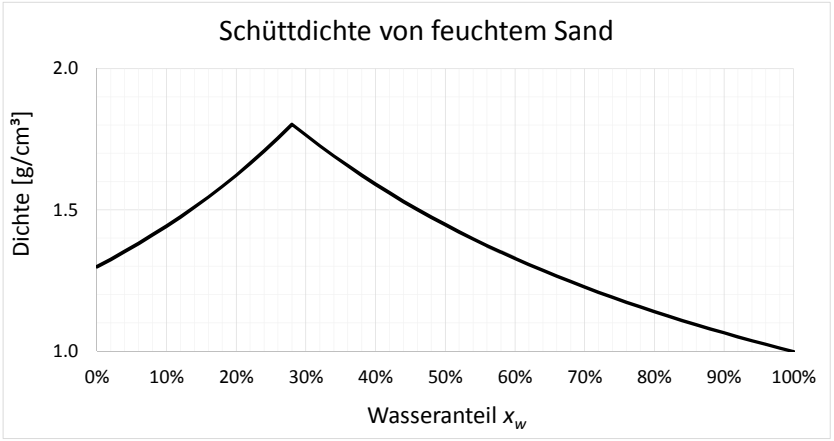
Einfaches Model

(partielle Sättigung der Poren bei konstanter Porosität; bei hoher Sättigung: Slurry)

ρ (Schütt)	1.298	g/cm³
ρ (Sand)	2.632	g/cm³
ρ (Wasser)	0.998	g/cm³
ρ (Luft)	0.001	g/cm³
Annahme, Luft keine Masse		
ϕ (Luft)	**0.507**	
ϕ (Partikel)	**0.493**	
ρ (Slurry) (ρ_{max})	**1.805**	g/cm³

Ergebnisse

Wasseranteil x_w	*ϕ_w (part. Sätt.)*	*ϕ_w (Slurry)*	*ϕ_w*	*ϕ_s*	*rho*
0.000	0.000	0.000	0.000	0.493	1.298
0.020	0.027	0.051	0.027	0.493	1.324
0.040	0.054	0.099	0.054	0.493	1.352
0.060	0.083	0.144	0.083	0.493	1.381
0.080	0.113	0.187	0.113	0.493	1.411
0.100	0.145	0.227	0.145	0.493	1.442
0.120	0.177	0.265	0.177	0.493	1.475
0.140	0.212	0.300	0.212	0.493	1.509
0.160	0.248	0.334	0.248	0.493	1.545
0.180	0.286	0.367	0.286	0.493	1.583
0.200	0.325	0.397	0.325	0.493	1.623
0.220	0.367	0.427	0.367	0.493	1.664
0.240	0.411	0.454	0.411	0.493	1.708
0.260	0.457	0.481	0.457	0.493	1.754
0.280	0.506	0.506	0.506	0.493	1.803
0.300	0.557	0.531	0.531	0.469	1.765
0.320	0.612	0.554	0.554	0.446	1.727
0.340	0.670	0.576	0.576	0.424	1.691
0.360	0.732	0.597	0.597	0.403	1.656
0.380	0.797	0.618	0.618	0.382	1.623
0.400	0.867	0.637	0.637	0.363	1.590
0.420	0.942	0.656	0.656	0.344	1.560
0.440	1.022	0.674	0.674	0.326	1.530
0.460	1.108	0.692	0.692	0.308	1.501
0.480	1.201	0.709	0.709	0.291	1.474
0.500	1.301	0.725	0.725	0.275	1.447
0.520	1.409	0.741	0.741	0.259	1.422
0.540	1.527	0.756	0.756	0.244	1.397
0.560	1.655	0.770	0.770	0.230	1.373
0.580	1.796	0.785	0.785	0.215	1.350
0.600	1.951	0.798	0.798	0.202	1.328
0.620	2.122	0.811	0.811	0.189	1.306
0.640	2.312	0.824	0.824	0.176	1.285
0.660	2.525	0.837	0.837	0.163	1.265
0.680	2.764	0.849	0.849	0.151	1.245
0.700	3.035	0.860	0.860	0.140	1.226
0.720	3.344	0.871	0.871	0.129	1.208
0.740	3.702	0.882	0.882	0.118	1.190
0.760	4.119	0.893	0.893	0.107	1.173
0.780	4.611	0.903	0.903	0.097	1.156
0.800	5.202	0.913	0.913	0.087	1.139
0.820	5.925	0.923	0.923	0.077	1.124
0.840	6.828	0.933	0.933	0.067	1.108
0.860	7.989	0.942	0.942	0.058	1.093
0.880	9.538	0.951	0.951	0.049	1.078
0.900	11.706	0.960	0.960	0.040	1.064
0.920	14.957	0.968	0.968	0.032	1.050
0.940	20.376	0.976	0.976	0.024	1.037
0.960	31.215	0.984	0.984	0.016	1.023
0.980	63.730	0.992	0.992	0.008	1.011
1.000	999.000	1.000	1.000	0.000	0.998

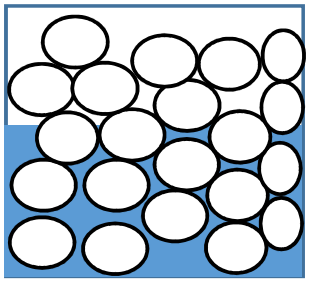


Regime "partielle Sättigung"

$$\phi_w = \frac{\phi_s \rho_s}{\rho_w} \frac{x_w}{1-x_w}$$

$$\phi_s = const$$

$$\rho = \phi_s \rho_s \frac{1}{1-x_w}$$

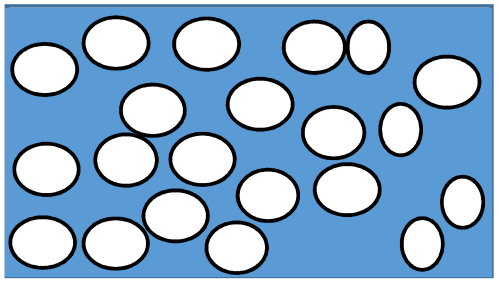


"Slurry" Regime

$$\phi_w = \frac{\rho_s}{\rho_w (1-x_w) + \rho_s x_w} x_w$$

$$\phi_s = 1 - \phi_w$$

$$\rho = \phi_s \rho_s \left(1 + \frac{\rho_s \rho_w x_w}{\rho_w (1-x_w) + \rho_s x_w} \right)$$



Stefan Radl
TU Graz

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