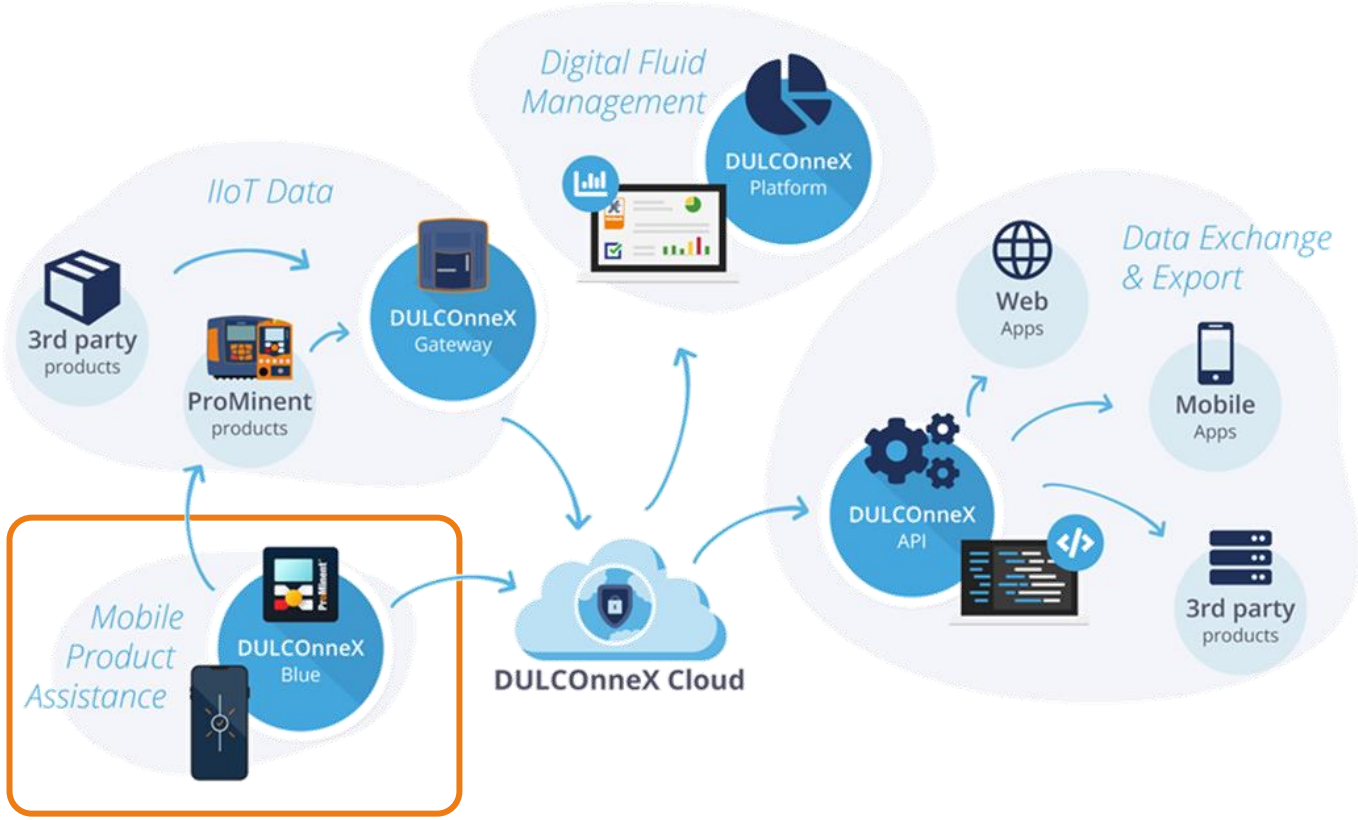
What is DULCOnneX? – The idea behind the solution



- **Connecting** your ProMinent equipment, 3rd party products and **entire systems**
- Providing **all relevant** fluid and system **information** of your installations **in one place**
- **Accessing your data** via a **secure cloud environment** on a **device of your choice**
- **Just like being on-site** at all your installations simultaneously **- anytime & anywhere**

DULCOnneX – ProMinent's solution for digital fluid management

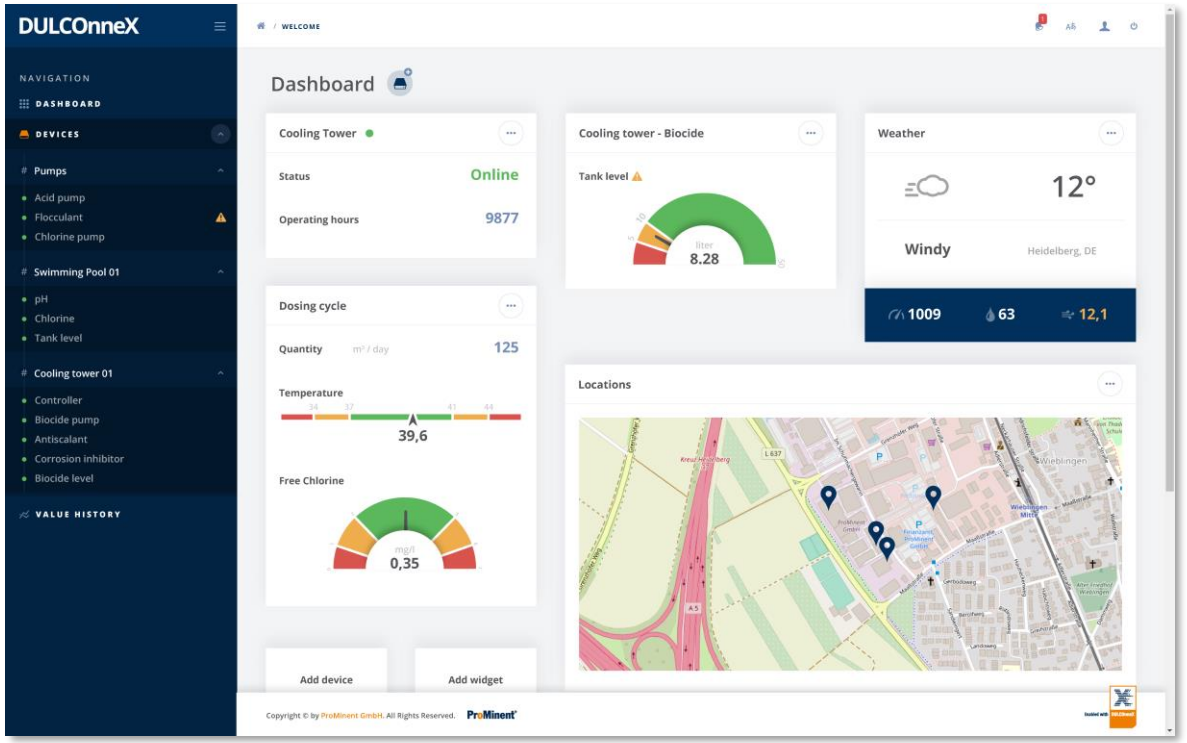
- Individual solution components:
  - DULCOnneX Gateway
  - DULCOnneX Cloud
  - DULCOnneX Platform
  - DULCOnneX API
  - DULCOnneX Blue **Q1/2021**
- The combination of DULCOnneX Gateway and DULCOnneX Platform gives you access to the IoT data of your connected assets and unlocks completely new possibilities
- The DULCOnneX API enables IoT data exchange and export and the realization of integrations with other digital solutions

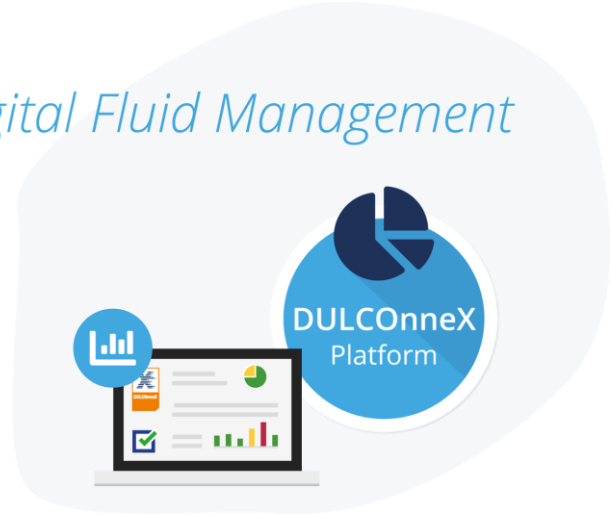


- The mobile app DULCOnneX Blue transforms smartphones into a central control unit and assists you to comfortably operate compatible ProMinent products with maximum efficiency

DULCOnneX Platform – Digitales Fluid Management

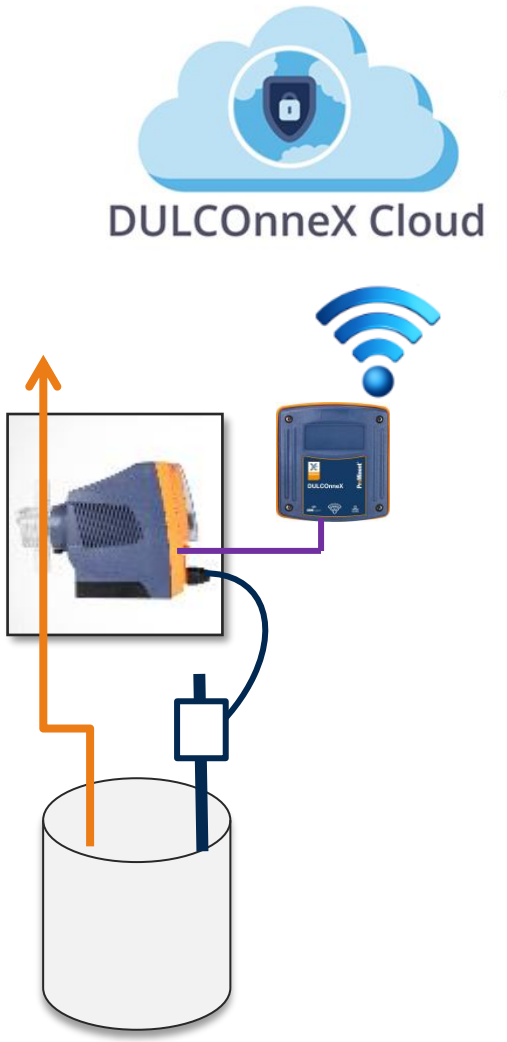
- In order to exploit the full potential of the IoT data from your assets, we recommend using our web-based platform
- Accessed via your personal customer account, the DULCOnneX Platform offers numerous features and advantages

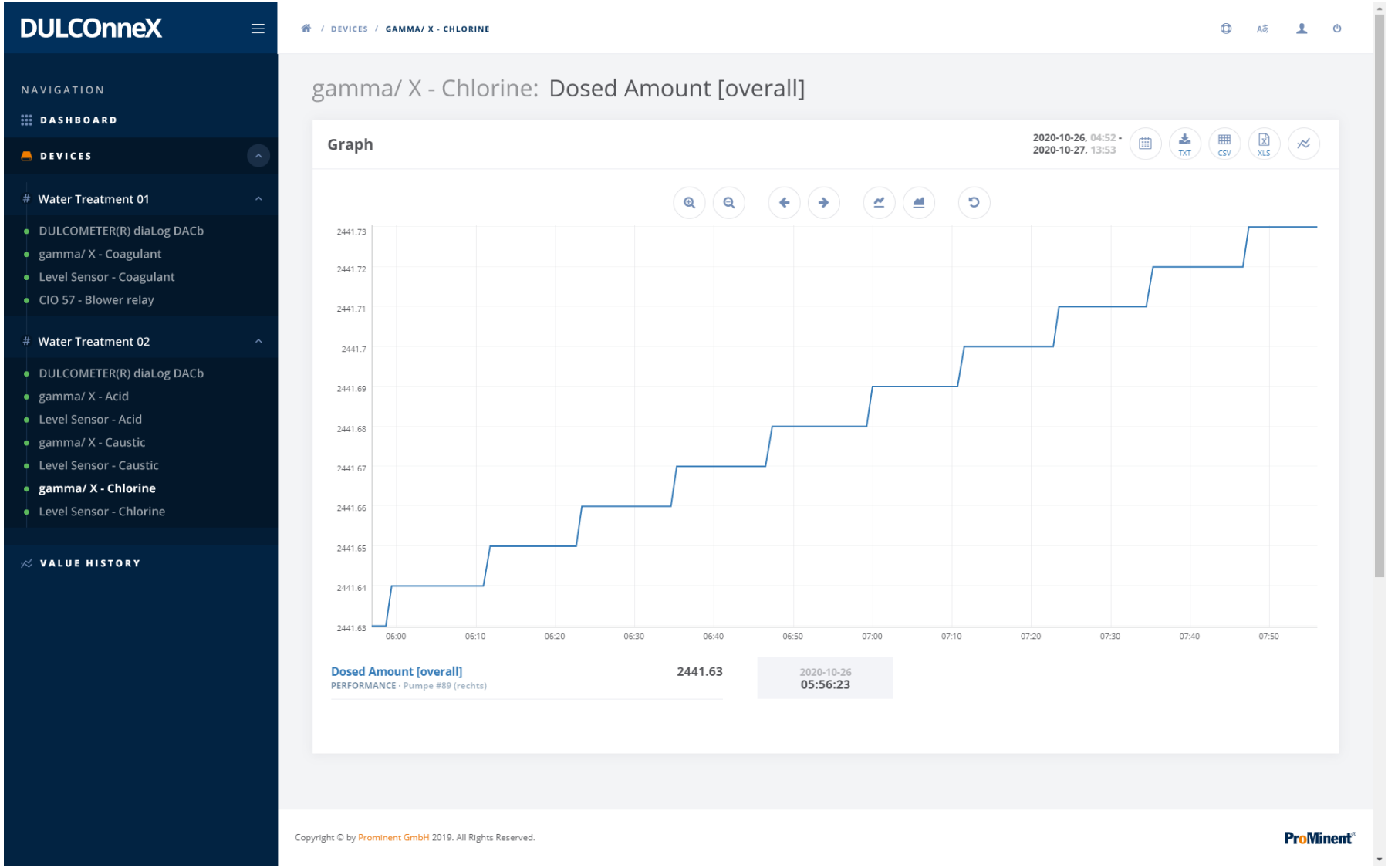




- Data visualization
- Complete history of device data and measured values
- Individually configurable alarms and reports
- Automatically generated documentation
- Notification about unusual behaviour and events

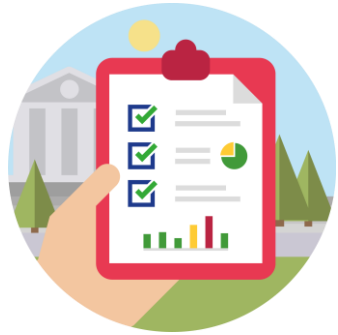
DULCOnneX Platform – Remote monitoring of metering systems





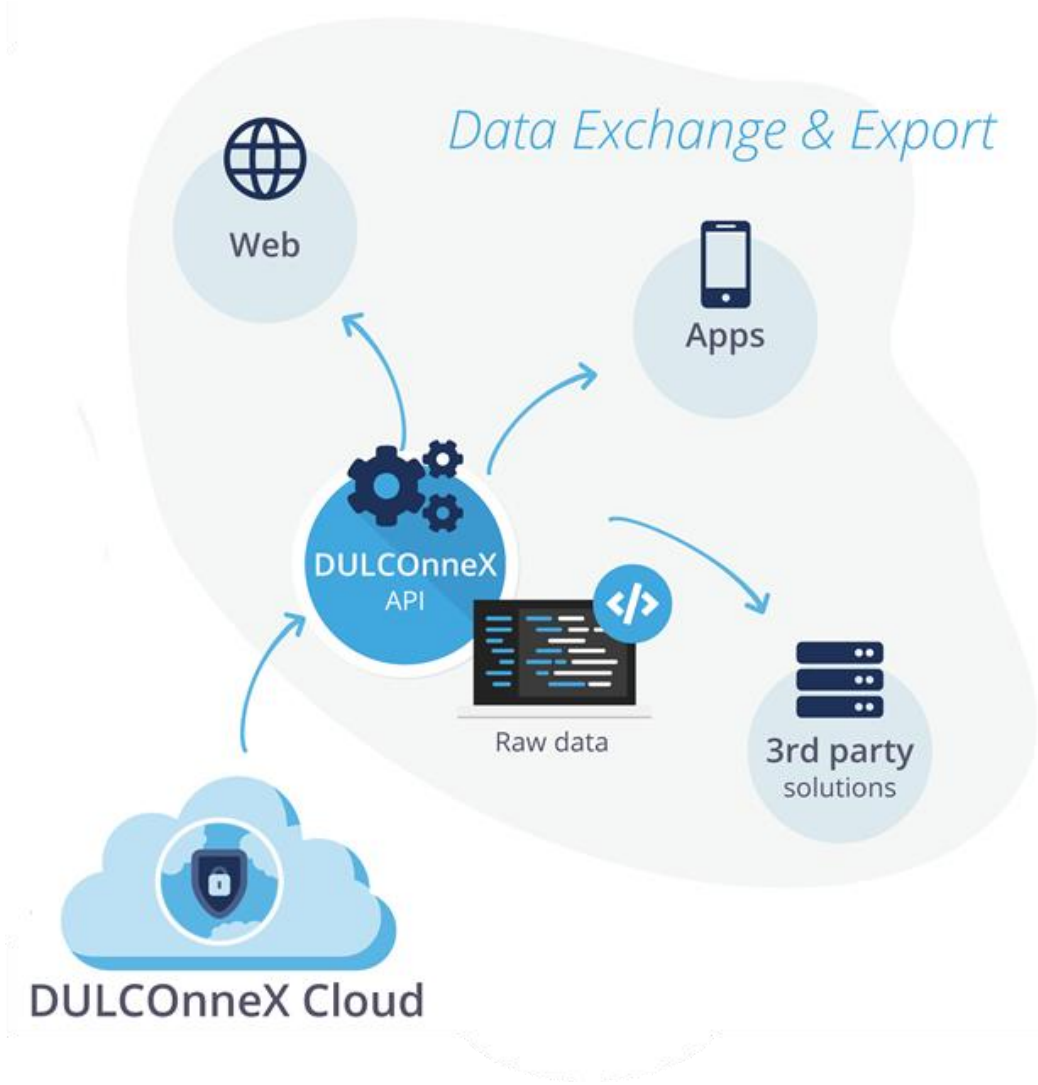
DULCOnneX Platform – Key Benefits

- Information from various installation sites in one place
  - travelling for documentary purposes becomes obsolete
- Verification of chemical dosage and device performance
  - plausible consumptions and improved system availability
- Continuous logging of system operation and equipment health
  - increased transparency and plannable service measures
- Complete history of values, parameters and events
  - facilitates legal compliance and technical trouble shooting
- Automatically generated reports in exportable file formats
  - simplify and accelerate the fulfillment of regulatory documentation duties
- Configurable alarms and notifications via e-mail
  - staying ahead of things and reacting quickly
- Remote monitoring of equipment in potentially hazardous environments
  - just like being onsite whilst staying in safe distance



DULCOnneX API – Data Exchange & Export

- The DULCOnneX API enables you to access the raw data of your assets
- This data can be integrated into an existing local process control system or any digital 3rd party solution of choice
- The preferable technical solution with the highest level of flexibility:
  - the encrypted IoT data is made available to you at a secure node
  - After successful authorization via API token you can quiery data as required



DULCOnneX – Data Security

DULCOnneX is designed to obtain the highest level of security and to ensure the reliable protection of your data.

All measurements & data of your devices are anonymized, encrypted (RSA 2048 Bit), sent via secure WiFi connection (WPA2) with a state-of-the-art security protocol (TLS1.2), and finally securely stored in the DULCOnneX Cloud.
And we keep your user data and your devices‘ data consequently separated.

On top of that, the security of our system gets regularly tested by independent security experts.

- **Security features**
  - Encryption standard TLS1.2
  - RapidSSL RSA CA G1
    & DigiCert Global Root G2 Certificates
  - WPA2 / IEEE 802.11i standard
  - Redundant data storage
  - Separate databases for measurements and user data

DULCOnneX – Extended Connectivity

- **What else can be connected to DULCOnneX?**
  - Any device providing an industrial standard signal (Digital and analog I/Os, 4..20 mA, counter)

- **I/O Modules offer a wide range of possibilities:**
  - Retrofitting of older ProMinent products (CDLb, DACa, …)
  - Integration of 3rd party equipment (**pressure, level, flow**, …)
  - Realization of physical feedback (visual and acustic signals, …)
  - …

- Feel free to contact us: **dulconnex@prominent.com**

- Let‘s explore possibilities for your individual application

ProMinent®

Thank you for your attention

And what can I do for you?

Stefan Hein

Director Digitalization & Industry 4.0 | ProMinent Group

hein.stefan@prominent.com

Enabled with DULCOnneX

ProMinent®

Thank you for your attention

And what can I do for you?

Joshua Arlusamy

Technical Manager | ProMinent Fluid Controls (M) Sdn Bhd

arlusamy.joshua@prominent.com

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Q & A

Tuesday
SGT:4:00 pm
GMT: +8:00
Virtual (Webex)

Organised by:

enquiry@swa.org.sg
T: (65) 6515 0812

SINGAPORE WATER ASSOCIATION

ProMinent®

ProMinent® Singapore Since 1980
Ready for you. Anytime, anywhere

Upcoming Event

Emerging Stronger - Digitalise Your Corporate and Admin Functions

15 Dec 2020
Tuesday
4:00pm to 5:30pm

Hybrid format:
(a) Online streaming
(b) Physical session @ PUB WaterHub
Singapore Water Exchange
84 Toh Guan Rd East
Level 1, Seminar Room

Joint organisers :

SWA Singapore Water Association | PUB Singapore Water Exchange | IMDA Infocomm Media Development Authority | SMEs GO DIGITAL | SkillsFuture SG | sme an NTUC initiative for small and medium enterprises

2021
Click to view event calendar

Thank You

For further queries on this event, please contact :

Singapore Water Association

T: (65) 6515 0812
E: enquiry@swa.org.sg
www.swa.org.sg

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