STOCKMEIER GROUP

Sustainability

in tank cleaning - a new approach to net zero emissions

AGENDA

Sustainability in the context of TANK CLEANING

"Sustainability in tank cleaning and water treatment processes - a new approach to net zero emissions".

Disclaimer:

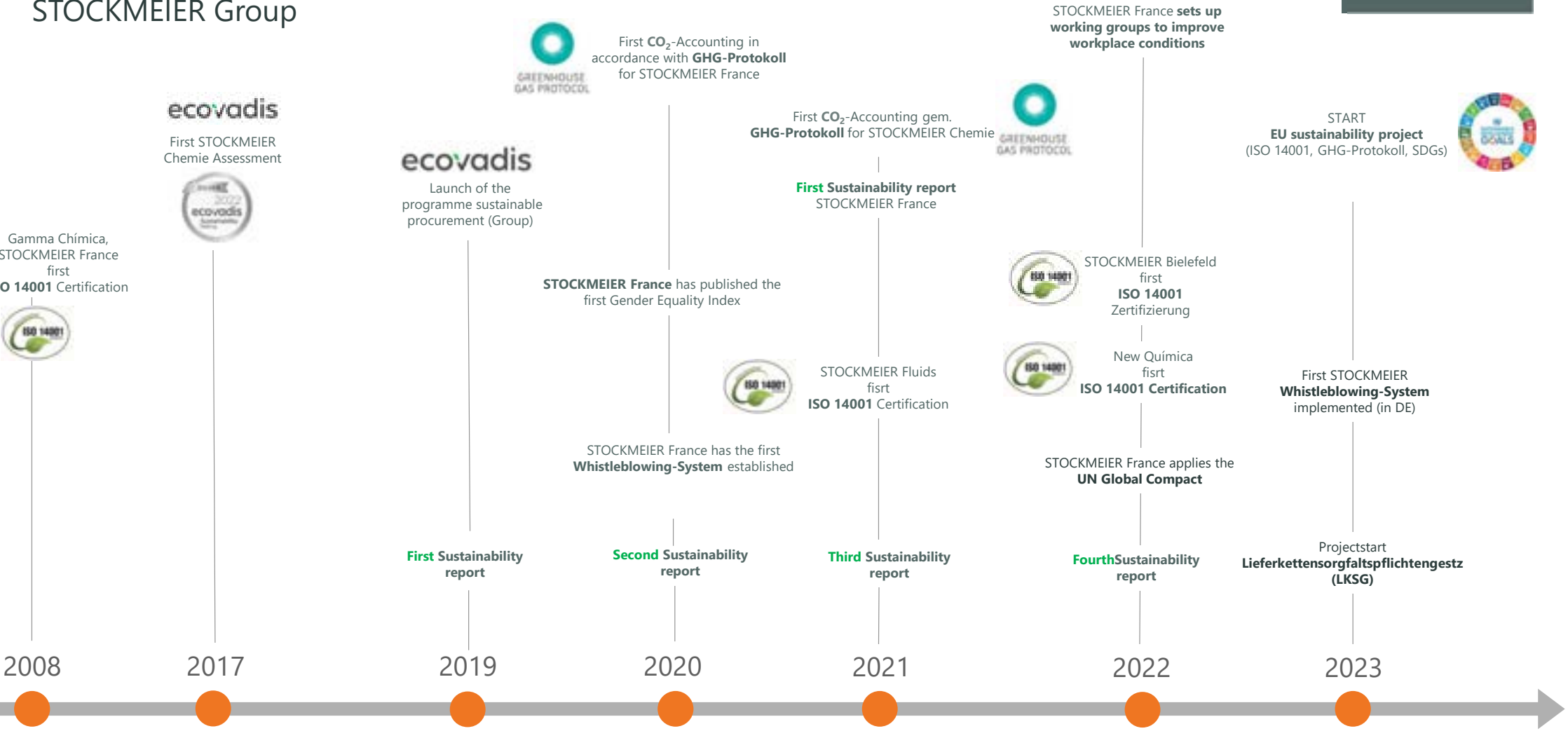
"Natural intelligence - last attempt“

A lecture that was created completely without artificial intelligence (AI).

Not only since ChatGPT has Natural Intelligence (NI) been as threatened with extinction as leopards, whales and geriatric nurses.

Our sustainability activities in a timeline

STOCKMEIER Group



What will happen across the Group in future?

The level is EUROPE

The participants

- **GERMANY:** STOCKMEIER Food, STOCKMEIER Chemie, KAPP-Chemie, Staub und Silbermann, STOCKMEIER Urethanes
- **POLAND:** STOCKMEIER Chemia
- **FRANCE:** STOCKMEIER France
- **BELGIUM:** INNOCHEM N.V.
- **ITALY:** GAMMA CHIMICA S.p.A.
- **SPAIN:** STOCKMEIER Química S.L.U

3 Work programmes

ISO 14001 certification work area

- All production sites are to be certified in accordance with ISO 14001

Greenhouse Gas Protocol (GHG) work area, emissions measurement

- The entire STOCKMEIER Group should prepare its greenhouse gas balance in accordance with the GHG Protocol (Scope 1, 2 and parts of Scope 3).

SDG workspace with KPIs and targets

- Group-wide KPIs for the most important SDGs Measure and document KPIs Set targets and measures.

Understanding the Sustainable Development Goals (SDGs)

Developed by the United Nation

The United Nations developed the SDGs in 2015 to help **governments, companies** and **civil society** overcome the challenges.

- **193** Member states
- **17** SDGs
- **169** Subgoals
- A mission: the transformation of our world

Link: THE 17 GOALS | Sustainable Development (un.org)

Net zero emissions

- …Net zero is the point at which man-made greenhouse gas emissions, including carbon and methane, are reduced as far as possible and all **residual** emissions have been removed from the atmosphere.

- Residual is the amount of greenhouse gases produced despite all possible measures to reduce emissions.

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Specific expertise

Prerequisites for success

To ensure a safe and environmentally sound tank cleaning process, companies need to know:

- The correct product information (composition, properties, hazards,...).
- The precautions to be taken during transport and/or unloading (e.g. nitrogen blanket).
- How to comply with safety and health standards.
- How to treat wastewater.
- How to manage waste.
- How to reduce air emissions.
- The available technologies to meet all legal & quality requirements.

Therefore, tank cleaning must be carried out by **qualified and well-trained persons** who have access to the right technical equipment.

Specific measures

Sustainability in the Cleaning Solutions division

Quality improvement saves CO_2e (kg) + resources *Rule-based, it can even be simple*

6 R Principles to be observed:

- Rethink
- Reject
- Recycle
- Reduce
- Reuse
- Recover

Development of cleaning agents with low hazard potential

- Use of environmentally friendly, less hazardous raw materials
- Sustainable product formulations (e.g. surfactants of plant origin, use of secondary raw materials)
- Lowest possible environmental impact

Circular economy offers sustainable solutions

Re-introduction into the cycle e.g. water treatment

- Less transport effort Well To Wheel (WTW), (saving fuel / CO2 emissions)

Cleaning even at low temperatures

- Energy / CO_2 savings due to lower working temperatures
- Water saving
- Less waste thanks to the operating system

EFTCO NEWSPAPER 2023

Cleaning over 200,000

different products…

… is no easy task!

SAFE CLEANING - SUSTAINABLE FUTURE 51

// GENERAL DATA

Efficiency heating	90%
Calorific value gas oil	85%
Energy gas oil (kWh/l)	10 kWh/l
Efficiency HP pump	80%
Average waterconsumption / tank cleaning	2 m³
kW pump (100 ltr/min, 100 bar)	19.4
Electricity consumption WWT / m³	4.81 kWh
Delta T water	75 °C

CO2e production Well To Wheel (WTW)
source CO2e parameters: GLEC framework

Electricity (kg CO2e/kWh)	Gas Oil kg CO2e/kWh)
0.420	0.325

Per tank cleaning	Consumption	Production CO2e (kg)
Energy consumption for heating tank cleaning water (kWh)	228.04	74.11
Electricity consumption HP Pump (kWh)	8.08	3.40
Elektricity consumption WWT (kWh)	9.62	4.04
Water consumption (m³)	2.00	0
TOTAL / TANK CLEANING		81.55
Dedicated transport (1 crop) Dieselconsumption truck (liter / 100 km)	25	
Average amount of empty kilometers	285	231.56
EXTRA CO_2 EMISSION DEDICATED TRANSPORT		150.01

The CO_2 emissions are calculated with the CO_2 parameters (WTW) of the GLEC Framework. It can be estimated that the total CO_2 emission saved per year for all tank cleanings done in Europe is about 637,561,008 CO2e (kg).

Energy saving

Specific measures

EFTCO paper 2023

[Safe Cleaning, EMISSION GUIDELINE | EFTCO]

CO_2 reduction

New developments - Cleaning Solutions

Alkaline low-temperature cleaning agent **Exemplary calculation**
Volume – 70m³

Temperature 65°C

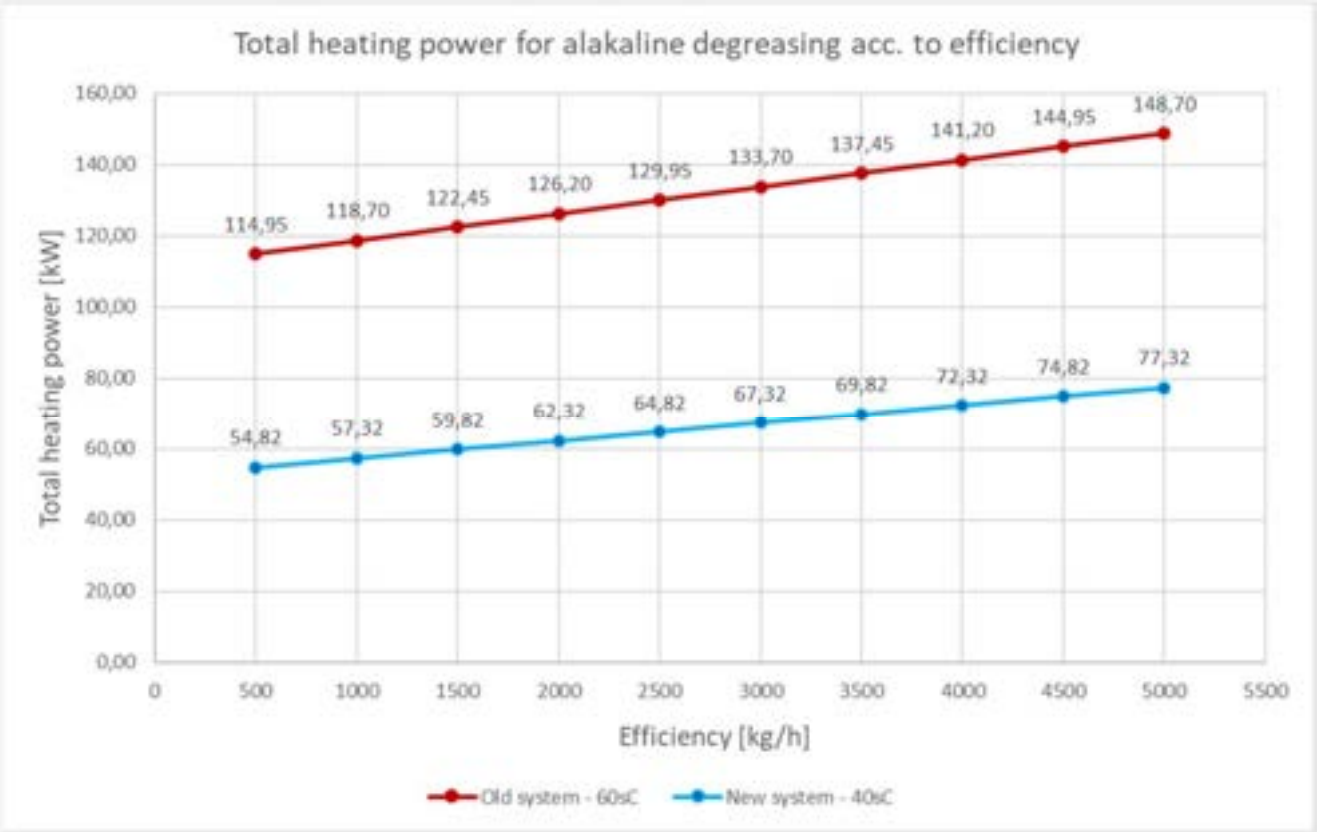
Efficiency [kg/h]	Heating up the load [kW]	Losses via bath surface [kW]	Losses via bath walls [kW]	Total Power [kW]	Gas consuption [m³/h]	CO_2 [m³/h]
500	3,75	95,88	15,32	**114,95**	**11,5**	**11,7**
1000	7,50	95,88	15,32	**118,70**	**11,9**	**12,1**
1500	11,25	95,88	15,32	**122,45**	**12,2**	**12,4**
2000	15,00	95,88	15,32	**126,20**	**12,6**	**12,8**
2500	18,75	95,88	15,32	**129,95**	**13,0**	**13,2**
3000	22,50	95,88	15,32	**133,70**	**13,4**	**13,6**
3500	26,25	95,88	15,32	**137,45**	**13,7**	**14,0**
4000	30,00	95,88	15,32	**141,20**	**14,1**	**14,3**
4500	33,75	95,88	15,32	**144,95**	**14,5**	**14,7**
5000	37,50	95,88	15,32	**148,70**	**14,9**	**15,1**

New system
Temperature 40°C

Efficiency [kg/h]	Heating up the load [kW]	Losses via bath surface [kW]	Losses via bath walls [kW]	Total Power [kW]	Gas consuption [m³/h]	CO_2 [m³/h]
500	2,50	43,47	8,85	**54,82**	**5,50**	**5,57**
1000	5,00	43,47	8,85	**57,32**	**5,75**	**5,82**
1500	7,50	43,47	8,85	**59,82**	**6,00**	**6,07**
2000	10,00	43,47	8,85	**62,32**	**6,25**	**6,33**
2500	12,50	43,47	8,85	**64,82**	**6,50**	**6,58**
3000	15,00	43,47	8,85	**67,32**	**6,75**	**6,83**
3500	17,50	43,47	8,85	**69,82**	**7,00**	**7,09**
4000	20,00	43,47	8,85	**72,32**	**7,26**	**7,34**
4500	22,50	43,47	8,85	**74,82**	**7,51**	**7,59**
5000	25,00	43,47	8,85	**77,32**	**7,76**	**7,85**

CO_2 reduction

New developments - Cleaning Solutions

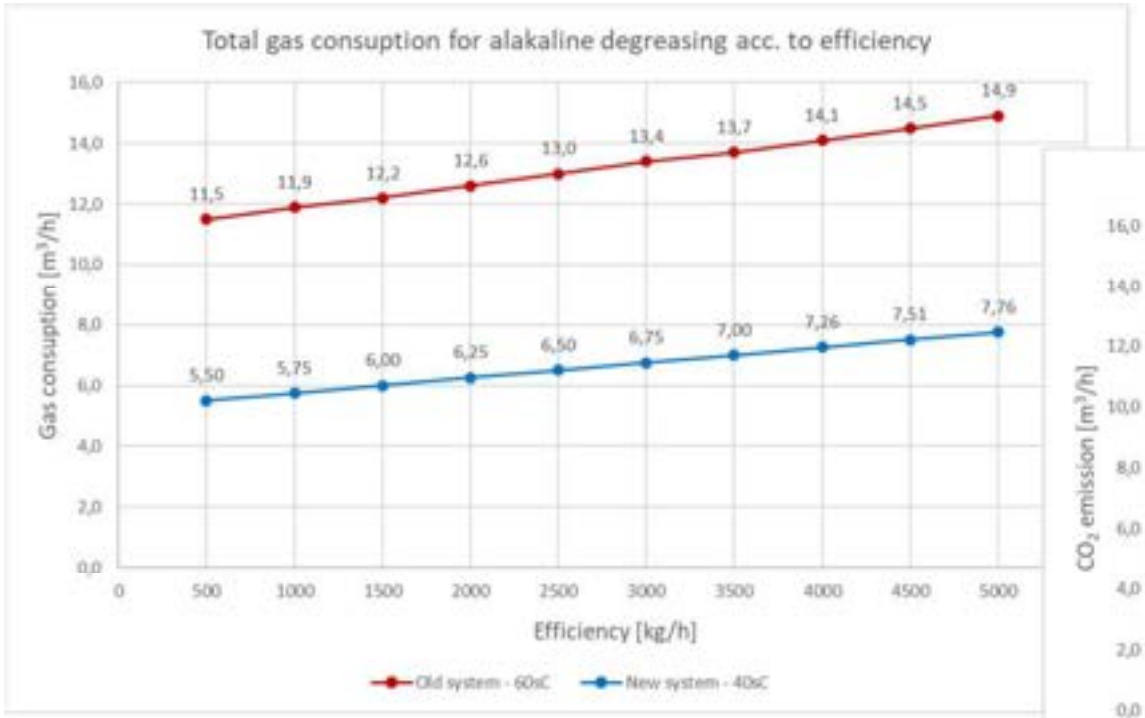


The new generation of alkaline degreasing offers several advantages:

- lower heating energy requirement
- lower gas consumption
- lower CO2 emissions
- effective cleaning
- water treatment

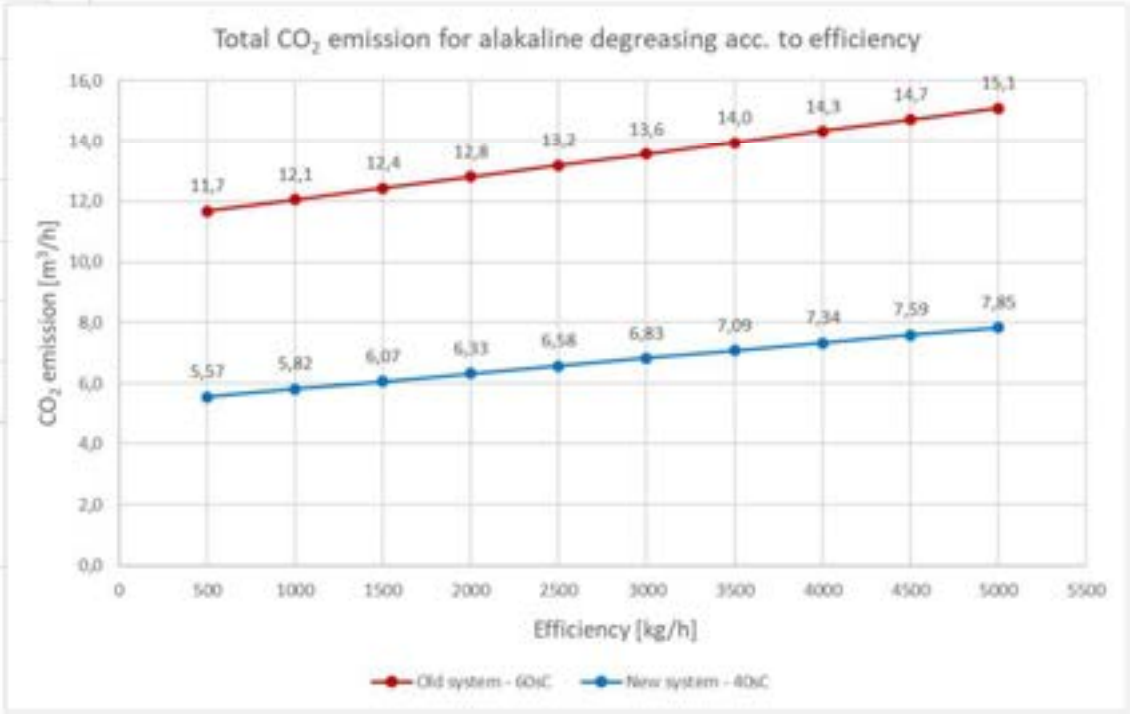
CO_2 reduction

New developments - Cleaning Solutions



Lower gas consumption ~50%

Lower CO_2 emissions ~50%



Specific measures

Sustainability in tank cleaning

BAT Best **a**vailable **t**echnology and knowledge

- Reducing cleaning times - **key potential**
- Reduction in the consumption of operating materials and consumables

And on top of that, environmental protection and improvement of the working environment through lower emissions!

With our specialised knowledge, many years of experience and close customer-supplier relationships, it is possible to move in the right direction together.

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Water chemistry

Sustainability in the water treatment processes

Specific measures

Sustainability in the water treatment processes

The value of waste heat recovery

Waste heat recovery is one of the simplest and most cost-effective ways for your company

To improve overall energy efficiency

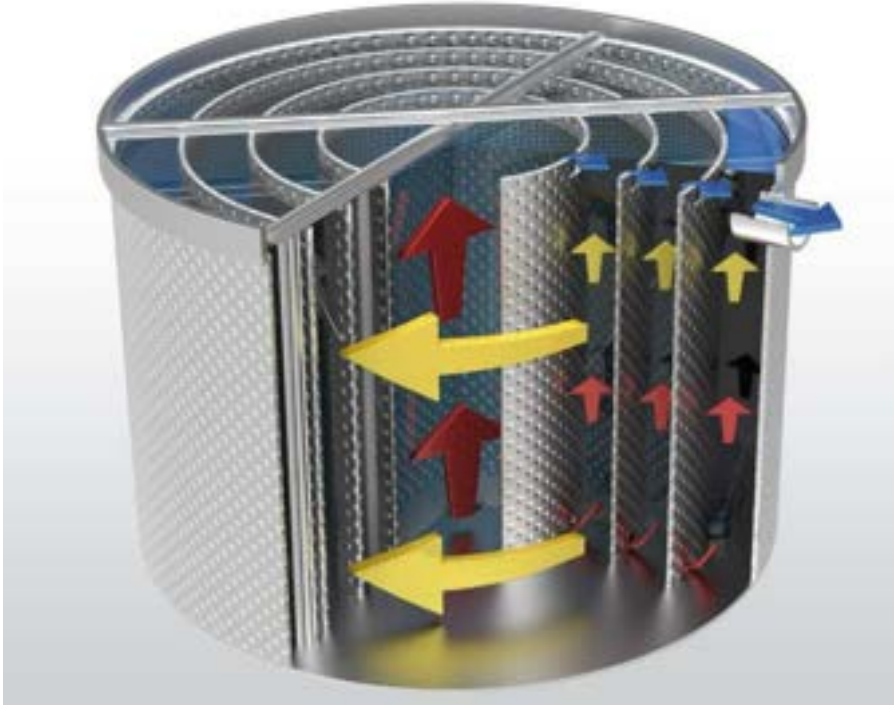
...which in turn has a positive impact on your bottom line.

Unutilised industrial waste heat becomes valuable energy.

- Up to 50% of the energy used in industrial processes today is lost as waste heat.
- This makes waste heat recovery one of the most effective methods of improving energy efficiency and reducing carbon emissions.

Heat exchanger

Sustainability in the water treatment processes



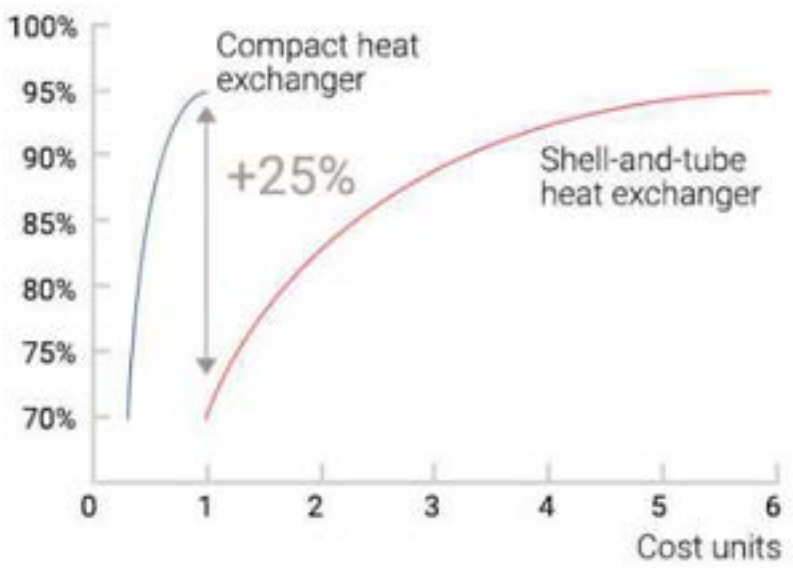
Source: Diagram DAS

Heat transfer from wastewater to process water

- Suitable for wastewater contaminated with solids
- Increased performance for aerobic wastewater technology
- Compliance with the restriction of the officially specified upper temperature limit of 30°C for the direct discharge of wastewater - cooling down.

Heat exchanger

Sustainability in the water treatment processes



Quelle: Alfa Laval

The diagram shows the degree of heat recovery as a function of the acquisition costs.

The profitability of compact heat exchangers is up to 25 % at comparable costs.

Water treatment

Sustainability in the water-treatment processes

- Precipitation / Flocculation

→ Impurities dissolved in the water are converted into an insoluble state

→ Example: Tasks at municipal wastewater treatment plants - phosphate precipitation

→ Addition of precipitants causes the formation of microflocs to **macroflocs**

Koagulation Flocculation

Water treatment

Sustainability in the water-treatment processes

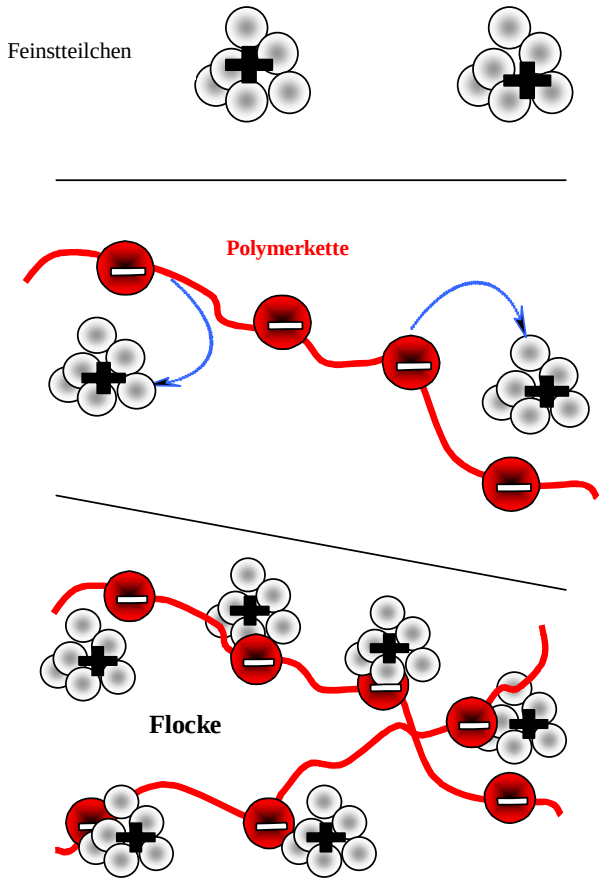
Precipitation / Flocculation

→ The raw water contains **positively (cationic)** or **negatively (anionic)** charged particles (solids)

→ The addition of a **polymer** a charge exchange takes place

→ Small, free-floating particles (microflakes) are **combined into large flakes** (macroflakes)

→ The large flakes have a **higher weight** and settle as sludge

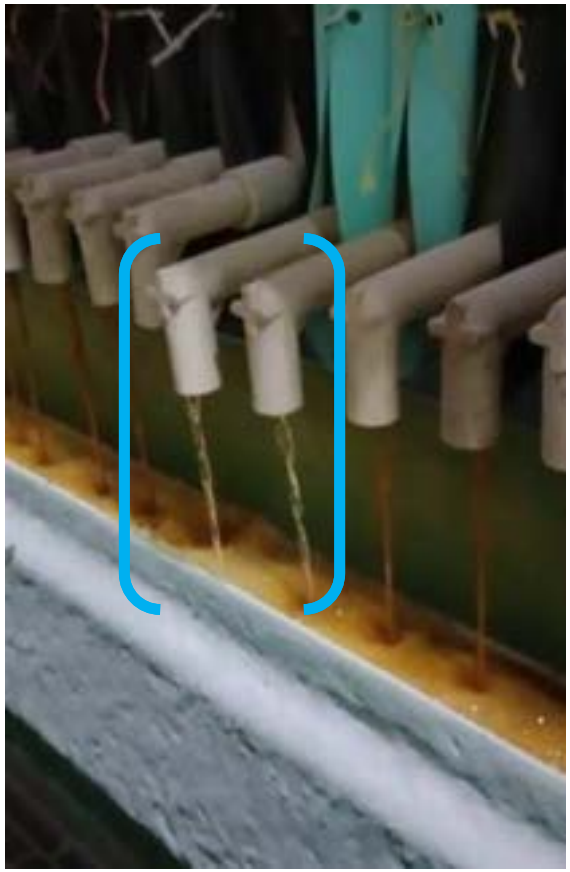


Water treatment - Filtration

Sustainability in the water-treatment processes

Filter cake Disposal costs per tonne - **Water content**

- Chamber filter press: Solids content approx. 30 - 50%
- Membrane filter press: Solids content approx. 75%
- High-temperature filter press:
  thermal filter cake drying
- **Alternative:** CFP- conversion - **green membrane filter** cloth - solids content approx. 75%
- Producing higher wastewater quality reduces discharge costs

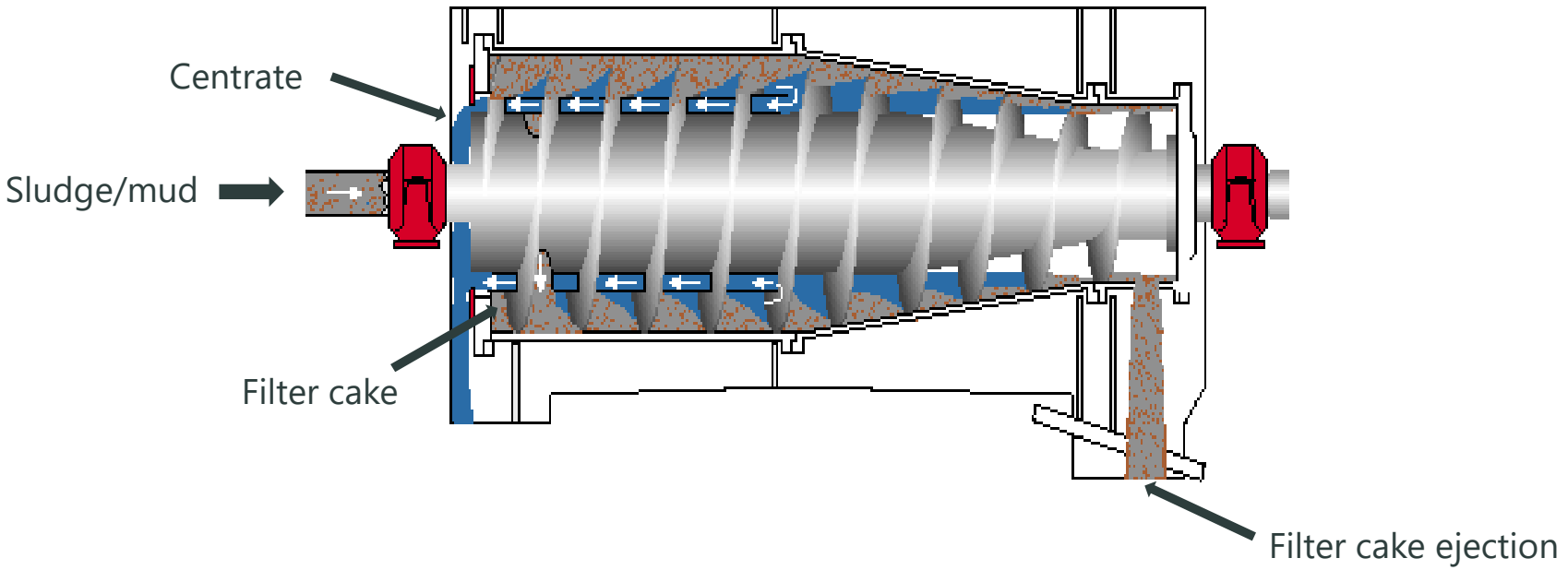


The decisive factor is the membrane = dry filter cake = €

Water treatment - Filtration

Sustainability in the water-treatment processes

Centrifuge



Activated Carbon

Sustainability in the water-treatment processes

Aktiv carbon

→ Filter material based on thermally/chemically activated carbon

→ Thanks to its distinctive pore system, activated carbon can adsorb a variety of pollutants from liquids or gases adsorb

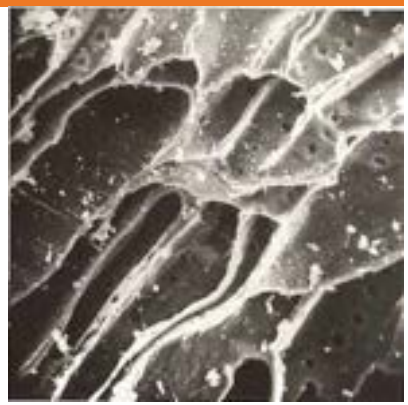
→ Base: hard coal, coconut, wood, brown coal

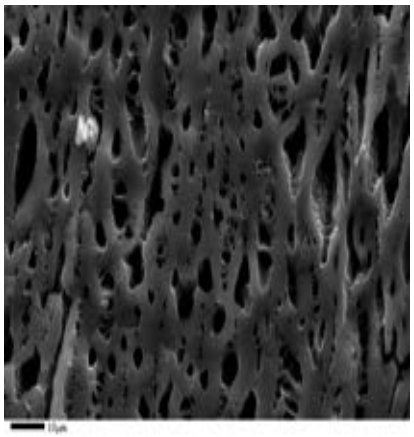
→ Powdered carbon/granulated carbon for liquid phase

→ Impregnated moulded carbon for air/gas treatment

→ Crushed carbon as a filtration agent

→ Laboratory and reactivation services available





Porensystem Kokosaktivkohle

Activated carbon - typs

Filter material for special applications

Activated carbon (AC)

Selection of the AK base material (stone charcoal, brown charcoal, coconut charcoal, charcoal) and the AC quality (degree of activation) depending on the task

Typical applications for tanker cleaning:

COD (CSB) reduction, **HC-** reduction (limited **BTX**), **AOX** elimination in the waste water Sector **H_2S** reduction, **odour** elimination in the exhaust air area

...duration of contact of AC with material and volume of the AC are decisive for service life and economic efficiency

Summary

Sustainability

6R- Principles to be observed:

Rethink, reduce, reuse, recycle, reject, recycle

- BVT Best available technology and knowledge,
  harmonious interaction between customer and supplier
- Reducing cleaning times **- key potential**
- Heat recovery, e.g. from waste water
- Macroflocculation for a very good filter cake
- Chamber filter press with special membrane - higher solids content, less water content
- Activated carbon for special filter applications
- Production of high water quality = safe money
- **safe money = CO_2 reduction** ➡ money works … and stays with the company €€€

Tank Cleaning Europe

Big picture Halal certificate

Halal Quality Control

شهادة حلال

HALAL CERTIFICATE

Awarded to:

STOCKMEIER Chemie GmbH & Co. KG

Am Stadtholz 37, 33609 Bielefeld , Germany

Manufacturing Site Address

Gustav-Adolf-Ring 5, 04838 Eilenburg, Germany

Am Stadtholz 37, 33609 Bielefeld, Germany

Halal Quality Control BV Netherlands hereby awards this Halal Certificate to the above mentioned company which has been found in compliance with the following criteria:

Reference Halal Standards: GSO/SMIIC 1: 2019 | UAE.S 2055-1: 2015 | HAS 23000-1

Scope of Certification: Development and manufacture of cleaning agents

Product Category: K

For the Products: See the Annex for the approved products

This Halal Certificate is the sole property of the Halal approved company and is not to be shared with unauthorized parties.

Chief Executive Officer:
Dr. A.M. ALCHAMAN

Client ID:	DE10410401569
Issue Date:	02/04/2024
Expiry Date:	28/04/2025
Cert. No:	DE10410401569

Halal certification with 241 products

Control Office Of Halal Slaughtering and Halal Quality Control BV Netherlands

مكتب مراقبة الذبح حسب الشريعة الإسلامية
مكتب مراقبة جودة الحلال في هولندا

Nr	Product name
223	Lenatone® BSM CDX
224	Lenatone® BSM multi schutzarm
225	Lenatone® BSM TA plus
226	Lenatone® BSM-S
227	Lenatone® ES 160
228	Lenatone® SDB
229	Lenatone® SDK 60
230	Lenatone® SLK
231	Lenatone® SLK E
232	Lenatone® SPX
233	LonaSCare® VOI
234	Obyxil 2005
235	Qualitätswaschpulver TAID
236	SC Hautlotion 2in1
237	Septasan
238	Septasan liquid
239	Septasan® Animal Wash
240	Wakeron 40
241	Wardofix

Certificate No: DE10410401569
Date of Issue: 02/04/2024
Date of Expiry: 28/04/2025

Annex number: 01
Revision number: 1.0
Revision date: 02/04/2024

Signature of the Chief Executive Officer and Stamp:
Dr. A.M. ALCHAMAN

Sustainability in tank cleaning processes **is not an illusion.**

We are now ready to implement it according to the 6R- principles.

CO_2-Balance

May the cleanliness be with you…

STOCKMEIER Holding GmbH

Am Stadtholz 37
33609 Bielefeld
+49 521/3037-0

info@stockmeier.de
www.stockmeier.com

Your contact

Björn Haupt
bjoern.haupt@stockmeier.com
Mobile +49 151 544 59 206