



## **Aquabio AMBR at General Mills, Atlanta, USA for treatment and reuse of Cereals Wastewater**

Aquabio has designed and built an advanced membrane bioreactor plant with Building Crafts Inc. & Dynatec, NJ at the General Mills Cereal production facility at Covington GA, USA. The plant efficiently removes organics and suspended solids to very low levels suitable for <10mg/l BOD, <5mg/l TSS discharge and further treatment using Reverse Osmosis for water reuse within the factory. The Covington plant is a major cereal production unit with Cheerios and Cinnamon Toast products. The recycled water represents over 50% of the wastewater treated and is used in non-potable factory applications (e.g. dust scrubbers) and as demineralised feed water for the site boilers (reducing boiler operating costs and water wastage through significantly lower blowdown frequency).

Parameter	Value	Units
Daily flow rate to Bioreactor	500,000	gal/day
Instantaneous flow rate to Bioreactor	347	gal/min
Raw wastewater temperature	50 to 140	°F
Design feed water temperature to bioreactor	86 to 104	°F
Average BOD <sub>Total</sub> conc'n to Bioreactor	771	mg/l
Average BOD <sub>Total</sub> load to Bioreactor	3,212	lbs/day
Max. BOD <sub>Total</sub> conc'n to Bioreactor	1,288	mg/l
Max. BOD <sub>Total</sub> load to Bioreactor	5,364	lbs/day
Max. suspended solids conc'n to Balance Tank	512	mg/l
Max. Ammonia TKN conc'n to Bioreactor	< 10	mg/l
Max. Total Phosphorous (P) conc'n to Bioreactor	< 10	mg/l
Maximum fats, oils and greases to Bioreactor	< 10	mg/l
pH range (after pre-treatment)	6 to 8	
Hardness	As city water	
Total dissolved solids ('spot' range 157 to 1700)	731 (average)	mg/l



The wastewater is screened and transferred to a balance tank. Following balancing and nutrient addition the wastewater is fed to the membrane bioreactor. Both the balancing and bioreactor tanks are mixed and aerated using jet aeration systems. The MBR is a single stage system operation at high MLSS levels to provide robust and reliable treatment. The summary of key treatment stages is as follows:-

- Fine screening – rotary drum
- Mixed and aerated balancing tank with 24hr hydraulic retention time
- AMBR bioreactor
- Biomass separation using ultrafiltration membranes (external to the bioreactor for ease of maintenance and high flux performance)
- Part treatment of MBR permeate using reverse osmosis (RO) for high quality, demineralised reuse



Parameter (UF Permeate, AMBR)	Treatment Target
TSS	≤ 5 mg/l
BOD <sub>5</sub>	≤ 10 mg/l
pH	6.0 to 9.0

Parameter	Treatment Target (post RO)
Water Quality	To the prescribed concentrations and values detailed in the Federal Drinking Water Standards & GMI Water as an Ingredient Requirements



The plant includes MCC, PLC, SCADA monitoring and operation linked to the sites integrated control system.

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