

Pumping trust. Worldwide.



C.R.I. PIPES

uPVC COLUMN PIPES

HIGH IMPACT, HIGH TENSILE uPVC COLUMN PIPES FOR SUBMERSIBLE PUMPS



An ISO 9001 & ISO 14001 Company

SUBMERSIBLE COLUMN PIPES

ABOUT C.R.I. uPVC COLUMN PIPES

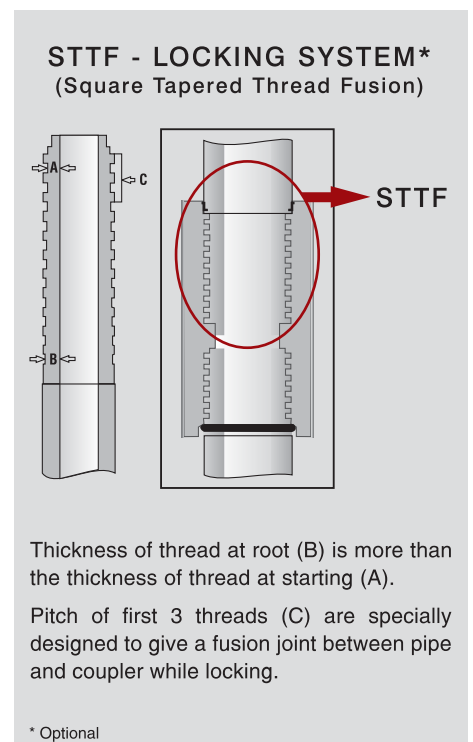
C.R.I.'s vast experience & successful track record in pump industry spanning 45 years facilitate not only to enhance the range of pumps & motors, but also to produce and supply quality pumping accessories. C.R.I.'s uPVC pipes are one among such accessories produced with specially designed formulation under integrated quality control systems, right from sourcing raw materials. Also adequate safety factors has been considered in designing the pipes to have maximum weight carrying capacity.

These pipes are specially designed for submersible pumps, capable of handling both internal hydrostatic pressure as well as high tensile load caused by the pump weight & column water pressure and weight . In general the first pipe fitted with the pump will be subjected to high hydrostatic pressure and the top most one has to withstand the entire weight of the column water & pump.

The unique formulation used in the manufacture of these pipes ensures that the threads do not turn brittle, break or chip during the entire life cycle. The threading & dimension standards maintained make these pipes ideally suitable for using as column pipes for submersible pumps worldwide. These pipes are produced in difference types which can be selected according to the installation requirements.

FEATURES

- Rigid construction & longer life span upto 25 years.
- The best alternative for G.I Pipes and cost effective.
- Can be used for potable water supply.
- Special care is taken while fixing couplers with pipes to avoid column slippage.
- Specially designed square threads are capable of withstanding heavy load and are corrosion free.
- STTF locking system which enhances reliability.
- Special rubber seal is provided at the end of threads to ensure 100% leak proof even at high pressure.
- A special rubber (EPDM & Nitrile) ring is provided in the coupling between the 2 pipes to absorb the vibration caused due to high pump pressure.
- Internal surface of these pipes are very smooth, resulting in very low head loss due to friction and increases water discharge upto maximum of 30%, compared with traditional G.I. pipes thereby saving power.
- Because of its light weight characteristic & special square thread design these pipes can be tightened easily by hand and no need of using pipe wrench.
- uPVC column pipes are resistant to chemical reactions when used in acidic or alkaline waters assuring long life.
- Can handle water with maximum temperature upto 45°C.
- These pipes come in 3m Standard length and are of light weight ensuring easy handling and storage.



PHYSICAL & MECHANICAL PROPERTIES

PROPERTY	UNIT	STANDARD
Specific Gravity	1.4 gms/cm ³	-
Tensile Strength	627 kg/cm ²	as per ASTM D 1785
Flexural Strength	647 kg/cm ²	as per ASTM D 1785
Izod Impact Strength	15 kg - cm/cm ²	as per ASTM D 1785
Charpy Impact Strength	17 kg - cm/cm ²	as per ASTM D 1785
Impact Strength	No Fracture	-
Vicat Softening Temperature	87.3°C	as per ASTM D 1525

DIMENSION & WEIGHT DETAILS

SUITABLE FOR SUBMERSIBLE PUMP INSTALLATIONS UPTO 106m (350FT) DEPTH

MEDIUM TYPE

NOMINAL DIAMETER		OUTER DIAMETER (mm)		WALL THICKNESS AT ENDS (mm)		WALL THICKNESS AT CENTER (mm)		EFFECTIVE LENGTH OF PIPE (mm)	NET.WT (kg) APPROX. PER PIPE	NO. OF PIPES PER BUNDLE
Inches	mm	Min	Max	Min	Max	Min	Max			
1	25	32.8	33.1	3.6	3.8	2.0	2.2	3050	1.45	25
1¼	32	41.8	42.1	4.0	4.2	2.2	2.4	3050	2.00	25
1½	40	47.8	48.1	4.2	4.4	2.5	2.7	3050	2.40	25
2	50	59.8	60.1	4.3	4.5	2.5	2.7	3050	2.91	15
2½	65	74.7	75.2	5.0	5.2	2.8	3.0	3050	3.76	10
3	80	87.7	88.2	5.8	6.0	3.6	3.9	3050	5.50	5
4	100	112.6	113.3	6.0	6.2	3.8	4.1	3050	8.36	5
5	125	139.6	140.3	8.5	9.0	5.5	6.0	3050	13.40	5

SUITABLE FOR SUBMERSIBLE PUMP INSTALLATIONS UPTO 152m (500FT) DEPTH

MEDIUMPLUS TYPE

NOMINAL DIAMETER		OUTER DIAMETER (mm)		WALL THICKNESS AT ENDS (mm)		WALL THICKNESS AT CENTER (mm)		EFFECTIVE LENGTH OF PIPE (mm)	NET.WT (kg) APPROX. PER PIPE	NO. OF PIPES PER BUNDLE
Inches	mm	Min	Max	Min	Max	Min	Max			
1	25	32.8	33.1	4.5	4.7	3.0	3.2	3050	1.70	25
1¼	32	41.8	42.1	4.6	4.8	3.1	3.3	3050	2.25	25
1½	40	47.8	48.1	5.0	5.1	3.3	3.5	3050	2.65	25
2	50	59.8	60.1	5.2	5.4	3.3	3.5	3050	3.45	15
2½	65	74.7	75.2	5.6	5.8	3.4	3.7	3050	4.40	10
3	80	87.7	88.2	6.4	6.6	4.2	4.5	3050	6.25	5
4	100	112.6	113.3	7.0	7.2	4.5	4.8	3050	9.40	5
5	125	139.6	140.3	9.5	10.0	6.0	7.0	3050	15.35	5

SUITABLE FOR SUBMERSIBLE PUMP INSTALLATIONS UPTO 213m (700FT) DEPTH

STANDARD TYPE

NOMINAL DIAMETER		OUTER DIAMETER (mm)		WALL THICKNESS AT ENDS (mm)		WALL THICKNESS AT CENTER (mm)		EFFECTIVE LENGTH OF PIPE (mm)	NET.WT (kg) APPROX. PER PIPE	NO. OF PIPES PER BUNDLE
Inches	mm	Min	Max	Min	Max	Min	Max			
1	25	32.8	33.1	5.0	5.2	3.6	3.8	3050	1.90	25
1¼	32	41.8	42.1	5.2	5.4	3.7	3.9	3050	2.50	25
1½	40	47.8	48.1	5.4	5.6	3.7	3.9	3050	2.90	20
2	50	59.8	60.1	6.0	6.2	3.8	4.0	3050	3.95	15
2½	65	74.7	75.2	6.2	6.4	4.0	4.2	3050	5.00	10
3	80	87.7	88.2	7.0	7.2	4.8	5.1	3050	6.95	5
4	100	112.6	113.3	8.0	8.2	5.5	5.8	3050	10.56	5
5	125	139.6	140.3	11.0	11.5	8.0	8.5	3050	17.80	5

SUITABLE FOR SUBMERSIBLE PUMP INSTALLATIONS UPTO 335m (1100FT) DEPTH

HEAVY TYPE

NOMINAL DIAMETER		OUTER DIAMETER (mm)		WALL THICKNESS AT ENDS (mm)		WALL THICKNESS AT CENTER (mm)		EFFECTIVE LENGTH OF PIPE (mm)	NET.WT (kg) APPROX. PER PIPE	NO. OF PIPES PER BUNDLE
Inches	mm	Min	Max	Min	Max	Min	Max			
1	25	32.8	33.1	5.7	5.8	4.6	4.8	3050	2.20	25
1¼	32	41.8	42.1	6.0	6.3	4.8	5.0	3050	2.90	20
1½	40	47.8	48.1	6.2	6.5	5.0	5.2	3050	3.50	15
2	50	59.8	60.1	7.2	7.5	5.2	5.5	3050	4.86	10
2½	65	74.7	75.2	8.2	8.5	6.2	6.5	3050	6.96	10
3	80	87.7	88.2	9.8	10.1	6.2	6.5	3050	8.20	5
4	100	112.6	113.3	10.0	10.3	6.7	7.0	3050	12.44	5
5	125	139.6	140.3	13.0	13.5	10.0	10.50	3050	20.50	5

* All dimensions are in mm.

* Installation depth depends on recommended permissible hydrostatic pressure rating of the pipes and refer pump delivery pressure chart on page 4 for more details.

SUBMERSIBLE COLUMN PIPES

WEIGHT CARRYING CAPACITY

SUITABLE FOR SUBMERSIBLE PUMP INSTALLATIONS UPTO 106m (350FT) DEPTH

MEDIUM TYPE

NOMINAL DIAMETER		PIPE WEIGHT (kg) APPROX FOR 106m LENGTH	COLUMN WATER WEIGHT (kg) FOR 106m LENGTH	PUMP SET WEIGHT (kg) APPROX.	CABLE WEIGHT (kg) APPROX.	TOTAL WEIGHT (kg)	MAX. LOAD CAPACITY (kg) FOR PULLING WITH CHAIN PULLY OR CRANE	ULTIMATE BREAKING LOAD (kg)
Inches	mm							
1	25	59	67	55	30	210	800	1040
1¼	32	70	110	75	30	285	1250	1600
1½	40	84	147	110	30	371	1350	1700
2	50	102	252	150	40	544	1550	2000
2½	65	132	394	250	40	816	1920	2400
3	80	193	543	350	50	1135	2800	3600
4	100	294	933	500	75	1802	4150	5300
5	125	474	1378	550	75	2477	6525	8400

SUITABLE FOR SUBMERSIBLE PUMP INSTALLATIONS UPTO 152m (500FT) DEPTH

MEDIUMPLUS TYPE

NOMINAL DIAMETER		PIPE WEIGHT (kg) APPROX FOR 152m LENGTH	COLUMN WATER WEIGHT (kg) FOR 152m LENGTH	PUMP SET WEIGHT (kg) APPROX.	CABLE WEIGHT (kg) APPROX.	TOTAL WEIGHT (kg)	MAX. LOAD CAPACITY (kg) FOR PULLING WITH CHAIN PULLY OR CRANE	ULTIMATE BREAKING LOAD (kg)
Inches	mm							
1	25	85	83	60	40	268	1050	1400
1¼	32	113	150	85	40	388	1345	2100
1½	40	130	203	120	40	493	1465	2500
2	50	173	338	160	55	726	1825	2800
2½	65	220	530	270	55	1075	2410	3500
3	80	313	755	375	70	1513	3670	5000
4	100	500	1278	550	105	2433	4810	7500
5	125	777	1896	600	110	3383	7750	10050

SUITABLE FOR SUBMERSIBLE PUMP INSTALLATIONS UPTO 213m (700FT) DEPTH

STANDARD TYPE

NOMINAL DIAMETER		PIPE WEIGHT (kg) APPROX FOR 213m LENGTH	COLUMN WATER WEIGHT (kg) FOR 213m LENGTH	PUMP SET WEIGHT (kg) APPROX.	CABLE WEIGHT (kg) APPROX.	TOTAL WEIGHT (kg)	MAX. LOAD CAPACITY (kg) FOR PULLING WITH CHAIN PULLY OR CRANE	ULTIMATE BREAKING LOAD (kg)
Inches	mm							
1	25	130	105	65	55	355	1325	1800
1¼	32	165	193	85	55	498	1550	2600
1½	40	193	266	130	55	644	1750	3000
2	50	266	455	170	75	966	2150	3800
2½	65	343	711	290	75	1419	2750	5000
3	80	483	1022	400	95	2000	4100	7000
4	100	735	1733	600	145	3213	5800	10300
5	125	1256	2656	650	154	4716	9040	11650

SUITABLE FOR SUBMERSIBLE PUMP INSTALLATIONS UPTO 335m (1100FT) DEPTH

HEAVY TYPE

NOMINAL DIAMETER		PIPE WEIGHT (kg) APPROX FOR 335m LENGTH	COLUMN WATER WEIGHT (kg) FOR 335m LENGTH	PUMP SET WEIGHT (kg) APPROX.	CABLE WEIGHT (kg) APPROX.	TOTAL WEIGHT (kg)	MAX. LOAD CAPACITY (kg) FOR PULLING WITH CHAIN PULLY OR CRANE	ULTIMATE BREAKING LOAD (kg)
Inches	mm							
1	25	231	154	70	115	570	1565	-
1¼	32	297	264	90	115	766	1900	3100
1½	40	374	380	140	115	1009	2139	4000
2	50	528	600	180	150	1458	2880	4700
2½	65	759	963	310	150	2182	4250	7000
3	80	891	1425	425	225	2966	5720	9500
4	100	1353	2514	650	225	4742	9520	16000
5	125	2317	3705	750	242	7014	14100	17200

* All dimensions are in mm.

* Installation depth depends on recommended permissible hydrostatic pressure rating of the pipes and refer pump delivery pressure chart on page 4 for more details.

PUMP DELIVERY PRESSURE

Pump delivery pressure is the maximum delivery head of the pump. In the pump performance curves the value of head at which the flow becomes nil (zero), is the max. head in metres. Hence the max head of the pump must not exceed the recommended permissible hydrostatic pressure of the pipes published in the following table.

Permissible hydrostatic Pressure (10m = 1kg/cm²)

NOMINAL DIAMETER		MEDIUM	MEDIUMPLUS	STANDARD	HEAVY
Inches	mm				
1	25	16 kg/cm ²	22 kg/cm ²	30 kg/cm ²	-
1¼	32	15 kg/cm ²	20 kg/cm ²	25 kg/cm ²	35 kg/cm ²
1½	40	15 kg/cm ²	21 kg/cm ²	26 kg/cm ²	35 kg/cm ²
2	50	14 kg/cm ²	16 kg/cm ²	20 kg/cm ²	27 kg/cm ²
2½	65	10 kg/cm ²	12 kg/cm ²	16 kg/cm ²	26 kg/cm ²
3	80	11 kg/cm ²	14 kg/cm ²	17 kg/cm ²	26 kg/cm ²
4	100	10 kg/cm ²	12 kg/cm ²	15 kg/cm ²	26 kg/cm ²
5	125	10 kg/cm ²	11 kg/cm ²	15 kg/cm ²	26 kg/cm ²

* Installation depth depends on recommended permissible hydrostatic pressure rating of the pipes and refer pump delivery pressure chart for more details.

SELECTION OF PIPES

The column pipes must be selected from the types available, so that the pump delivery pressure does not exceed the permissible hydrostatic pressure. In the column, for every 10m above the pump, there is a pressure drop of 1 kg/cm². If the pump delivery pressure is high, two different class pipes of the same size can be used, instead of using same type of pipes alone for the entire depth, to make it cost effective. Heavy type pipes can be used upto required length starting from pump and medium plus / standard type pipes can be used for the remaining length. An illustration is given below.

As per above illustration 40m of Heavy class pipes must be used starting from the pump, even for the lower depth installations since the pump delivery pressure is 24kg/cm².

While selecting the pipe it must be ensured that the total load is very well within the recommended ultimate breaking load.

INSTALLATION PROCEDURE

- First connect the male end of the bottom adaptor (C.I. / S.S) firmly to the pump discharge housing using a pipe wrench and first pipe can be connected to the female end.
- Before connecting clean both the ends of the pipes with clean water and check rubber seal ring for any damage.
- The pipe can be tightened by hand itself but, while tightening water has to be poured on pipe threads for lubrication. Anyhow for better grip strap wrench can be used to tighten / hold the pipes.
- Tighten the pipes by hand, until the rubber seal ring in the pipe end completely enters in to the coupling.
- Submersible pump cable need to be tied in regular intervals along with the column pipes, for securing the cable from getting damaged.
- At the time of lowering the pump into borehole the C-clamp must be fastened only to the pipe portion marked as "CLAMP HERE".
- Then all other pipes can also be connected in the same way. Pipe wrench should not be used on the pipe for support.
- Once the top column pipe reaches the ground level, connect the top adaptor with male end connection.
- Finally from the ground level regular plumbing accessories can be used to transfer water to required delivery point.

NOTE : Separate earth conductor should be used for earthing the submersible pump, as these pipes are insulators.

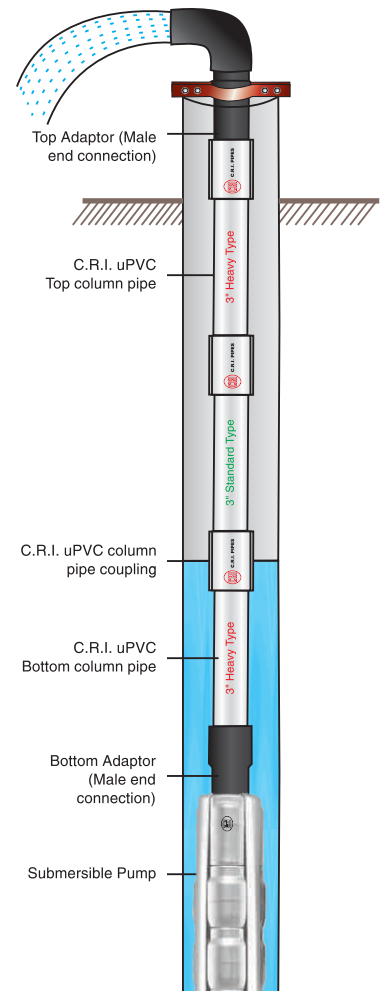
MINIMUM TENSILE STRENGTH AT THREAD JOINT

When two pipes of same type are fitted using a ribbed coupler and subjected to tensile the minimum tensile strength at thread joints shall be as given below.

NOMINAL DIAMETER		MEDIUM	MEDIUMPLUS	STANDARD	HEAVY
Inches	mm				
		kgf			
1	25	950	1315	1430	1845
1¼	32	1490	1705	2010	2595
1½	40	1925	2350	2470	3265
2	50	2175	2854	3440	4275
2½	65	2930	3480	4275	6750
3	80	4305	4950	5580	8595
4	100	5930	7345	8730	11980
5	125	11500	13000	15700	18800

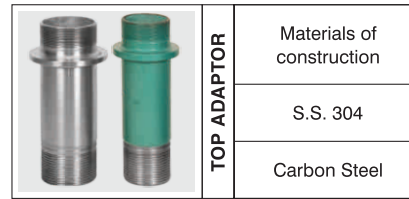
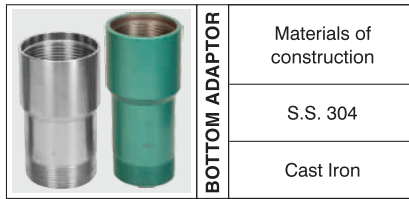
EXAMPLE

Pump delivery pressure	24 kg/cm ²
Pump outlet size & Pipe size	2" (50mm) Nominal Diameter
Standard type pipe recommended permissible pressure	20 kg/cm ²
Heavy type pipe recommended permissible pressure	27 kg/cm ²
Refer pump delivery pressure chart	
24 - 20 = 4 kg/cm ² , Extra Pressure over Standard pipes 4x10=40m (10m = 1kg/cm ²)	



ILLUSTRATION

ACCESSORIES



STORAGE

These pipes should be stored in a covered area protected from direct sunlight.

APPROXIMATE FRICTIONAL HEAD LOSS IN C.R.I. STANDARD TYPE COLUMN PIPES

FLOW		NOMINAL DIAMETER OF PIPE (INCHES/MM)							HEAD LOSS IN METERS, FOR 100M LENGTH OF PIPE
m ³ /h	l/min.	1" 25	1¼" 32	1½" 40	2" 50	2½" 65	3" 80	4" 100	
1	16.67	1.758	0.570	0.199	0.056	0.018	0.009		
1.5	25.00	3.575	1.158	0.404	0.121	0.037	0.018	0.005	
2	33.33	5.914	1.917	0.668	0.200	0.061	0.029	0.009	
2.5	41.67	8.739	2.832	0.987	0.296	0.090	0.043	0.012	
3	50.00	12.023	3.897	1.358	0.407	0.123	0.059	0.017	
3.5	58.33	15.747	5.103	1.779	0.533	0.162	0.077	0.022	
4	66.67	19.892	6.447	2.247	0.674	0.204	0.098	0.028	
4.5	75.00	24.446	7.922	2.761	0.828	0.251	0.120	0.034	
5	83.33	29.396	9.526	3.320	0.996	0.302	0.144	0.041	
6	100.00	40.443	13.107	4.568	1.370	0.415	0.198	0.056	
7	116.67	52.967	17.165	5.983	1.794	0.544	0.260	0.074	
8	133.33		21.683	7.557	2.267	0.687	0.328	0.093	
9	150.00		26.647	9.287	2.785	0.844	0.403	0.115	
10	166.67		29.534	11.168	3.349	1.015	0.485	0.138	
12	200.00		36.849	12.699	4.608	1.397	0.668	0.190	
14	233.33		48.657	16.761	6.035	1.830	0.874	0.248	
16	266.67			21.321	6.312	2.310	1.104	0.314	
18	300.00			26.368	7.803	2.840	1.357	0.386	
20	333.33			31.891	9.435	3.080	1.502	0.464	
22	366.67			37.883	11.204	3.351	1.696	0.548	
24	400.00			44.334	13.108	3.920	1.859	0.638	
26	433.33				15.146	4.528	2.147	0.734	
28	466.67				17.316	5.176	2.453	0.835	
30	500.00				19.615	5.862	2.778	0.979	
35	583.33				25.921	7.743	3.669	1.028	
40	666.67				33.010	9.856	4.669	1.307	
45	750.00				40.863	12.196	5.776	1.617	
50	833.33				49.466	14.759	6.988	1.955	
55	916.67					17.540	8.303	2.323	
60	1000.00					20.537	9.720	2.718	
65	1083.33					23.746	11.237	3.142	
70	1166.67					27.164	12.853	3.592	
75	1250.00					30.789	14.566	4.070	
80	1333.33					34.619	16.375	4.575	
85	1416.67					38.651	18.281	5.106	
90	1500.00					42.885	20.280	5.664	
95	1583.33					47.317	22.374	6.247	
100	1666.67						24.560	6.856	
105	1750.00						26.839	7.491	
110	1833.33						29.209	8.151	
115	1916.67						31.670	8.837	

APPROXIMATE FRICTIONAL HEAD LOSS IN C.R.I.
HEAVY TYPE COLUMN PIPES

FLOW		NOMINAL DIAMETER OF PIPE (INCHES/MM)						
m ³ /h	l/min.	1" / 25	1¼" / 32	1½" / 40	2" / 50	2½" / 65	3" / 80	4" / 100
1	16.67	2.596	0.587	0.295	0.089	0.029	0.014	
1.5	25.00	5.277	1.193	0.599	0.181	0.060	0.028	0.009
2	33.33	8.731	1.974	0.990	0.299	0.099	0.046	0.015
2.5	41.67	12.902	2.917	1.464	0.442	0.147	0.068	0.021
3	50.00	17.751	4.013	2.014	0.609	0.203	0.094	0.029
3.5	58.33	23.248	5.257	2.638	0.797	0.265	0.123	0.039
4	66.67	29.368	6.640	3.332	1.007	0.335	0.155	0.049
4.5	75.00	36.090	8.160	4.095	1.237	0.412	0.190	0.060
5	83.33	43.398	9.812	4.924	1.488	0.495	0.229	0.072
6	100.00	59.708	13.500	6.774	2.047	0.682	0.315	0.099
7	116.67	64.634	17.680	8.871	2.681	0.893	0.412	0.130
8	133.33		22.335	11.207	3.387	1.128	0.521	0.164
9	150.00		27.448	13.772	4.162	1.386	0.640	0.201
10	166.67		32.340	16.560	5.002	1.667	0.770	0.242
12	200.00		37.969	18.910	6.886	2.293	1.059	0.334
14	233.33		50.135	24.963	7.448	3.002	1.387	0.438
16	266.67			31.759	9.472	3.793	1.652	0.553
18	300.00			39.281	11.711	3.854	1.903	0.679
20	333.33			47.513	14.161	4.659	2.134	0.817
22	366.67			56.445	16.819	5.531	2.533	0.965
24	400.00				19.679	6.470	2.963	1.066
26	433.33				22.741	7.476	3.422	1.124
28	466.67				25.994	8.545	3.911	1.220
30	500.00				29.454	9.678	4.429	1.380
35	583.33				38.931	12.787	5.850	1.822
40	666.67				49.585	16.280	7.446	2.319
45	750.00					20.148	9.213	2.868
50	833.33					24.385	11.148	3.469
55	916.67					28.984	13.248	4.121
60	1000.00					33.940	15.510	4.823
65	1083.33					39.247	17.933	5.576
70	1166.67					44.901	20.513	6.376
75	1250.00					50.899	23.250	7.225
80	1333.33					57.236	26.140	8.121
85	1416.67						29.183	9.065
90	1500.00						32.378	10.056
95	1583.33						35.723	11.093
100	1666.67						39.216	12.176
105	1750.00						42.857	13.304
110	1833.33						46.644	14.477
115	1916.67						50.577	15.696

HEAD LOSS IN METERS, FOR 100M LENGTH OF PIPE

Friction loss calculated using
Darcy - Weisbach equation
 $h_{fs} = 4f (L/D) (V^2 / 2)g$
for H₂O at 20°C



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