Dimensioning of Bio Filters

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1 Equilibrium Concentration of harmful Gas in the Liquid of a Scrubber

Henry- respectively Dalton-Gesetz

$$C_g = H * C_L$$

C_g	Concentration of a gas component in the gas phase		[mg/m³]
H	Absorption constant (Henry-constant)	[-]	
C_L	Equilibrium Concentration		[mg/m³]

2 Pressure Lost in the Bio Filter (per meter filter hight ca. 200 Pa - 2000 Pa):

$$p_T = p_R + p_U + p_F + p_D$$

p_T	total pressure increase	[N/m²]
p_R	pressure losses by friction in pipes	[N/m²]
p_U	pressure losses by direction change in pipes	[N/m²]
p_G	resistance value of aggregates (e.g. dust separator, heat exchanger, humidifier)	[N/m²]
p_F	filter pressure lost	[N/m²]
p_D	dynamik outlet pressure	[N/m²]

3 Filter Load

Surface Filter Load:

- 1 - 20 m³/(m² * h)
- 20 - 300 m³/(m² * h)

Container filter Load:

- 50 - 500 m³/(m² * h)

Force Parameter:

VDI-Richtlinie 3477 named three force parameter:

- filter surface load [m³/(m² * h)],
possible load for odor deodorization ca. 30 - 200 m³/(m² * h)

- filter volume load [m³/(m³ * h)],
usual load for odor deodorization ca. 40 - 200 m³/(m³ * h)

- specific filter load [g/(m³ * h)],
odor deodorization [GE/(m³ * h)],
- usual range for the biological degradation ca. 20 - 200 g/(m³ * h)