

v1.14	SBGX	Iron Oxide	Iron Oxide-Hydroxide	Iron Chloride	Air Injection
<i>Investment into</i>					
Storage and Handling	outside, low	covered, low	covered, low	covered, high	not applicable
Dosing Equipment	none / low	none / low	medium	medium	high
<i>Risk of/to</i>					
Exposure / Personnel	low	low	low	high	n. a.
Explosion	low	low	low	low	high
Corrosion	low	low	low	high, HCl ^A	high, H ₂ SO ₄ ^B
Gas Impurities	low	low	low	low	high
Reaction Products	none	none	none	HCl	H ₂ SO ₄
<i>Other Characteristics</i>					
Chemical Composition	FeO and Fe ₂ O ₃ ^C	Fe ₂ O ₃	FeO(OH)	FeCl ₂ or FeCl ₃	n. a.
Reactive Iron Ion Content	> 60% ^D	30% - 60%	15% - 30%	10% - 14%	n. a.
Reaction Speed	high	low	low	high	low
Deposit / Buffer Effect	high	high	medium	none	none
Effect on Bacterial Health	positive	normal	normal	negative	negative
Effect on Gas Yield	positive	normal	normal	0 to minus 32% ^E	negative
Trace Element Addition	recommended	required	required	required	required
Shelf Life	> 12 months	> 12 months	< 12 months	< 12 months	n. a.
Price per chem. Reaction	medium	high	medium	high	n. a.

Anecdotally, *highly toxic* iron(II) sulphate, aka "Grünsalz" in German, can also be used as an additive: $\text{FeSO}_4 + \text{H}_2\text{S} \rightarrow \text{FeS} + \text{H}_2\text{SO}_4$

^A IUPAC: Hydrogen chloride, other name: Hydrochloric acid gas

^B IUPAC: Sulfuric acid

^C See www.swissbiogas.com/Resources - Download Area/Effects of Different States of Fe on Anaerobic Digestion: A Review

^D Analysis March 2023

^E See www.swissbiogas.com/Resources - Download Area/The effect of iron salt on anaerobic digestion and phosphate release to sludge liquor