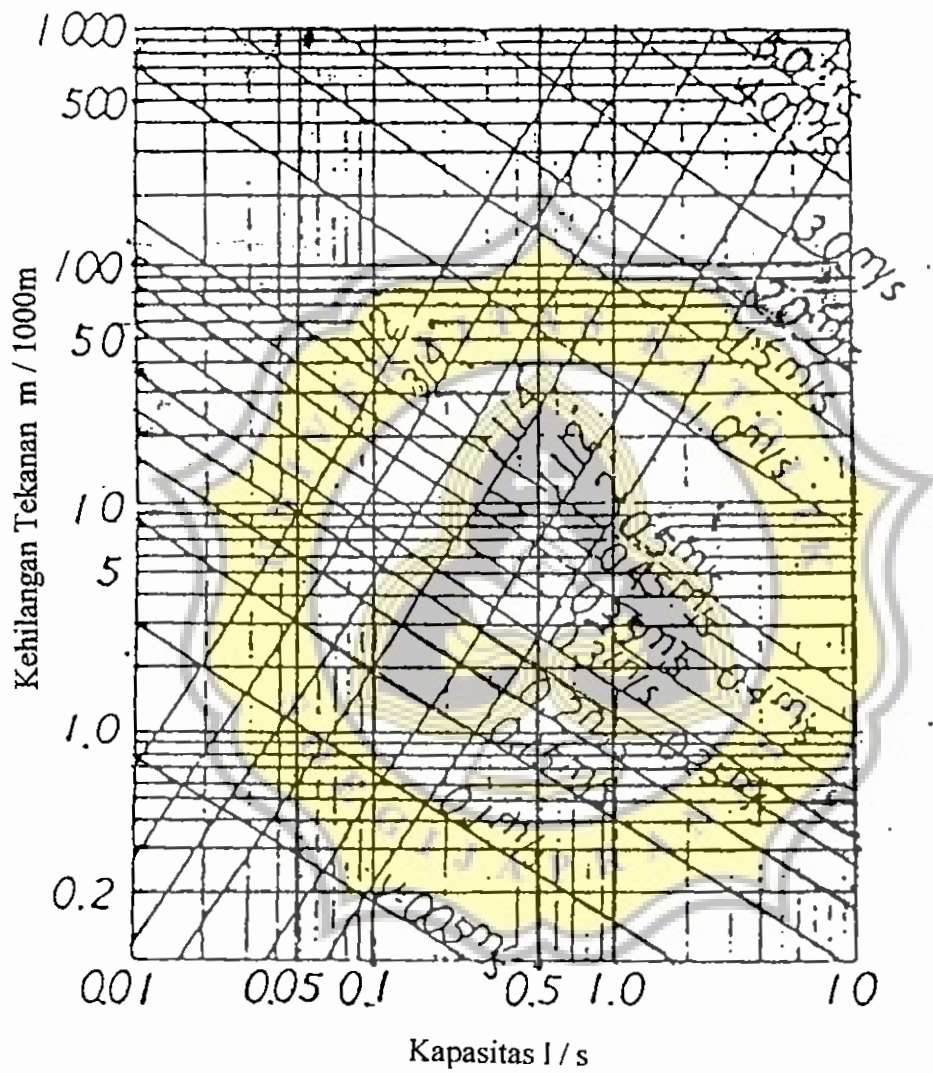


HUBUNGAN ANTARA ALIRAN DAN KEHILANGAN TEKANAN



Formula dari Weston dipakai untuk pipa $\phi \frac{1}{2}$ " sampai dengan pipa $\phi 2$ "

TABEL UNTUK CARA KEKUATAN BATAS
(oleh Ir. Wiratman)
 $\delta = 0,2$

α	ξ_u	ϕ_u	ϕ_u'	ζ	q	C_u
.055	.069	13.545	-.455	.958	.03437	5.51
.058	.073	12.793	-.379	.957	.03625	5.37
.060	.075	12.3333	-.333	.956	.0375	5.28
.063	.078	11.698	-.27	.955	.03938	5.16
.065	.081	11.308	-.231	.954	.04062	5.08
.068	.085	10.765	-.176	.953	.0425	4.97
.070	.088	10.429	-.143	.952	.04375	4.90
.073	.091	9.959	-.096	.951	.04562	4.80
.075	.094	9.667	-.067	.950	.04687	4.74
.078	.097	9.256	-.026	.949	.04875	4.65
.080	.100	9.0	0	.948	.05	4.59
.083	.104	8.639	.036	.947	.05187	4.51
.085	.106	8.412	.059	.946	.05313	4.46
.088	.110	8.091	.091	.945	.055	4.39
.090	.112	7.889	.111	.944	.05625	4.34
.093	.116	7.602	.140	.943	.05813	4.27
.095	.119	7.421	.158	.942	.05937	4.23
.098	.122	7.163	.184	.941	0.6125	4.17
.100	.125	7.0	.200	.940	.0625	4.13
.103	.129	6.767	.223	.939	.06438	4.07
.105	.131	6.619	.238	.938	.06562	4.03
.108	.135	6.407	.259	.937	.0675	3.98
.110	.138	6.273	.273	.936	.06875	3.94
.113	.141	6.08	.292	.935	.07063	3.89
.115	.144	5.957	.304	.934	.07188	3.86
.118	.148	5.78	.322	.933	.07375	3.81
.120	.150	5.667	.333	.932	.075	3.78
.123	.154	5.504	.350	.931	.07688	3.74
.125	.156	5.400	.360	.930	.07813	3.71
.128	.160	5.25	.375	.929	.080	3.67
.130	.163	5.154	.385	.928	.08125	3.64
.133	.166	5.015	.398	.927	.08313	3.60
.135	.169	4.926	.402	.926	.08438	3.58
.138	.173	4.797	.420	.925	.08625	3.54
.140	.175	4.714	.429	.924	.0875	3.52
.143	.179	5.594	.441	.923	.08938	3.48
.145	.181	4.517	.448	.922	.09063	3.46
.148	.185	4.405	.459	.921	.0925	3.43
.150	.188	4.333	.467	.920	.09375	3.41

α	ξ_u	ϕ_u	ϕ_u'	ζ	q	C_u
.153	.191	4.229	.477	.919	.09563	3.37
.155	.194	4.161	.484	.918	.09687	3.35
.158	.198	4.063	.494	.917	.09875	3.32
.160	.200	4.0	.500	.916	.100	3.30
.163	.204	3.908	.509	.915	.10188	3.28
.163	.206	3.848	.515	.914	.10313	3.26
.168	.210	3.762	.524	.913	.105	3.23
.170	.213	3.706	.529	.912	.10625	3.21
.173	.216	3.624	.538	.911	.10812	3.19
.175	.219	3.571	.564	.910	.10938	3.17
.178	.222	3.494	.551	.909	.11125	3.14
.180	.225	3.444	.556	.908	.1125	3.13
.183	.229	3.372	.563	.907	.11437	3.10
.185	.231	3.325	.568	.906	.11563	3.09
.188	.235	3.255	.574	.905	.1175	3.07
.190	.238	3.221	.579	.904	.11875	3.05
.193	.241	3.145	.585	.903	.12062	3.03
.195	.244	3.103	.590	.902	.12188	3.02
.198	.248	3.04	.596	.901	.12375	2.99
.200	.250	3.0	.600	.900	.125	2.98
.203	.254	2.941	.606	.899	.12687	2.96
.205	.256	2.902	.610	.898	.12687	2.95
.208	.260	2.846	.615	.897	.130	2.93
.210	.262	2.81	.619	.896	.13125	2.92
.213	.266	2.456	.624	.895	.13312	2.90
.215	.269	2.751	.628	.894	.13438	2.89
.218	.272	2.67	.633	.893	.13625	2.87
.220	.275	2.636	.636	.892	.1375	2.86
.223	.279	2.587	.641	.891	.13937	2.84
.225	.281	2.556	.644	.890	.14062	2.83
.228	.285	2.509	.649	.889	.1425	2.81
.230	.287	2.478	.652	.888	.14375	2.80
.233	.291	2.433	.657	.887	.14562	2.78
.235	.294	2.404	.660	.886	.14687	2.77
.238	.297	2.361	.664	.885	.14875	2.76
.240	.300	2.333	.667	.884	.150	2.75
.243	.304	2.292	.671	.883	.15187	2.73
.243	.306	2.625	.673	.882	.15312	2.72
.248	.310	2.226	.677	.881	.155	2.71
.250	.312	2.2	.680	.880	.15625	2.70
.253	.316	2.162	.684	.879	.15812	2.68
.255	.319	2.137	.686	.878	.15937	2.67
.258	.322	2.101	.690	.877	.16125	2.66

α	ξ_u	ϕ_u	ϕ_u'	ζ	q	C_u
.260	.325	2.077	.692	.876	.1625	2.65
.263	.329	2.042	.696	.875	.16437	2.64
.265	.331	2.019	.698	.874	.16563	2.63
.268	.335	1.985	.701	.873	.1675	2.62
.270	.337	1.963	.704	.872	.16865	2.61
.273	.341	1.930	.707	.871	.17062	2.59
.275	.344	1.909	.709	.870	.17187	2.59
.278	.347	1.878	.712	.869	.17375	2.57
.280	.350	1.857	.714	.868	.175	2.57
.285	.357	1.827	.717	.867	.17687	2.55
.285	.356	1.807	.719	.866	.17812	2.55
.288	.360	1.778	.722	.865	.180	2.53
.290	.363	1.759	.724	.864	.18125	2.53
.293	.366	1.73	.727	.863	.18312	2.52
.295	.369	1.712	.729	.862	.18437	2.51
.298	.372	1.685	.732	.861	.18625	2.50
.300	.375	1.667	.733	.860	.1875	2.49
.303	.379	1.640	.736	.859	.18937	2.48
.305	.381	1.623	.738	.858	.19062	2.47
.308	.385	1.597	.740	.857	.1925	2.46
.310	.387	1.581	.742	.856	.19375	2.46
.313	.391	1.556	.744	.855	.19562	2.45
.315	.394	1.54	.746	.854	.19688	2.44
.318	.397	1.516	.746	.853	.19875	2.43
.320	.400	1.500	.750	.852	.200	2.42
.323	.404	1.477	.752	.851	.20187	2.41
.325	.406	1.462	.754	.850	.20312	2.41
.328	.410	1.439	.756	.849	.215	2.40
.330	.412	1.424	.758	.848	.20625	2.39
.333	.416	1.402	.760	.847	.20812	2.38
.335	.419	1.388	.761	.846	.21125	2.38
.338	.422	1.367	.763	.845	.2125	2.37
.340	.425	1.353	.763	.843	.21437	2.36
.343	.429	1.332	.767	.843	.21562	2.35
.345	.431	1.319	.768	.842	.2175	2.35
.348	.435	1.299	.770	.841	.21875	2.34
.350	.437	1.286	.771	.840	.22062	2.33
.353	.441	1.266	.773	.839	.22187	2.32
.355	.444	1.254	.775	.838	.22375	2.32
.358	.447	1.235	.777	.837	.225	2.31
.360	.450	1.222	.778	.836	.22678	2.31
.363	.454	1.204	.780	.835	.230	2.30
.365	.456	1.192	.781	.834	.23125	2.29

α	ξ_u	ϕ_u	ϕ_u^2	ζ	q	C_u
.368	.460	1.174	.783	.833	.230	2.28
.370	.462	1.162	.784	.831	.23125	2.28
.373	.466	1.145	.786	.830	.23312	2.27
.375	.469	1.133	.787	.829	.23437	2.27
.378	.472	1.116	.788	.828	.2375	2.26
.383	.479	1.089	.791	.827	.23937	2.25
.385	.481	1.078	.792	.826	.24062	2.24
.388	.485	1.062	.794	.825	.2425	2.24
.390	.488	1.051	.795	.824	.24375	2.23
.393	.491	1.036	.796	.823	.24562	2.22
.395	.494	1.025	.797	.822	.24687	2.22
.398	.497	1.01	.799	.821	.24876	2.21
.400	.500	1.0	.800	.820	.2500	2.21
.403	.504	.985	.801	.819	.25187	2.20
.405	.506	.975	.802	.818	.25313	2.20
.408	.510	.961	.804	.817	.255	2.19
.410	.513	.951	.805	.816	.25625	2.19
.413	.516	.937	.806	.815	.25812	2.18
.415	.519	.928	.807	.814	.25938	2.18
.418	.523	.914	.809	.813	.26125	2.17
.420	.525	.906	.810	.812	.2625	2.17
.423	.529	.891	.811	.811	.26438	2.16
.425	.531	.881	.812	.810	.26563	2.16
.428	.535	.869	.813	.809	.2675	2.15
.430	.538	.860	.814	.808	.26875	2.15
.433	.541	.848	.815	.807	.27063	2.14
.435	.544	.837	.816	.806	.27188	2.14
.438	.547	.826	.817	.805	.27375	2.13
.440	.550	.818	.818	.804	.2750	2.13
.443	.554	.806	.819	.803	.27688	2.12
.448	.560	.786	.821	.801	.280	2.11
.450	.563	.778	.822	.800	.28125	2.11
.453	.566	.766	.823	.799	.28312	2.10
.455	.569	.758	.824	.798	.28438	2.10
.458	.573	.747	.825	.797	.28625	2.09
.460	.575	.739	.826	.796	.2875	2.09
.463	.579	.728	.827	.795	.28937	2.08
.465	.581	.720	.828	.794	.29063	2.08
.468	.585	.709	.829	.793	.2925	2.08
.470	.587	.702	.830	.792	.29375	2.07
.473	.591	.691	.831	.791	.29563	2.07
.478	.597	.674	.833	.789	.29875	2.06
.480	.600	.667	.833	.788	.300	2.06

DESIGN CRITERIA

1. design period

15 years (range 10 - 25 years)

2. depreciation period

contruction element 25 years (15 - 40 years)

mechanical element 15 years (15 - 25 years)

electrical element 15 years (15 - 25 years)

3. population growth

entirely dependent on local conditions (birt rate, death rate, migration rate),
moreover likely to change with time.

In most cases the annual increase will be between 2 and 4%

4. period of operation

8 - 24 hours per day depending on number of shifts (1-3), declining rate
filtration increases period of operation with 1 Or 2 shifts

5. water demand

dependent on local condition and water supply system installed :

standpipes 30 l/cap, d (10-50 l/cap,d)

private connection
(1 tap) 50 l/cap,d (20 - 100 l/cap,d)

6. water quality

the quality of the treated water should conform to drinking water standards. The
following maximum improvements in water quality may expected bu methodes :

slow sand filtration treatment : turbidity	max. 10 NTU
COD	2 - 5 mg/l
MPN E-Coli	100 - 1000/100 ml

Sedimentation + slow

Sand filtration	: turbidity	max. 100 NTU
	COD	2 - 10 mg/l
	MPN E-Coli	100 - 1000/100 ml

depth of system of underdrains 0,4 m (0,3 - 0,5 m)
specification of filter bed $d_{\text{eff}} = 0,15 - 0,35 \text{ mm}$
UC = 2 - 5

11. clear water reservoir

storage capacity 30 - 50% of daily water production
height of tank 2,5 - 4 m
level variation of clear water 1,5 m (1- 2 m)
area 10 - 100 m²

12. water conduits

velocity of flow in influent,
effluent and drainage mains 0,3 - 0,6 m/s

13. chloronation system

maximum dosage 1,5 mg/l (1-5 mg/l)
contact-period (disinfection) 20 - 30 minutes
maximum storage period of
chemicals 1 - 6 months, depending on type

