H₂O ALLEGIANT

Water Treatment Solutions

TECHNICAL PROPOSAL

Water Treatment System

ibyma

Date: September 13, 2025

Sector: industrial

Location: los mochis

📋 EXECUTIVE SUMMARY

ibyma operates in the **industrial** sector and requires a comprehensive water treatment solution for **135 m³/day**. Our recommended system represents an investment of **$56,693 USD** with an implementation timeline of **6 months**.

Key Project Highlights

Treatment Capacity: 135 m³/day
Total Investment: $56,693 USD
Implementation: 6 months
Industry Focus: industrial

Project Objectives

- Comply with discharge or water quality regulations (NOM-001) with ≥20% safety margin
- Reduce environmental footprint / Improve sustainability
- Save costs / Achieve a return on investment (ROI)

Expected Performance

BOD 96%
FOG 95%

📋 PROJECT BACKGROUND

PARAMETER	VALUE
🔧 COMPANY	ibyma
🔧 INDUSTRY SECTOR	industrial
🔧 LOCATION	los mochis
🔧 DESIGN FLOW RATE	135 m³/day

🔍 ANÁLISIS DEL PROBLEMA ESPECÍFICO

Contaminantes y Objetivos

PARÁMETRO	VALOR
🔧 CAUDAL DE DISEÑO	135 m³/día
🔧 BOD	2600.0 mg/L
🔧 FOG	3.0 qualitative_scale_1-3 (1=low,2=medium,3=high)

Objetivos de Calidad y Uso

- Achieve effluent BOD consistent with NOM-001 with ≥20% safety margin (design effluent BOD ≈ 91 mg/L)
- Reduce FOG to low levels (design removal ≈95%) to protect downstream treatment and meet sewer acceptance
- Provide option for partial non-potable reuse to reduce potable water purchases

Condiciones y Restricciones

- Discharge to municipal sewer (must meet local sewer authority and NOM-001 requirements)
- Regulatory restrictions noted by client (early engagement with regulator required)
- Only BOD and FOG provided; full influent characterization required before detailed design

🔄 ANÁLISIS DE ALTERNATIVAS

Se evaluaron las siguientes tecnologías alternativas durante el proceso de selección:

- **MBR (Membrane Bioreactor):** Higher CAPEX and OPEX compared with SBR for this flow and project objectives; MBR would reduce footprint further but increases energy and membrane replacement costs, conflicting with the client's ROI objective.
- **Conventional activated sludge with clarifier:** Larger footprint and less operational flexibility for highly variable and FOG-rich food-processing wastewater; higher risk of operational issues from FOG.

🎯 OBJECTIVE OF THE PROJECT

> *The primary objectives for this water treatment project are: comply with discharge or water quality regulations (nom-001) with ≥20% safety margin, reduce environmental footprint / improve sustainability, save costs / achieve a return on investment (roi). This solution is specifically designed for industrial wastewater to ensure regulatory compliance and operational efficiency.*

Specific Project Objectives

Objective 1:

Comply with discharge or water quality regulations (NOM-001) with ≥20% safety margin

Objective 2:

Reduce environmental footprint / Improve sustainability

Objective 3:

Save costs / Achieve a return on investment (ROI)

📋 SUPUESTOS Y RECOMENDACIONES

Supuestos de Diseño

- Design BOD removal requirement set to 96.5% to achieve a conservative effluent BOD ≈ 91 mg/L (provides ≥20% margin relative to typical sewer limits—exact numeric limits to be confirmed).
- Equalization sized for 1.0 day of flow (135 m3) to buffer diurnal and batch loads common in food processing.
- SBR HRT of 8 hours used to size reactor volume (45 m3).
- Sludge yield assumed at 0.50 kg dry solids per kg BOD removed for conceptual sludge production estimate.
- Energy consumption assumed at 0.35 kWh/m3 (moderate estimate for the selected train).
- CAPEX scaled from sector benchmark capex_unit_cost = 419.94 USD/m3 for Food Processing application.

Recomendaciones

- Se recomienda monitoreo online básico para pH y parámetros críticos
- Formación operativa para personal local responsable
- Mantenimiento preventivo según especificaciones del fabricante
- Evaluación periódica de eficiencias de tratamiento

🔬 JUSTIFICACIÓN DE TECNOLOGÍAS SELECCIONADAS

La selección de tecnologías se basó en criterios técnicos específicos considerando eficiencia de remoción, costos operacionales, requerimientos de espacio y facilidad de operación.

TECNOLOGÍA SELECCIONADA	JUSTIFICACIÓN TÉCNICA	ALTERNATIVAS CONSIDERADAS	CRITERIO DE SELECCIÓN
	DAF is effective for high FOG removal and reduces load to the biological stage. SBR provides flexible, compact, proven biological treatment for high-	MBR, Conventional activated sludge + clarifier	Effectiveness on high BOD and FOG, footprint,

TECNOLOGÍA SELECCIONADA	JUSTIFICACIÓN TÉCNICA	ALTERNATIVAS CONSIDERADAS	CRITERIO DE SELECCIÓN
🔧 DAF + SBR + GAC + DISINFECTION	strength food-processing wastewater. GAC polishes dissolved organics and improves effluent stability. This combination is proven in similar projects and provides a cost-effective balance of CAPEX, OPEX and performance.		CAPEX/OPEX balance, operational reliability, alignment with ROI and sustainability objectives

EXPECTED REMOVAL EFFICIENCIES

BOD

96.5%

FOG

95.0%

📋 TECHNICAL EQUIPMENT SPECIFICATIONS

System Summary

CAPEX Total:

$56,693 USD

OPEX Anual:

$51,355 USD

Área Requerida:

120 m²

EQUIPMENT TYPE	CAPACIDAD (M³/DÍA)	POWER (KW)	DIMENSIONS (L×W×H)	CAPEX (USD)
	135	3.0	6.0 x 5.0 x 4.5	$1,984

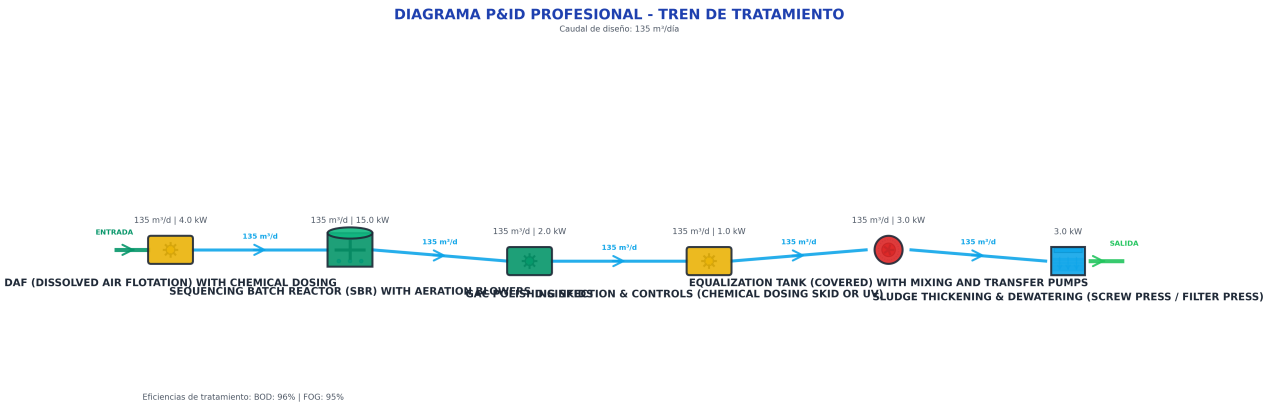
EQUIPMENT TYPE	CAPACIDAD (M³/DÍA)	POWER (KW)	DIMENSIONS (L×W×H)	CAPEX (USD)
🔧 EQUALIZATION TANK (COVERED) WITH MIXING AND TRANSFER PUMPS				
🔧 DAF (DISSOLVED AIR FLOTATION) WITH CHEMICAL DOSING	135	4.0	3.0 x 2.0 x 2.0	$3,969
🔧 SEQUENCING BATCH REACTOR (SBR) WITH AERATION BLOWERS	135	15.0	5.0 x 3.0 x 3.0	$7,937
🔧 GAC POLISHING SKIDS	135	2.0	2.0 x 2.0 x 2.5	$2,976
🔧 DISINFECTION & CONTROLS (CHEMICAL DOSING SKID OR UV)	135	1.0	1.2 x 1.0 x 1.5	$2,976
🔧 SLUDGE THICKENING & DEWATERING (SCREW PRESS / FILTER PRESS)	0	3.0	2.5 x 1.5 x 2.0	$2,976

📊 TECHNICAL AND FINANCIAL ANALYSIS

Specialized technical visualizations for water treatment systems

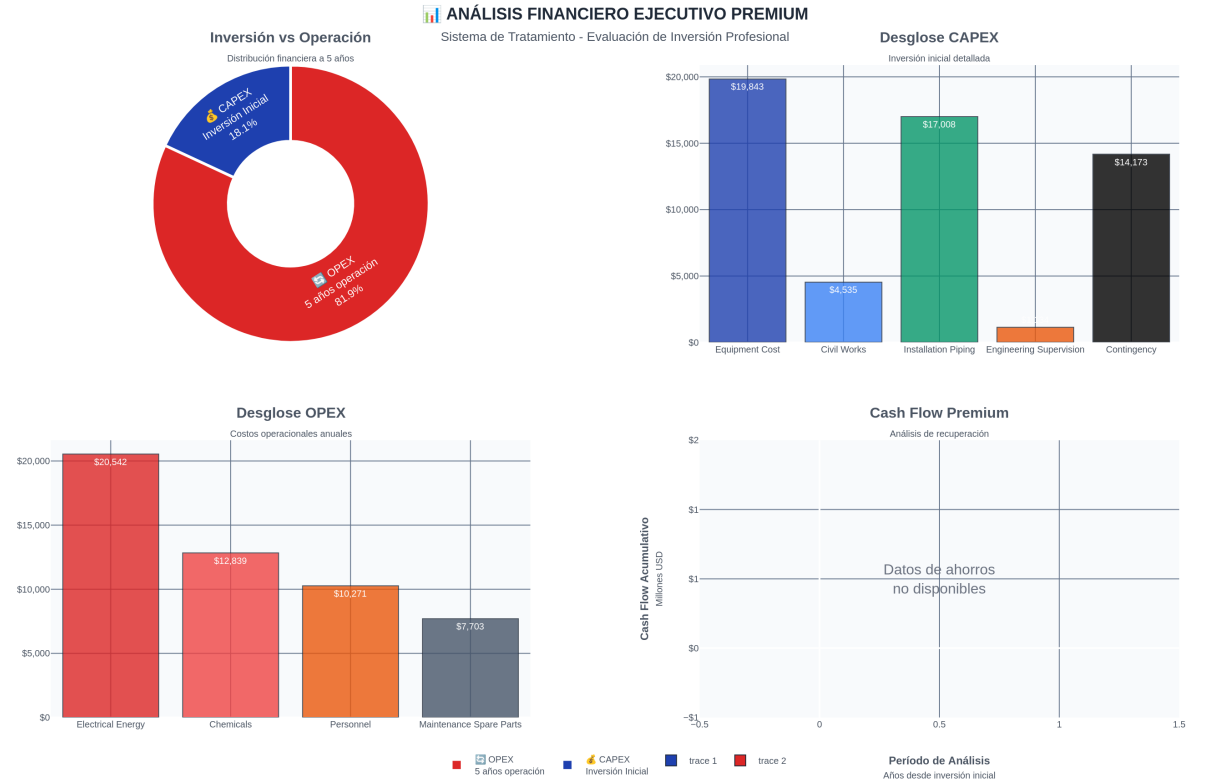
PROFESSIONAL P&ID DIAGRAM - TREATMENT TRAIN

Premium adaptive process diagram with AI agent semantic analysis, complete technical specifications and optimized intelligent layout



💰 EXECUTIVE FINANCIAL ANALYSIS WITH CASH FLOW

Premium financial dashboard with complete CAPEX/OPEX breakdown, cash flow projection and professional ROI metrics



Technical Note: All specifications, costs and schedules presented están basados en estándares de la industria y pueden variar según condiciones específicas del sitio y requerimientos particulares del cliente.

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