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Finntreat Oy

MODERN ALLIANCE GROUP

مودرن ألیانس

Modern Alliance Group

PAA-System

Finntreat Oy

Modern Alliance Group is a Saudi company co-operating in alliances with foreign specialist companies. MAG in co-operation with Finntreat conducted a toxic, odorous and corrosive gas removal pilot at Manfouha STP between 6.1.2015 – 25.1.2015. PAA-system was applied to the sludge handling part of the Manfouha process. The target of the system verification process was to eliminate H2S emissions from the sludge to be dewatered. By eliminating the H2S emissions the odor, toxicity and corrosion are also remarkably reduced.

Finntreat Oy is a process and project management adviser company founded 1982. FTOY has since then worked in KSA in various STP projects including Jubail Industrial City STP Phase 1 and WWTP Phase 1, Arana 1 of Makkah and Khumrah 4 of Jeddah. In Vietnam FTOY was involved in Hanoi water project. In EAR FTOY was advisor in Beni Suef Governorate water and wastewater project. In Finland FTOY has been involved in tens of STP and WWTP projects.

PAA-System utilization in Primary treatment

The primary treatment consisting of inlet PS, screening, grit and grease removal and primary clarification causes odor, corrosion and occupational health problems by H2S in all STP due to warm septic influent. PAA-System is used by dosing PAA to influent at PS or into nearest manhole to mitigate the problems. The process controldev ensures the elimination of H2S in all the primary treatment unit operations and controls the dose to those, only.

Sludge treatment using PAA-System

PAA-System is used to control H2S in especially anaerobically digested sludge to eliminate odor, corrosion and occupational health problems in effective way. T he H2S is oxdiced to S and the anaerobic bacteria producing hydrogen sulphide eliminated. This is why there is not any more H2S in gaseous phase causing the problems. The p ilot run at Manfouha STP proved the process to work in excellent way. The process helps in smelly partially aerobically stabilized sludge, too.

Replacement of chlorine in disinfection

Chlorine is an old disinfection chemical for effluent. Anyway it causes harmful bi-products especially in treated sewage effluent disinfection. And as an old chemical warfare agent chlorine is dangerous if ending in wrong hands. Tens of ton containers are stored in STPs close to or even inside the cities. Tests were conducted at Manfouha STP to prove the feasibility of using PAA in disinfection of effluents of N/E and S plants.

Other disinfection methods UV and O3are effective but act at the spot of treatment as the effect is not available outside UV unit and due to the instant reaction rate of ozone. PAA has been used for effluent disinfection in Finland during several years. A globally common strategy is to replace chlorine in disinfection of effluents that is in plans of NWC of KSA, too.

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FINNTREAT

Sludge treatment pilot at Manfouha STP

The largest waste water treatment plant in Riyahd with a daily capacity of 700000m3 municipal waste water

Problem:

- Really high H2S levels and corrosion problems MAG PAA peroxide system to treat raw sludge Raw sludge flow circa 4000m3/d (2/3 digested sludge and 1/3 thickened sludge)

Solution: MAG peroxide system

- Chemical feed to a balancing tank (V=500m3)
- Measurements after centrifuges from reject water and sludge cake

Results:

- Almost immediate effect on H2S levels at balance tank and after centrifuges
- 24h from the start of the chemical feed the target level max 10ppm achieved
- Operators noticed and stopped wearing gas masks
- Sulfide reduction from 24mg/l to 8mg/l

M/s: Modern Alliance Group,
Dear M/s,

Reference to your trial project for odor treatment at Manfouha Treatment Plants by adding chemical materials mixture of (PAA-System) in order to reduce the emission of (H_2S) gas where the trail has been implemented in the Balance Tank particularly in the period from 06/o1/2015 up to 25/01/2015 and where the trail was successfully achieved the aimed objective according to the attached report and results. So we would like to inform your that the NWC accepts the results of the trial for reduction of (H_2S) gas emission as planned and due to the trial didn't mention any other factors or any other side effects for it so, the NWC will not bear any responsibility may be resulted from the use of this mixed chemicals (PAA-System) or case of any repeat for this trial in any other site.

Allah help the all and thanks,

شركة المياه الوطنية
National Water Company

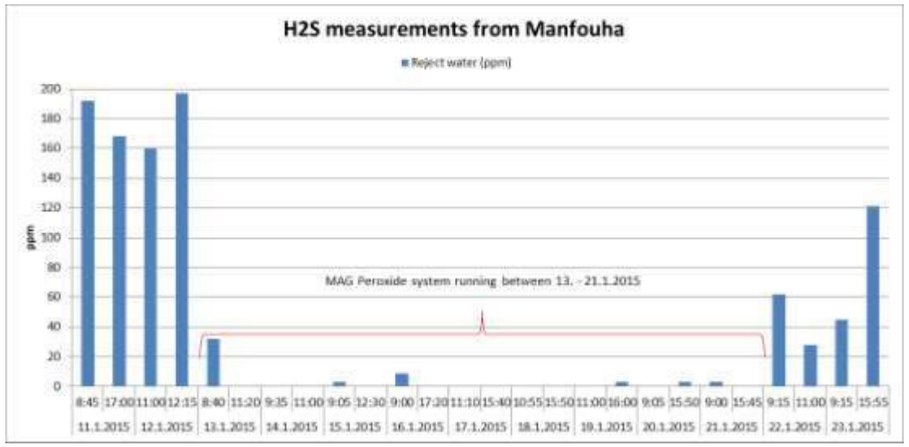
السادة مجموعة التحالف العصري

السلام عليكم ورحمة الله وبركاته،،،

إشارة إلى مشروعكم التجريبي لمعالجة الروائح في محطات المعالجة البيئية في محطة منفوحة وذلك بإضافة خليط من مواد كيميائية (PAA-System) الهدف منها خفض مستوى انبعاث غاز (H_2S) حيث طبقت التجربة في خزان الموازنة تحديدا ما بين الفترة ٦ / ١ / ٢٠١٥ م ولغايـــة ٢٥ / ١ / ٢٠١٥ م . وحيـــث أن التجربة حققت الهدف المنشود منها بناءا على التقرير والنتائج المرفقة عليه فان شركة المياه الوطنية توافق على نجاح التجربة في خفض نســبة انبعاث غاز (H_2S) وفق ما كان مستهدف ،وبما أن التجربة والدراسة لم تتطرق إلى أي عوامل او آثار أخرى عليه فأن شـركة المياه الوطنية تخلي مسئوليتها تجاه أي أثار جانبية قد تترتب على استخدام هذه المادة أو إعادة تجربتها في أي مكان آخر.

مدير إدارة الخدمات البيئية
م عبدالرحيم بن سالم البلوي

Measurement results during the pilot at Manfouha STP



Pilot equipment installed at Manfouha STP to treat sludge

Present us your toxic gas, odor and corrosion problem and we will propose a solution.

Contact:

Paavo Vaittinen
paavo.vaittinen@finntreat.fi

peroxide system

General Description:

peroxide system is an automated system for water quality measurements and chemical feeding. Combined with latest industrial automation and network connection the system can be remotely controlled and online data stored to a cloud service. The peroxide system can be used to a wide variety of applications from disinfection to toxic gas removal. The system is suitable for potable and waste water processes and is easy and fast to apply to a working process. Only a small footprint is needed. Equipment can be delivered as a skid mount, separate units or for outside use in an isolated container. Applicable to:

- A new or a working process
- Potable and waste water treatment processes
- Pipelines and open channels
- Pressurized system

Qualities:

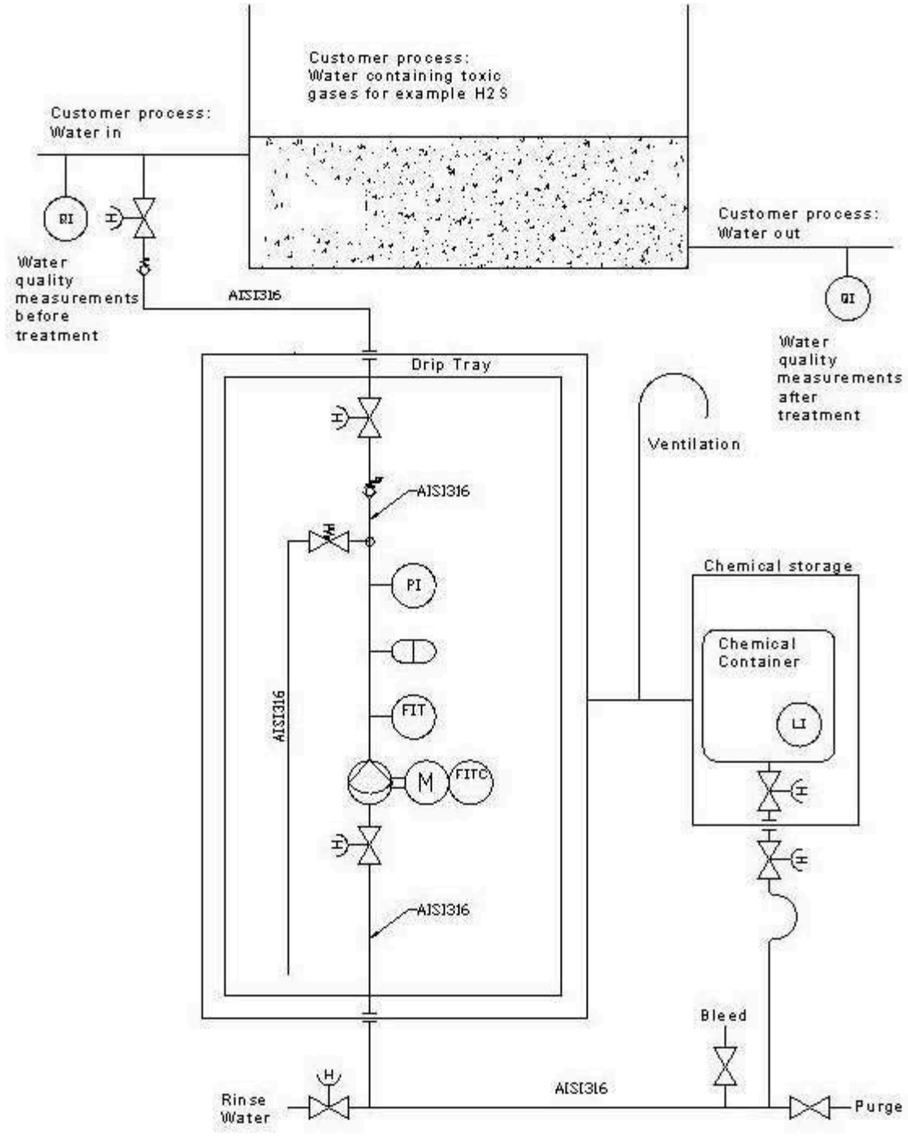
- Toxic gas removal
  - o Effective against sulfur and nitrogen compounds
  - o Reduces bacteria which produces sulfur and nitrogen compounds
  - o Prevents anaerobic states
  - o A safe working environment – H2S is a deadly gas
  - o peroxide system not only removes H2S but prevents it from forming
- Corrosion removal
  - o Combined corrosion speed reduces
  - o Corrosion in pipelines is usually from microbes called as biocorrosion (Microbially Influenced Corrosion, MIB)
  - o Removes biofilm and prevents new growth
- Disinfection
  - o Effective on Legionella and other difficultly removable bacteria
  - o Effective on coliphages
- Automated feeding
  - o To minimize the chemical consumption
  - o Based on applicable measurements such as flow, ORP, H2S, sulfide, turbidity, Suspended solids
- Remote control
  - o Software updates
  - o Process control
  - o SMS and E-mail alarms

Feeding equipment installed in a container for three different feeding locations in one system

Technical Specifications

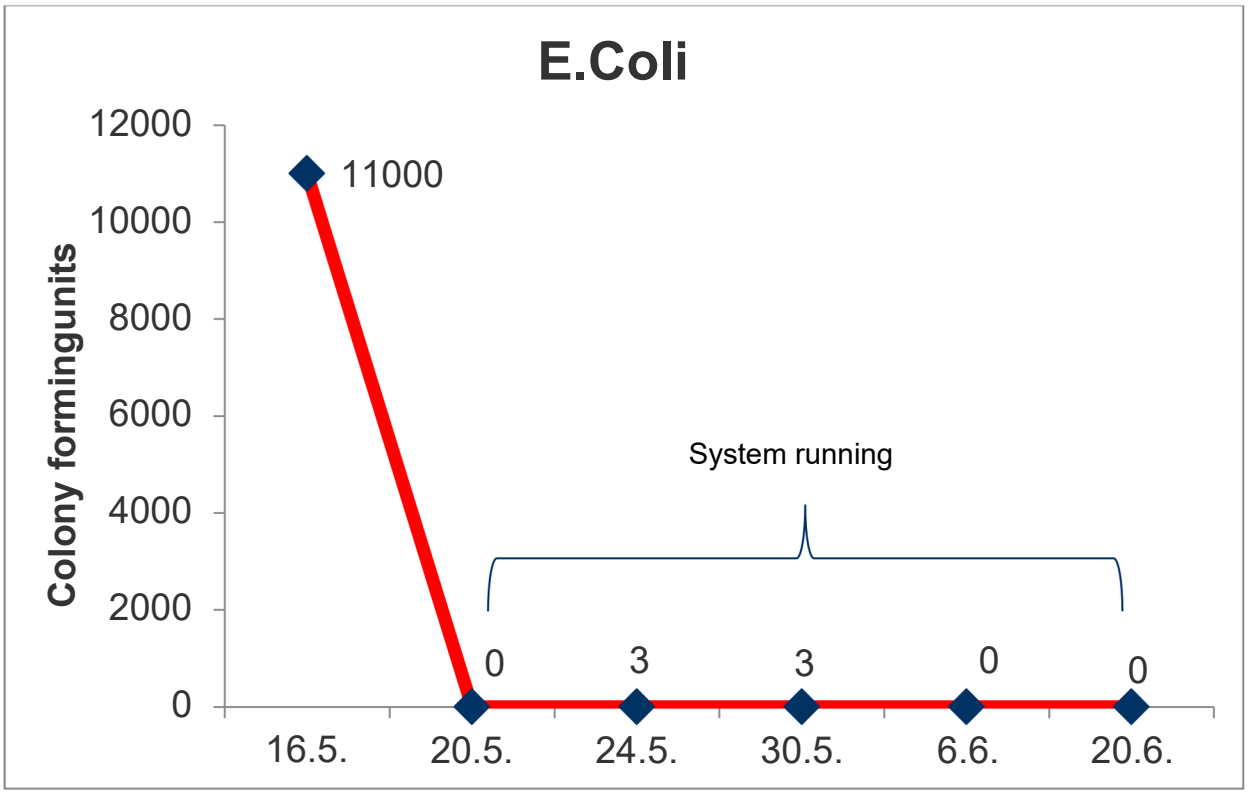
Supply voltage:	230V, 50 Hz (others on request)
Current consumption:	circa 2kW, (Automation and one feeding point and installed inside, no heating needed)
Main dimensions (LxWxD):	Automation 800x600x400mm Pump set-up 800x500x500mm (for one feeding point)
Weight:	200kg (Automation and pump set-up for one feeding point)
Data transfer:	4G/3G/GPRS/EDGE/450
Chemical:	A peroxide depending on application
Chemical storage:	Storage size depending on usage - ISO-container, V 15-20m3 - IBC-container, Material HDPE, V=1000l, - Offshore IBC-container, Material Stainless Steel, V=1000l, (Designed and manufactured in accordance with DNV 2.7-1 / EN12079 certification) - Plastic Drum, V=200l - Plactic canister, V=25l
Chemical consumption:	Depending on used applications Feeding ratio from 1:5000 – 1:250000
Suitable materials:	For feeding lines AISI316 Stainless Steel, Ø6-12mm For gaskets Viton, Teflon

A Principal drawing of the peroxide system for one feeding point



Disinfection with PAA-system

Results of disinfection of a Finnish Waste Water Treatment plant effluent with PAA-system. Chemical feeding controlled by automation to reduce the chemical consumption. Injection rate of used chemical really low giving the system a low operation cost.



The PAA-system has high reduction rates to most bacteria and viruses. The system is effective on e-coli, choliphages, legionella, enterococcus faecalis, enterococci, etc.

Used Chemical:

- Available as stabilized equilibrium solution
  - At the end the chemical breaks down to water and carbon dioxide
- Widely used by food industry, paper mills and medical facilities as a disinfectant. FDA and EPA approved in the USA.
- Disinfection efficiency depends on water characteristics, dose, and contact time.
- No (harmful) disinfection by-products
- Can also oxidize DPB-type (disinfection by-product) compounds and several other odor compounds (like mercaptanes), drug residues etc.
- No re-activation of microbes after treatment