Iron hydroxide based products

FerroSorp®

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2. Why iron hydroxides?
3. Water treatment
4. Gas treatment

For three decades, HeGo Biotec GmbH has gained extensive experience in treating gases and water

1 Introduction of HeGo Biotec GmbH

Member of the Fechter Group

1990 (HeGo), 2022 (HBI)

36 (HeGo), 50 (total)

- Berlin (Headquarter)
- Lincoln, RI, USA

Activities:		
	Water treatment	FerroSorp® SP, Plus, FerroSorp® RW
	Gas treatment	FerroSorp® DG, S

Iron hydroxide has a high binding capacity for various pollutants

2 Why iron hydroxides?

Iron hydroxide has a high binding capacity for:

- Phosphates (PO_4^{3-})
- Arsenates (AsO_3^{4-}, AsO_4^{4-})
- Heavy metal ions (Cu, Zn, Ni, Hg …)

} Water phase

- Sulphides (S^{2-}, H_2S)

} Water & gas phase

Iron hydroxide is superior to iron oxide because of:

- Bigger surface area (BET 20 - 70 vs. 180+ m^2/g)
- Higher reactivity

Water treatment

Products based on iron hydroxide for the separation of contaminants from aqueous solutions

3 Filter granulates: FerroSorp® SP, Plus, RW

Advantages:

- Natural substances
- High cleaning performance at low cost
- High loading rates due to a highly porous surface

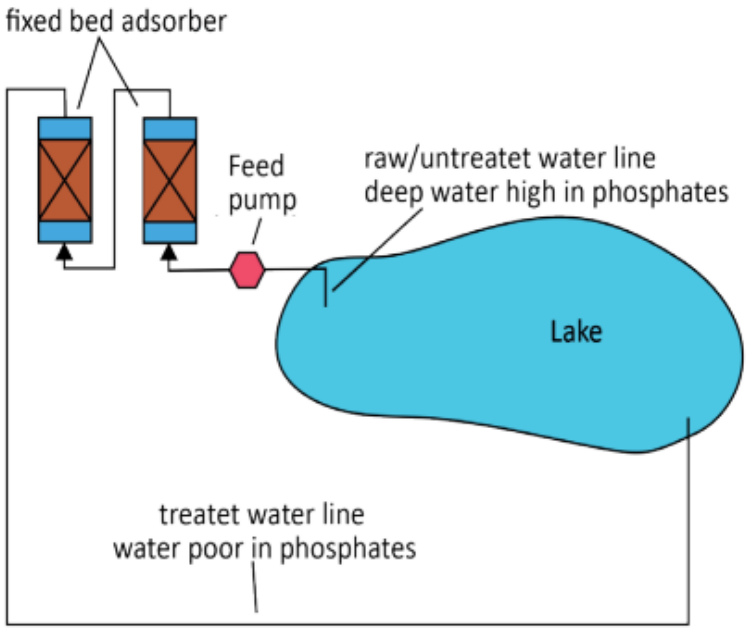
Applications:

- Water remediation
- Drinking water
- Aquariums, lakes and fish farming
- Storm and rainwater treatment
- Leachate treatment
- Retention soil filters

3 FerroSorp® Plus - Applications

Phosphate removal with a FerroSorp® Plus fixed bed adsorber

3 Applications for water treatment:



Restoration around the re-naturalization of the lake Orankesee

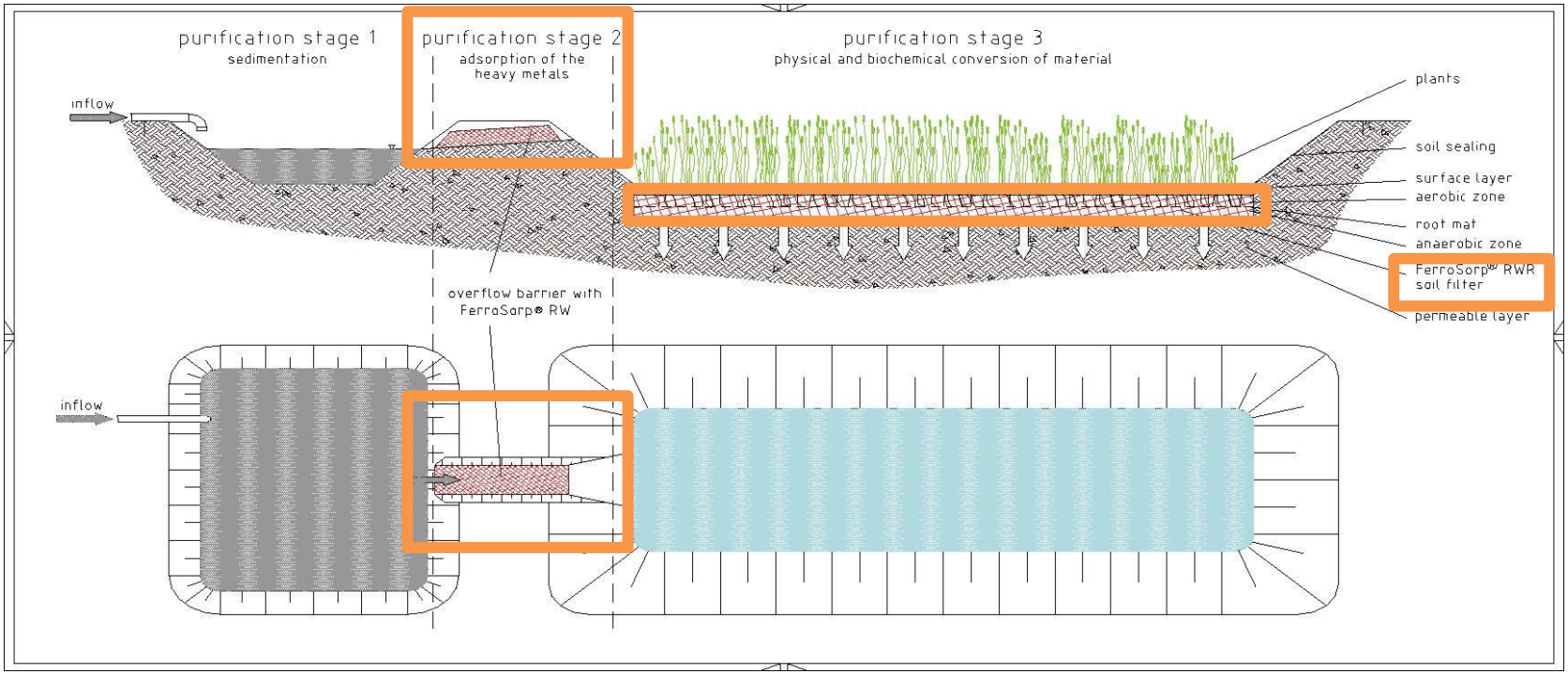
3 Applications for water treatment:

Filter layer includes FerroSorp® RW

3 Applications for water treatment:

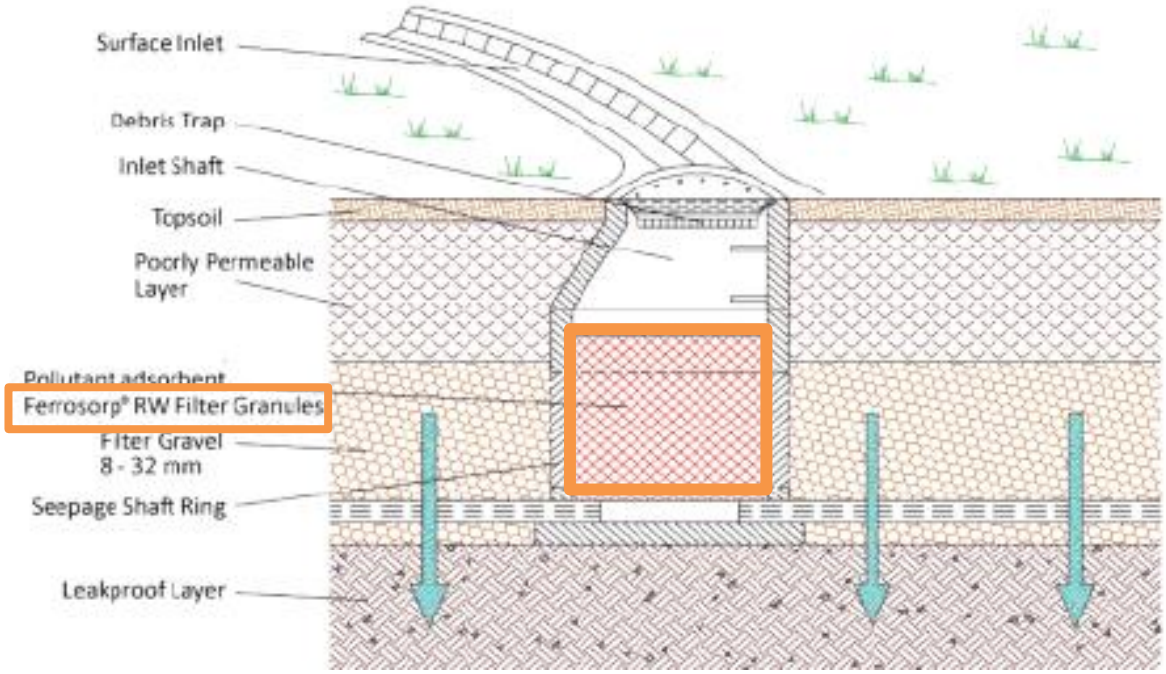
Use of FerroSorp® RW in open air rainwater infiltration with upstream sedimentation

3 Applications for water treatment:



Use of FerroSorp® RW in canister type filter vessel

3 Applications for water treatment:



FerroSorp® Plus is easy to handle, reduces cost and is available

3 Reference 1: Municipal Potable Water Treatment – Central Italy

Water flow	144 m³/h
Concentration	As 26 µg/L V 22 µg/L SiO_2 30 ppm
pH range	7 – 7.5
Water source	Various springs – seasonal plant (summer)
N° of filters	5
Configuration	Parallel
Diameter	1.6 m
Filling volume	4.0 m³ each filter
Used product	FerroSorp® Plus
Advantages compared to the previously used product	Cost-effective Availability

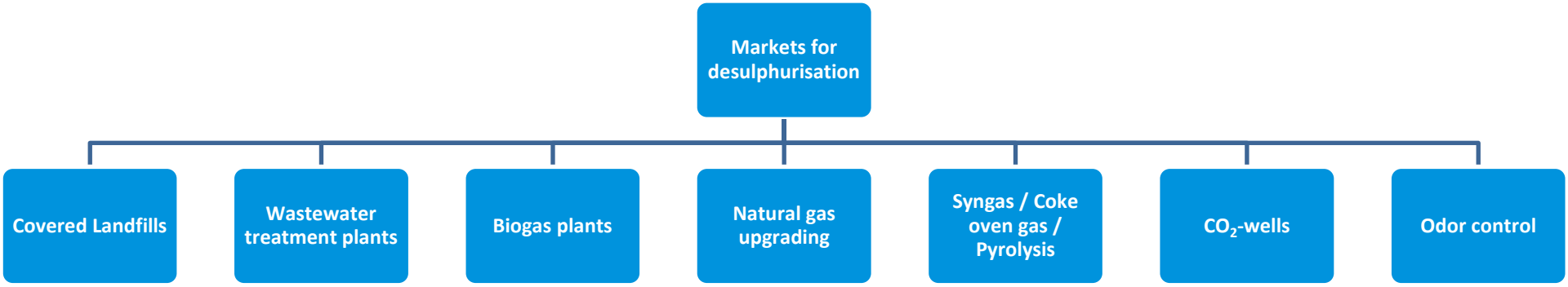
3 Reference 2: Municipal Potable Water Treatment – Peru

Water flow	45 m³/h
Concentration	As 18 – 20 µg/L
Water source	WWTP
N° of filters	6
Configuration	Parallel
Diameter	1.6 m
Filling volume	5 m³ each filter
Used product	FerroSorp® Plus
Pressure drop through the filters	0.1 bar on average

Gas treatment

Desulphurisation is needed for several applications

4 Overview about different applications



FerroSorp® DG is a cost-effective and well-proven solution for many biogas plants and other gases with H_2S

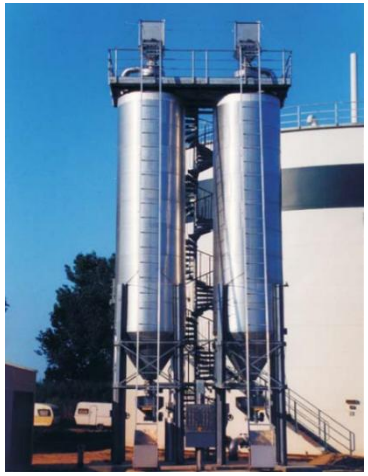
4 Desulphurisation with FerroSorp® DG and S series

Advantages of FerroSorp® DG:

- Stabilized biogas production
- Easy dosing
- No corrosion

Advantages of FerroSorp® S:

- Low removal costs for H_2S
- High loading capacities
- Reaches 0 ppm H_2S



We offer different solutions for the odour treatment

4 GoSens®, GoSil® and FerroSorp® FS-1000

GoSens®: H_2S measuring device

- 0 – 1.000 ppm
- Data transmission
- Battery life up to 24 months

FerroSorp® FS-1000: Exhaust air filter

- Remove H_2S odour from any location
- With integrated compressor

GoSil®: Pumping station injection point

FerroSorp® S is not only cheaper, but also more convenient and causes less pressure drop

4 Reference 1: Landfill gas, Quebec, Canada

Gas flow	1,200 m³/h (706 scfm)
H_2S-concentration	1,250 ppm (later ≤ 4,000)
Relative humidity	c. 30 %
# of vessels	2
Arrangement	Lead / Lag
Dimensions (diameter x filling height)	1.8 m x 9.1 m (6 ft x 30 ft)
Filling volume per vessel	22 m³
Used product	FerroSorp® Sk 5 - 25 mm
Advantages compared to the previously used product	- No severe clumping / bridging - Shorter downtime during change-outs - Less costs per filling - Longer operating time - Lower pressure drop

FerroSorp® S causes much less pressure drop and removes H_2S more reliably and more consistently

4 Reference 2: WWTP gas, Singapore

Gas flow	2,400 – 4,500 m³/h (1,410 – 2,650 scfm)
H_2S-concentration	1,500 – 3,000 ppm
Relative humidity	c. 70 %
# of vessels	2 (below ground)
Arrangement	Parallel
Dimensions (diameter x filling height)	3.7 m x 7 m (12 ft x 23 ft)
Filling volume per vessel	73 m³
Used product	FerroSorp® Sd 2 - 4 mm
Advantages compared to the previously used product	- Much lower pressure drop: c. 140 mbar (2 psi) vs. 345 mbar (5 psi) - Maintains 0 ppm H_2S at the outlet much longer

FerroSorp® S is used to remove odour (esp. H_2S) from exhaust air from the sewer system

4 Reference 3: Odour removal, Germany

Gas flow	370 m³/h
H_2S-concentration	c. 350 ppm
Relative humidity	90 – 100 %
# of Vessels	1
Dimensions (Diameter x filling height)	0.95 m x 0.6 m
Filling volume	c. 0.4 m³
Used product	FerroSorp® S 5 – 25, FerroSorp® Sd 2 - 4 mm and Activated carbon
Description	The air is treated with FerroSorp® S first to remove H_2S and then with activated carbon to remove VOCs

Thank you for your attention.

Please contact us, we gladly advise you individually!

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