CÁLCULO

REDE PREDIAL DE ABASTECIMENTO DE ÁGUA

RAMAL DE LIGAÇÃO

Tubagens																	
Referência	L_r (m)	L_{eq} (m)	Q_b (l/s)	K	Q_c (l/s)	h (m)	D_{int} (mm)	D_{com} (mm)	v (m/s)	J (mca/m)	P_{ent} (mca)	P_{sai} (mca)	E_p (W/m)	T_{ent} (°C)	T_{sai} (°C)	D_{isol} (mm)	E_{isol} (mm)
TH1	2.816	3.379	3.25	0.29	0.93	1.35	27.2	Ø32	1.6	0.108	20	18.28	-0.93	20	20	-	-

RAMAL DE ALIMENTAÇÃO

Tubagens																	
Referência	L_r (m)	L_{eq} (m)	Q_b (l/s)	K	Q_c (l/s)	h (m)	D_{int} (mm)	D_{com} (mm)	v (m/s)	J (mca/m)	P_{ent} (mca)	P_{sai} (mca)	E_p (W/m)	T_{ent} (°C)	T_{sai} (°C)	D_{isol} (mm)	E_{isol} (mm)
TH2	1.484	1.781	3.25	0.29	0.93	-1.27	27.2	Ø32	1.6	0.108	13.78	14.86	-0.93	20	20	-	-
TH3	0.615	0.738	0.6	1.00	0.6	0	27.2	Ø32	1.03	0.049	14.86	14.83	-0.93	20	20	-	-
TH4	1.549	1.859	0.3	1.00	0.3	1.5	21	Ø25	0.87	0.05	14.83	13.23	-0.73	20	20	-	-
TH5	0.153	0.183	0.3	1.00	0.3	0	21	Ø25	0.87	0.05	14.83	14.82	-0.73	20	20	-	-
TH6	22.8	27.36	0.3	1.00	0.3	-1.89	21	Ø25	0.87	0.05	14.82	15.35	-0.73	20	20	-	-
TH7	1.576	1.891	0.3	1.00	0.3	1.5	21	Ø25	0.87	0.05	15.35	13.75	-0.72	20	20	-	-
TH8	9.234	11.081	2.65	0.32	0.84	-0.48	27.2	Ø32	1.44	0.09	14.86	14.35	-0.93	20	20	-	-
TH9	6.403	7.683	2.65	0.32	0.84	-1.41	27.2	Ø32	1.44	0.09	14.35	15.07	-0.92	20	20	-	-
TH10	0.843	1.012	1.7	0.39	0.67	0.52	27.2	Ø32	1.15	0.06	15.07	14.49	-0.92	20	20	-	-
TH11	0.186	0.223	1.25	0.46	0.57	0	26.2	Ø32	1.06	0.053	13.99	13.98	-0.91	20	20	-	-
TH12	8.202	9.843	0.55	0.68	0.38	0	20.4	Ø25	1.15	0.084	13.99	13.17	-0.72	20	20	-	-
TH13	0.937	1.124	0.1	1.00	0.1	0.5	12.4	Ø16	0.83	0.088	12.67	12.07	-0.46	20	20	-	-
TH14	1.581	1.897	0.1	1.00	0.1	0.4	12.4	Ø16	0.83	0.088	12.67	12.1	-0.46	20	20	-	-
TH15	2.767	3.32	0.1	1.00	0.1	0.5	12.4	Ø16	0.83	0.088	12.67	11.88	-0.46	20	20	-	-
TH16	3.281	3.937	0.25	1.00	0.25	0.5	16.2	Ø20	1.21	0.122	12.67	11.69	-0.58	20	20	-	-
TH17	7.971	9.565	0.35	1.00	0.35	0	20.4	Ø25	1.07	0.074	13.99	13.29	-0.72	20	20	-	-
TH18	2.675	3.21	0.2	1.00	0.2	1	16.2	Ø20	0.97	0.083	12.79	11.52	-0.58	20	20	-	-
TH19	1.869	2.243	0.15	1.00	0.15	0.8	12.4	Ø16	1.24	0.178	12.79	11.59	-0.46	20	20	-	-
TH20	1.912	2.295	0.8	0.57	0.46	0	20.4	Ø25	1.39	0.117	13.99	13.72	-0.72	20	20	-	-
TH21	2.15	2.58	0.8	0.57	0.46	2.15	20.4	Ø25	1.39	0.117	13.72	11.27	-0.72	20	20	-	-
TH22	0.75	0.9	0.8	0.57	0.46	0.75	20.4	Ø25	1.39	0.117	11.27	10.41	-0.72	20	20	-	-
TH23	4.776	5.731	0.35	0.85	0.3	0	20.4	Ø25	0.91	0.056	9.91	9.59	-0.72	20	20	-	-
TH24	4.306	5.167	0.15	1.00	0.15	2	12.4	Ø16	1.24	0.178	9.09	6.17	-0.46	20	20	-	-
TH25	2.427	2.912	0.1	1.00	0.1	0.5	12.4	Ø16	0.83	0.088	9.09	8.34	-0.46	20	20	-	-
TH26	0.946	1.135	0.1	1.00	0.1	0.5	12.4	Ø16	0.83	0.088	9.09	8.49	-0.46	20	20	-	-

jorgelopes@len.pt
ricardolima@len.pt
965 848 622 | 964 383 879
www.len.pt

Tubagens																	
Referência	L_r (m)	L_{eq} (m)	Q_b (l/s)	K	Q_c (l/s)	h (m)	D_{int} (mm)	D_{com} (mm)	v (m/s)	J (mca/m)	P_{ent} (mca)	P_{sai} (mca)	E_p (W/m)	T_{ent} (°C)	T_{sai} (°C)	D_{isol} (mm)	E_{isol} (mm)
TH27	2.357	2.828	0.45	0.75	0.34	0	20.4	Ø25	1.04	0.07	9.91	9.72	-0.72	20	20	-	-
TH28	2.778	3.334	0.15	1.00	0.15	2	12.4	Ø16	1.24	0.178	9.22	6.62	-0.46	20	20	-	-
TH29	2.543	3.052	0.1	1.00	0.1	0.4	12.4	Ø16	0.83	0.088	9.22	8.55	-0.46	20	20	-	-
TH30	2.716	3.259	0.1	1.00	0.1	0.5	12.4	Ø16	0.83	0.088	9.22	8.43	-0.46	20	20	-	-
TH31	0.802	0.962	0.1	1.00	0.1	0.5	12.4	Ø16	0.83	0.088	9.22	8.63	-0.46	20	20	-	-
TH32	15.237	18.284	0.95	0.52	0.5	-0.36	27.2	Ø32	0.85	0.035	15.07	14.79	-0.92	20	20	-	-
TH33	4.625	5.55	0.95	0.52	0.5	0	27.2	Ø32	0.85	0.035	14.79	14.59	-0.91	20	20	-	-
TH34	3.772	4.526	0.55	0.68	0.38	0	27.2	Ø32	0.65	0.021	14.59	14.5	-0.91	20	20	-	-
TH35	4.264	5.116	0.35	0.85	0.3	0	27.2	Ø32	0.51	0.014	14.5	14.42	-0.91	20	20	-	-
TH36	5.371	6.446	0.35	0.85	0.3	3.03	20	Ø26	0.95	0.062	14.42	10.99	-0.73	20	20	-	-
TH37	0.243	0.292	0.35	0.85	0.3	0	20	Ø26	0.95	0.062	10.99	10.97	-0.72	20	20	-	-
TH38	0.059	0.071	0.35	0.85	0.3	0	20	Ø26	0.95	0.062	9.97	9.97	-0.72	20	20	-	-
TH39	2.852	3.423	0.25	1.00	0.25	0	16	Ø20	1.24	0.133	9.97	9.52	-0.57	20	20	-	-
TH40	2.846	3.415	0.1	1.00	0.1	-2.03	12	Ø16	0.88	0.104	9.52	11.19	-0.45	20	20	-	-
TH41	0.579	0.694	0.15	1.00	0.15	-0.53	12	Ø16	1.33	0.213	9.52	9.9	-0.45	20	20	-	-
TH42	2.865	3.439	0.1	1.00	0.1	-2.03	12	Ø16	0.88	0.104	9.97	11.64	-0.46	20	20	-	-
TH43	0.093	0.112	0.25	1.00	0.25	0	16	Ø20	1.24	0.133	10.99	10.98	-0.57	20	20	-	-
TH44	2.278	2.734	0.25	1.00	0.25	-2.15	16	Ø20	1.24	0.133	10.98	12.76	-0.57	20	20	-	-
TH45	4.457	5.348	0.2	1.00	0.2	1.5	21	Ø25	0.58	0.024	14.5	12.87	-0.71	20	20	-	-
TH46	0.288	0.345	0.4	1.00	0.4	0	27.2	Ø32	0.69	0.024	14.59	14.58	-0.91	20	20	-	-
TH47	3.602	4.322	0.4	1.00	0.4	3.03	20	Ø26	1.27	0.105	14.58	11.1	-0.73	20	20	-	-
TH48	0.365	0.437	0.4	1.00	0.4	0	20	Ø26	1.27	0.105	10.1	10.06	-0.73	20	20	-	-
TH49	1.584	1.901	0.2	1.00	0.2	-1.53	16	Ø20	0.99	0.089	10.06	11.42	-0.58	20	20	-	-
TH50	2.361	2.833	0.2	1.00	0.2	-1.73	16	Ø20	0.99	0.089	10.06	11.53	-0.58	20	20	-	-

RAMAL DE ALIMENTAÇÃO

Tubagens																	
Referência	L_r (m)	L_{eq} (m)	Q_b (l/s)	K	Q_c (l/s)	h (m)	D_{int} (mm)	D_{com} (mm)	v (m/s)	J (mca/m)	P_{ent} (mca)	P_{sai} (mca)	E_p (W/m)	T_{ent} (°C)	T_{sai} (°C)	D_{isol} (mm)	E_{isol} (mm)
TH51	2.715	3.258	0.25	1.00	0.25	2.15	16	Ø20	1.24	0.114	12.76	10.24	46.98	60	59.8	-	-
TH52	0.11	0.132	0.25	1.00	0.25	0	16	Ø20	1.24	0.114	9.24	9.23	46.67	59.8	59.8	-	-
TH53	2.974	3.569	0.1	1.00	0.1	-2.03	12	Ø16	0.88	0.088	9.23	10.95	37.23	59.8	59.5	-	-
TH54	3.042	3.651	0.15	1.00	0.15	-0.53	12	Ø16	1.33	0.183	9.23	9.09	37.23	59.8	59.6	-	-
TH55	0.217	0.26	1.25	0.46	0.57	0	26.2	Ø32	1.06	0.045	13.98	13.97	71.33	60	60	-	-
TH56	1.881	2.258	0.6	0.66	0.39	0	20.4	Ø25	1.2	0.077	13.47	13.29	57.27	60	59.9	-	-
TH57	2.9	3.48	0.6	0.66	0.39	2.9	20.4	Ø25	1.2	0.077	13.29	10.13	57.07	59.9	59.8	-	-
TH58	4.958	5.949	0.25	1.00	0.25	0	16.2	Ø20	1.21	0.104	9.63	9.01	46.27	59.8	59.5	-	-
TH59	4.652	5.582	0.15	1.00	0.15	2	12.4	Ø16	1.24	0.15	8.51	5.67	36.7	59.5	59.1	-	-
TH60	2.753	3.304	0.1	1.00	0.1	0.5	12.4	Ø16	0.83	0.073	8.51	7.77	36.7	59.5	59.1	-	-
TH61	2.437	2.924	0.35	0.85	0.3	0	20.4	Ø25	0.91	0.047	9.63	9.49	56.77	59.8	59.6	-	-
TH62	3.138	3.766	0.15	1.00	0.15	2	12.4	Ø16	1.24	0.15	8.99	6.42	36.91	59.6	59.3	-	-
TH63	2.523	3.027	0.1	1.00	0.1	0.4	12.4	Ø16	0.83	0.073	8.99	8.37	36.91	59.6	59.3	-	-
TH64	0.659	0.791	0.1	1.00	0.1	0.5	12.4	Ø16	0.83	0.073	8.99	8.43	36.91	59.6	59.5	-	-
TH65	7.871	9.446	0.2	1.00	0.2	0	16.2	Ø20	0.97	0.069	13.47	12.81	46.69	60	59.4	-	-
TH66	2.513	3.016	0.2	1.00	0.2	1	16.2	Ø20	0.97	0.07	12.31	11.1	45.6	59.4	59.2	-	-
TH67	7.869	9.442	0.45	0.75	0.34	0	20.4	Ø25	1.04	0.059	13.47	12.91	57.27	60	59.5	-	-

jorgelopes@len.pt
ricardolima@len.pt
965 848 622 | 964 383 879
www.len.pt

Tubagens																
Referência	L_r (m)	L_{eq} (m)	Q_b (l/s)	K	Q_c (l/s)	h (m)	D_{int} (mm)	D_{com} (mm)	v (m/s)	J (mca/m)	P_{ent} (mca)	P_{sai} (mca)	E_p (W/m)	T_{ent} (°C)	T_{sai} (°C)	D_{isol} (mm)	E_{isol} (mm)
TH68	3.711	4.453	0.25	1.00	0.25	0.5	16.2	Ø20	1.21	0.104	12.41	11.45	45.9	59.5	59.3	-	-
TH69	3.09	3.708	0.1	1.00	0.1	0.5	12.4	Ø16	0.83	0.073	12.41	11.64	36.83	59.5	59.2	-	-
TH70	2.328	2.794	0.1	1.00	0.1	0.4	12.4	Ø16	0.83	0.073	12.41	11.81	36.83	59.5	59.3	-	-

Abreviaturas utilizadas			
P	Pressão (mca)	D_{int}	Diâmetro interior comercial (mm)
P_{min}	Pressão mínima (mca)	D_{com}	Diâmetro comercial (mm)
$P_{máx}$	Pressão máxima (mca)	L_r	Comprimento medido nos desenhos (m)
P_{ent}	Pressão de entrada (mca)	L_{eq}	Comprimento equivalente (m)
P_{sai}	Pressão de saída (mca)	E_p	Fluxo de calor linear (W/m)
Q	Caudal (l/s)	T_{ent}	Temperatura de entrada (°C)
Q_b	Caudal bruto (l/s)	T_{sai}	Temperatura de saída (°C)
K	Coeficiente de simultaneidade	D_{isol}	Diâmetro interior do isolamento térmico (mm)
Q_c	Caudal, com simultaneidade aplicada (Q_b x K) (l/s)	E_{isol}	Espessura do isolamento térmico (mm)
J	Perda de carga localizada (mca)	h	Desnível (%)
J	Perda de carga do tramo (mca/m)	v	Velocidade (m/s)
D	Diâmetro (mm)		

jorgelopes@len.pt
ricardolima@len.pt
965 848 622 | 964 383 879
www.len.pt