

WASTE WATER TREATMENT



INNOVATION

ENGINEERING

OPTIMIZATION

LOPROX® – Low-Pressure Wet Oxidation for the Treatment of Wastewater and Sludge

Our service ...

LOPROX®, (Low-Pressure Wet Oxidation) process for the treatment of industrial wastewater and sludge.

Typical fields of application include

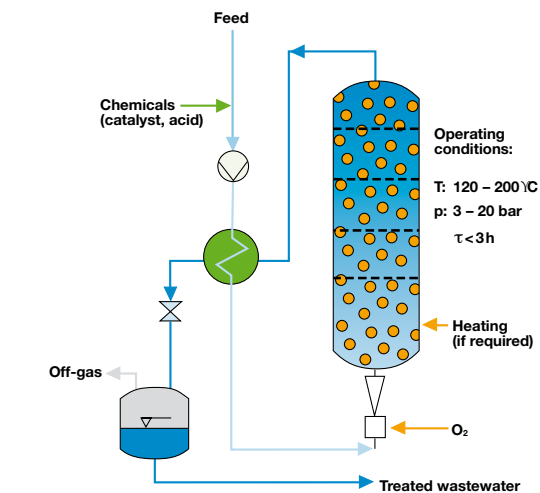
- Pre-treatment of highly polluted industrial wastewater streams (e.g. before being discharged into a biological treatment plant)
- Sludge treatment (e.g. sewage sludge)

Key element of the process is the homogeneous catalytic oxidation of organic matter with oxygen at elevated temperature and pressure. Characteristics are:

- Reaction in fluid phase (bubble column)
- Pressure range: 3 – 25 bar
- Temperature range: 120 – 220°C
- Oxidation with air or oxygen
- Catalyst: iron + co-catalyst



LOPROX®-Anlage, La Felguera, Spanien



Flow diagram of a LOPROX® plant

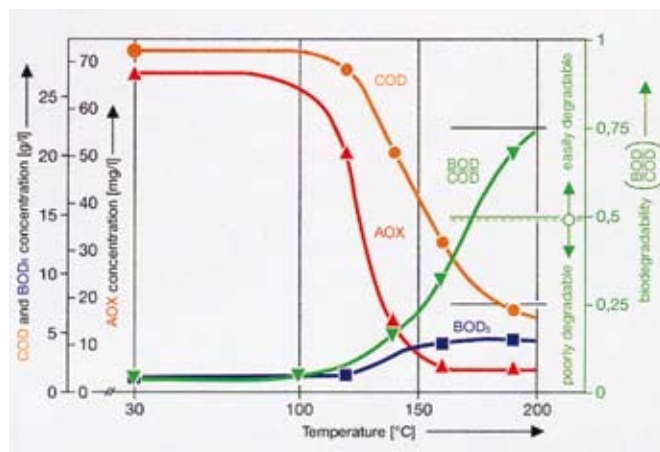
... is your gain.

- Cost-efficient and custom-designed treatment process for moderately to highly polluted wastewater streams (2 – 100 g/l COD)
 - Typical elimination rates for COD 60 – 90 %, for AOX > 90 %
 - Strong improvement of wastewater biodegradability (increasing BOD/COD-ratio from < 0.1 to around 0.5)
- Innovative process for sewage sludge disintegration and volume reduction:
 - 85 % reduction of organic dry matter
 - Significant improvement of dewatering properties
 - Cost-efficient alternative to incineration
- Destruction of persistent organic compounds (e.g. pharmaceuticals, pesticides, PAH, phenols, ...) and wastewater detoxification



Bayer Technology Services
Powering Your Performance

- Autothermic operation possible for most applications
- Cheap and environmentally friendly catalyst
- Salt concentration up to 20 % allowed
- Proven reliability and mastery of materials and corrosion questions (reaction columns with up to 18 years running time without replacement)



Typical course of reaction within the LOPROX® process

This diagram illustrates the typical course of reaction within the LOPROX® process applied to poorly biodegradable wastewater containing chlorinated aromatic compounds. Chemical oxygen demand (COD) and adsorbable organic halogens (AOX) are used as parameters indicating the degree of pollution. With increasing reaction temperature, both parameters are greatly decreased, AOX even more so than COD.

Simultaneously, biological oxygen demand (BOD) rises and thus the BOD/COD ratio increases drastically from its initial value of < 0.1 to values noticeably higher than 0.5.

The BOD/COD ratio gives an indication of the biodegradability of wastewater. Wastewater with a BOD/COD ratio > 0.5 can usually be cleaned well in biological treatment plants.

Our approach

Based on our own process developments and more than 20 years of experience, we offer you a customdesigned, innovative and effective solution for your wastewater and sludge, based on the patented Low-Pressure Wet Oxidation (LOPROX®) process.

The first step will be an assessment of the applicability of the LOPROX® process for the stream in question. This will be done based on a first analysis of the treatment task by our process engineers and wastewater experts.

In a second step, batch experiments in titanium autoclaves will be performed, from which suitable reaction conditions and removal rates can be derived for the parameters in question.

Thanks to our experience, these tests already allow a conceptual pre-basic design, including an estimation of investment and operating costs.

The last step of process development will be continuous experiments in our pilot plant to validate the batch experiments and to derive

- Optimum process conditions
- Degradation rates, including certified analysis of the effluent (e.g. AOX, ecotoxicity values, biodegradability, ...)
- Minimization of chemicals and auxiliaries consumption
- Behavior of auxiliary equipment (e.g. fouling of heat exchangers, ...)
- Materials testing (to achieve an optimum of
- Corrosion resistance and costs)

Our experienced engineering staff guarantees efficient and professional project management over the entire project cycle, including basic engineering, detail engineering, planning for the operating license, procurement, installation and commissioning, up to turnkey delivery to meet the most stringent requirements. You can also rely on us for plant personnel training and assistance with any future questions that might arise.

References

Our extensive experience with the LOPROX® process extends throughout a variety of industries. Our references include (excerpt):

- LOPROX®, Leverkusen, Germany LanXess; chemical industry
capacity: 30 m³/h, commissioning: 1985
- LOPROX®, La Felguera, Spain
Bayer S.A., pharmaceutical industry
capacity: 8 m³/h, commissioning: 1993
- LOPROX®, Leverkusen, Germany
Bayer AG; chemical industry
capacity: 16 m³/h, commissioning: 1996
- LOPROX®, Cilegon, Indonesia
Dystar; dye stuff synthesis
capacity: 7 m³/h, commissioning: 1999
- LOPROX®, Leverkusen, Germany
LanXess; chemical industry
capacity: 20 m³/h, commissioning: 2005