

Mutag BioChip™ reference WWTP treating IPA-containing wastewater

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| Client: | photovoltaics glass manufacturing company |
| Location: | Germany |
| Supplier: | Multi Umwelttechnologie AG (MUTAG) |
| Scope of supply: | Process design, engineering, Mutag BioChip™ MBBR carrier media |

Client company - facts and figures:

- Production of low iron solar glass (< 140 ppm Fe_xO_y)
- Production capacity: 300 tons/day or approx. 10,000,000 m² gross/year
- Glass thicknesses: 2.0 mm to 6 mm
- Maximum tempered glass size: 1.65 m * 3 m
- Solar transmission factor 3.2 mm glass: > 91.5 %

Mutag BioChip™ reference WWTP treating IPA-containing wastewater

Origin of the wastewater:

Within the production of photovoltaic panels, IPA (isopropyl alcohol) is used for cleaning the glass panels.

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1st stage of expansion:

In 2012, a tank which already existed at the client's WWTP was converted into a Mutag BioChip™ MBBR tank, based on the process design and engineering supplied by Multi Umwelttechnologie AG.

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1st stage of expansion:

Mutag BioChip™ MBBR design data:

- $Q = 48 \text{ m}^3/\text{d}$
- $\text{COD} = 18,600 \text{ mg/l} = 893 \text{ kg/d}$

(COD load corresponds to 7,440 PE)

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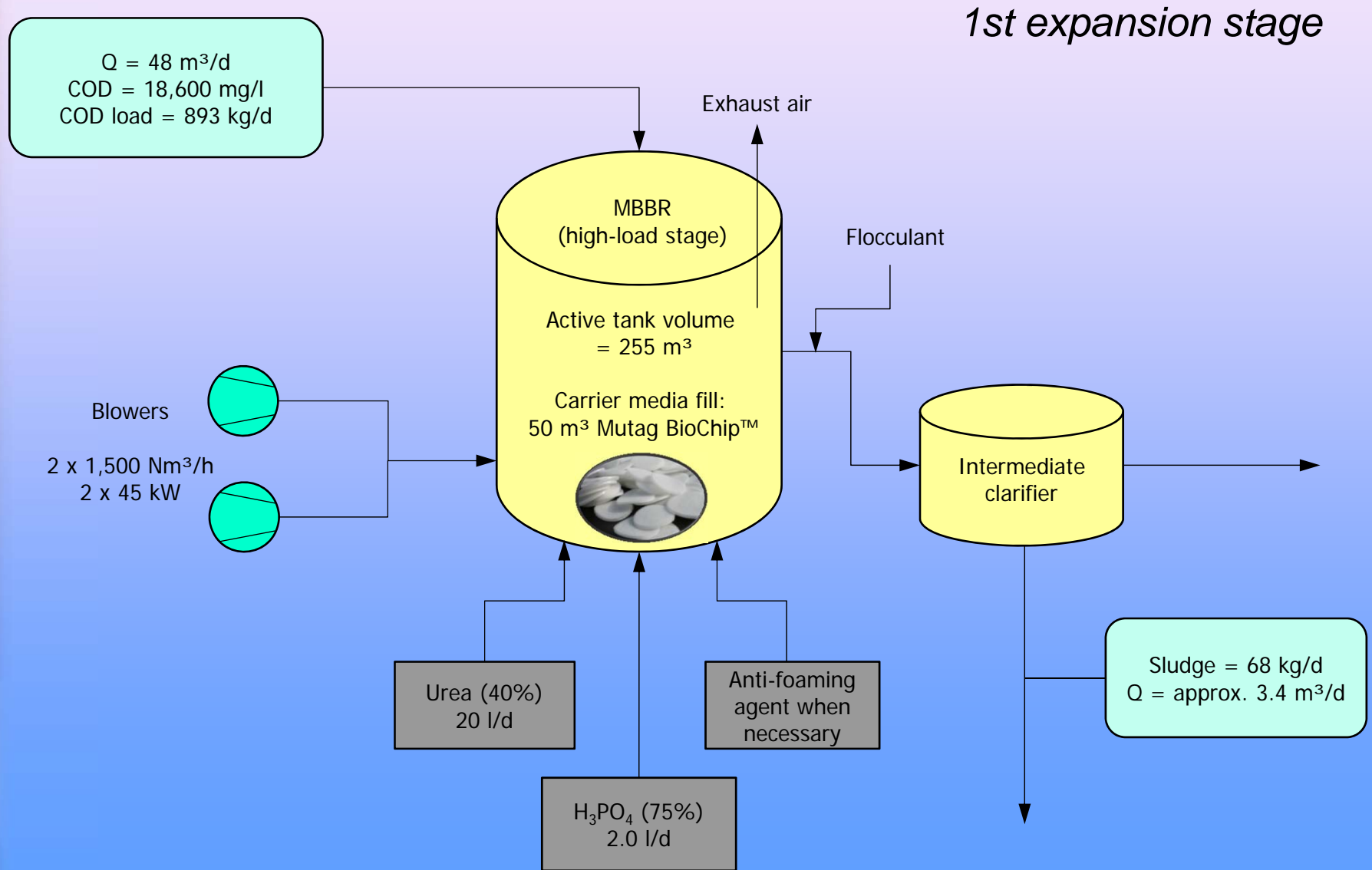
(COD load corresponds to 7,440 PE)

COD removal efficiency of the Mutag BioChip™ MBBR:

> 90%

Mutag BioChip™ quantity: 50 m³

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2nd stage of expansion:

Due to a production increase at the client's factory in 2013, the wastewater flow rate and hence the COD load was increased and a corresponding upgrade of the Mutag BioChip™ MBBR tank became necessary.

The related process design for the MBBR upgrade was supplied by Multi Umwelttechnologie AG.

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2nd stage of expansion:

Mutag BioChip™ MBBR design data:

- $Q = 72 \text{ m}^3/\text{d}$
- $\text{COD} = 14,600 \text{ mg/l} = 1,050 \text{ kg/d}$

(COD load corresponds to 8,750 PE)

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2nd stage of expansion:

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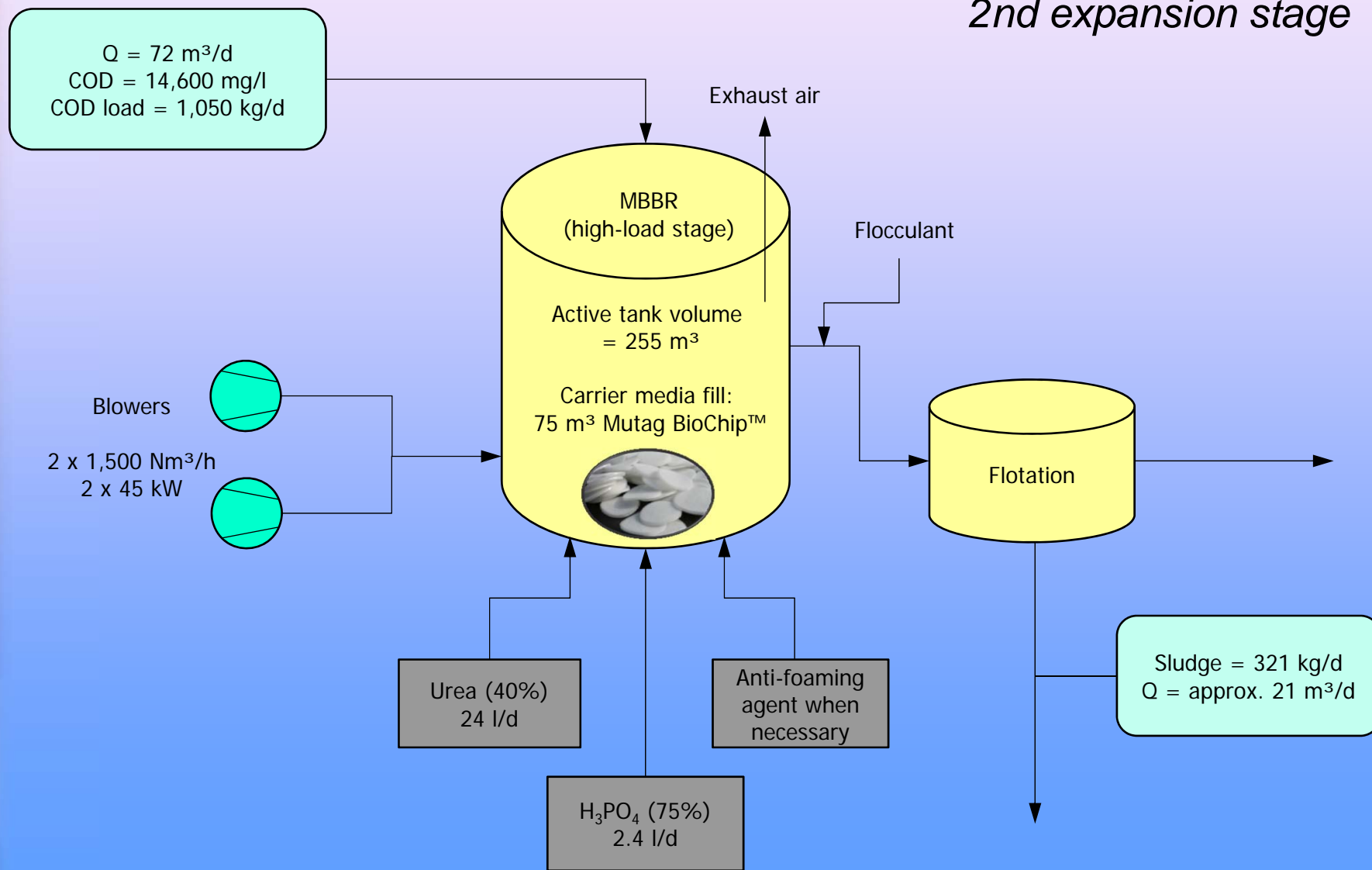
COD removal efficiency of the Mutag BioChip™ MBBR:

> 90%

Mutag BioChip™ quantity: 75 m³

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2nd expansion stage



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MBBR tank with cover, operated with Mutag BioChip™ carriers

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View into the Mutag BioChip™ MBBR tank

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Blower station

Process air supplied to the MBBR tank: 2 x 1,500 Nm³/h