



GORE® COVER FOR BIOSOLIDS COMPOSTING



BIOSOLIDS COMPOSTING: THE INTEGRATED APPROACH TO A COMPREHENSIVE WASTEWATER TREATMENT SOLUTION

Benefits of GORE® Cover

- Reduce operating costs
- Control odors and emissions
- Low energy process
- Hygienization compliance
- Return valuable, plant available nutrients to the land (NPK)
- Return on investment by producing the highest quality compost

Features of GORE® Cover

- Waterproof and breathable GORE® membrane
- Robust cover design for longest life-time
- Encapsulated technology system
- Positively aerated system with an oxygen control and temperature monitoring
- Ideal management of moisture
- Retention of bioaerosols and particulate matter



BIOSOLIDS COMPOSTING REFERENCES



CASE STUDY 1: ABWASSERVERBAND WÖRGL-KIRCHBICHL, AUSTRIA WASTE WATER TREATMENT PLANT (WWTP)

Decision for GORE® Cover

- Open windrow composting created emission/odor problems
- Increased treatment capacity from 5,000 tpy to 15,000 tpy
- Expansion in 2009
- GORE® Cover installed for Phase 1 active/intensive and Phase 2 maturation/curing composting
- Decreased treatment footprint from 2,200 m² to 1,600 m²
- Emission control and operation during winter at low temperatures were special requirements

t/y	10,000 tpy
Start-up	2009
Input material	Biosolids, green waste, digestate
Number of heaps	6 (with side walls)
Treatment time design	3+3 under GORE® Cover, further maturation under roof
Output quality	Meeting Austrian Quality Compost Requirements
Use of end product	Farming, private households
Regulatory requirements	Österreichisches Kompostgütesiegel (Quality compost certificate issued by the State of Austria)

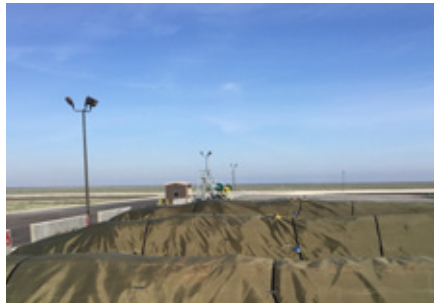
CASE STUDY 2: GREATER MONCTON SEWERAGE COMMISSION, CANADA

Decision for GORE® Cover

- GORE® Cover capable of handling extreme cold climate winter conditions
- Unique glycol heat collection system to extract heat generated by the composting which can be re-purposed during cold winter conditions or being used as a heat source for adjacent facility (heat buildings or green houses)
- Owner was searching for a low cost solution to produce high quality class A biosolids compost
- 360° view for responsible reuse of wastewater sludge

t/y	20,000 tpy
Start-up	2005
Input material	Biosolids, green waste
Number of heaps	8
Treatment time design	8 weeks
Output quality	Gardener's Gold Type "A" (Compost Soil Conditioner and Compost Mulch)
Use of end product	Unrestricted use
Regulatory requirements	CAN/BNB 0413-200/2005-01-21





CASE STUDY 3: LOS ANGELES COUNTY SANITATION DISTRICT TULARE LAKE COMPOST, USA

Decision for GORE® Cover

- Changing from negative aerated static pile (ASP) design
- Compliance with the state and local regulatory requirements (pathogen reduction, VOC emission control)
- Cost saving benefits (design, operation)
- Phased in construction possible due to modular design (5 stages, each 200,000 tpy/72 heaps)
- Flexibility to expand
- Completed Californian emission testing and achieved > 90% VOC emission control

t/y	1,000,000 tpy (Stage 1 200,000 tpy)
Start-up	2016
Input material	Biosolids, green waste
No of heaps	360 (72 in operation)
Treatment time design	4 – 8 weeks
Output quality	Class A Biosolids Compost
Use of end product	Unrestricted use
Regulatory requirements	EPA 503, CA Title 14 and SJVAPCD Rule 4565

BIOSOLIDS COMPOSTING PROCESS



COMPLIANCE AND VALUES FOR COMPOSTING PLANTS

GORE® Cover – Compliance for Composting Plants

Effective Odor Control for Good Air Quality

- Odor reduction up to 97% (Odor emission study)

VOC Emission Control

- US/Cal: > 90% thus California Compliant for 90% (acc. to Rule 1133.3, Rule 4565, Rule 4566 & BACT)

Dust and Bioaerosol Control

- Bacteria retention > 99%, e.g. *Aspergillus fumigatus*
- Dust and Particulate Matter (PM) Retention > 99% (Thesis Dr.-Ing. Windfuhr: Emission Study)

Pathogen Reduction and Hygienization

- US: Meets PFRP, VAR, Hygiene and ABPR EPA 503: Alt 5: Use of PFRP [503.32(a)(7) and (B)(1) of Appendix B]

Water Protection

- Waterproof GORE® Cover
- Protection from groundwater contamination
- Clear separation of leachate from storm water

Greenhouse Gas Control

- Lowest possible emission rate (CO₂ equivalent) compared to all other technologies
- Reduced emissions compared to all other treatment methods from an industry average of 48 kg to 12 kg per ton (UBA Study 2009; Germany)

GORE® Cover - Values for Composting Plants

Consistent high Compost Quality in Shortest Time

- Highest quality biosolids compost is meeting all regulatory requirements
- Compost contains plant available nutrients such as nitrogen, phosphorus, potassium, iron, calcium, magnesium and zinc
- US: Class A Biosolids Compost
- EU: Quality Compost Class A (e.g. Austrian Compost Ordinance; KGVÖ Seal of quality of Austria)

Most Flexible Design

- One modular technology concept for different treatment steps (operate, maintain, expand, customize)
- Design references from 2,000 to 1,000,000 tpy

Balanced Cost/Performance Ratio

- Lowest total cost of ownership
- Treatment costs per ton are lower compared to other systems and treatment methods (Florence KJ Study 2010)
- Energy consumption during composting phase: ≤ 2 kWh/t Input Material
- Rule of thumb: one operator per 20,000 tpy of additional annual capacity

Most Varied Climates

- Functional in varied climate conditions



WELL COVERED. WELL DONE.

- Comparing cost of ownership GORE® Cover is the most economic solution for the treatment of solid waste (Composting, Stabilization before landfill and Biodrying)
- GORE® Cover eliminates the need for buildings for the composting of organic waste
- GORE® Cover is accepted as in-vessel technology worldwide
- GORE® Cover offers solutions for green waste, food waste, other source separated organics, biosolids and MSW
- Static composting with positive aeration using membrane technology has the lowest possible emission rate

More than a cover – it's a complete system

- Support with site layout, commissioning, training and marketing of compost
- Back up for the efficiency and profitability of the site throughout its entire life-cycle via on-site check-ups
- Availability of a whole range of complementary customer services
- Web-based service platform for coordination of system components and spare parts (24 hours / 7 days a week)
- Training and support for owner and operator
- Demonstration packages and trial set-ups available on request

Experienced Partners for your Waste Treatment Solution

- GORE® Cover is sold by partners and system suppliers all over the world
- Please contact us to find your best partner for your local need



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