

## uPVC COLUMN PIPES



# Zirantec

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FABBRICA ITALIANA POMPE SOMMERSIBILI S.r.l



**ZIRANTEC products are  
manufactured by well  
qualified and experienced  
Italian Pump Engineers  
in state of the art  
manufacturing facilities  
in Italy**

## CERTIFICATION



ZIRANTEC Pumps, Motors & accessories are from the house of **Fabbrica Italiana Pompe Sommergibili S.r.l.** a four decades old Italian company of high repute, offering complete waste water solutions around the world. Its current product portfolio includes world class Waste Water Pumps of various types, Multistage Centrifugal Pressure Booster Pumps, Borehole Submersible Pumps & Motors, End Suction Centrifugal Pumps, Industrial Pumps for various applications.

Founded as early as 1978 in Rozzano, South of Milan, Italy by Mr.Orfeo Agostini, the company has witnessed steady growth and market expansion continuously ever since. In these four decades of existence, the company has carved a niche for itself in the waste water and sewage pump market in Italy and other countries. Its products are employed in Municipal, Domestic and Industrial applications. The Company is well known for the unique and robust designs of its products and their workmanship. Due to its superior quality ZIRANTEC products are also exported to many European, African and Asian countries.

ZIRANTEC's products are conceived, designed and manufactured by well qualified and experienced Italian Pump Engineers in state of the art manufacturing facilities in Italy. These manufacturing plants are accredited with UNI EN ISO 9001:2008 Certification.

Over the years, the company has metamorphosed and ventured into manufacturing of high quality water pumps, for domestic, agricultural and industrial applications. In the due process, Fabbri Italiana Pompe Sommergibili S.r.l. has shed its image of an exclusive sewage and waste water pumps manufacturer to a complete pump production company with an ability to manufacture diverse kinds of pumps for different applications.

## SUBMERSIBLE COLUMN PIPES

### ABOUT ZIRANTEC uPVC COLUMN PIPES

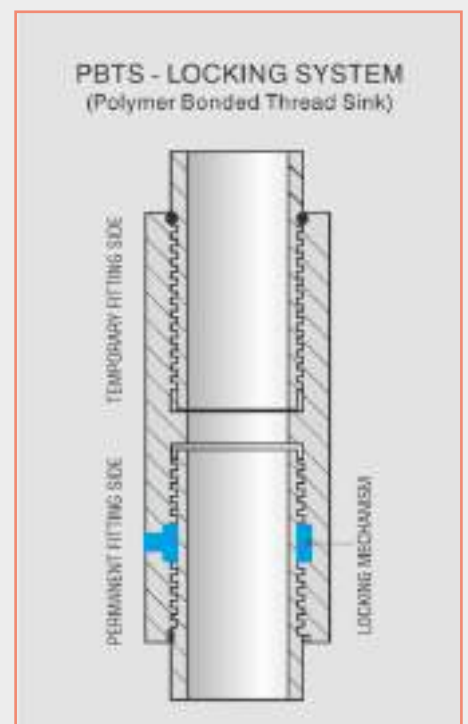
FIPS's vast experience & successful track record in pump industry spanning about 4 decades facilitate not only to enhance the range of pumps & motors, but also to produce and supply quality pumping accessories. ZIRANTEC's uPVC pipes are one among such accessories produced with specially designed formulation under integrated quality control system, 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.
- PBTS 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 - Highstrand) 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.
- Can be used in sun light because of its formulation to with standard UV exposure.



## PHYSICAL & MECHANICAL PROPERTIES

PROPERTY	UNIT	STANDARD
Specific Gravity	1,4 gms/cm <sup>3</sup>	-
Tensile Strength	627 kg/cm <sup>2</sup>	as per ASTM D 1785
Flexural Strength	647 kg/cm <sup>2</sup>	as per ASTM D 1785
Izod Impact Strength	15 kg - cm/cm <sup>2</sup>	as per ASTM D 1785
Charpy Impact Strength	17 kg - cm/cm <sup>2</sup>	as per ASTM D 1785
Impact Strength	No Fracture	-
Vicat Softening Temperature	87.3°C	as per ASTM D 1525

## DIMENSION & WEIGHT DETAILS

### STANDARD TYPE

NOMINAL DIAMETER		OUTER DIAMETER (mm)		WALL THICKNESS AT ENDS (mm)		WALL THICKNESS AT CENTER (mm)		EFFECTIVE LENGTH OF PIPE (mm)	WEIGHT PER PIPE (kg)	NO. OF PIPES PER BUNDLE
Inches	mm	Min	Max	Min	Max	Min	Max			
1	25	32,8	33,1	5,4	5,7	3,3	3,6	3010	1,72	25
1¼	32	41,8	42,1	5,7	6,0	3,5	3,8	3010	2,52	20
1½	40	47,8	48,1	6,3	6,6	4,0	4,3	3010	3,13	15
2	50	59,8	60,1	6,5	6,8	4,0	4,3	3010	3,98	10
2½	65	74,7	75,2	6,8	7,1	4,4	4,7	3010	5,62	8
3	80	87,7	88,2	8,0	8,3	5,4	5,7	3010	7,93	5
4	100	112,3	113,3	8,2	8,5	5,7	6,0	3010	11,26	4
5	140	139,5	140,2	12,7	12,5	7,7	8,0	3010	15,30	3

### HEAVY TYPE

NOMINAL DIAMETER		OUTER DIAMETER (mm)		WALL THICKNESS AT ENDS (mm)		WALL THICKNESS AT CENTER (mm)		EFFECTIVE LENGTH OF PIPE (mm)	WEIGHT PER PIPE (kg)	NO. OF PIPES PER BUNDLE
Inches	mm	Min	Max	Min	Max	Min	Max			
1¼	32	41,8	42,1	6,6	6,9	4,5	4,8	3010	2,82	15
1½	40	47,8	48,1	7,6	7,9	5,2	5,5	3010	3,68	12
2	50	59,8	60,1	8,1	8,4	5,4	5,7	3010	5,18	10
2½	65	74,7	75,2	9,2	9,6	6,4	6,7	3010	7,62	6
3	80	87,7	88,2	10,1	10,4	7,6	7,9	3010	10,19	5
4	100	112,3	113,3	11,9	12,3	9,4	9,7	3010	14,42	3
5	140	139,5	140,2	16,7	17	12,7	13	3010	23,30	2
6	165	164,7	165,5	16,5	17	13,8	14,5	3010	33	1

\* Super Heavy pipe can't be connected to regular adaptor & require special adaptor.

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

## WEIGHT CARRYING CAPACITY

### STANDARD TYPE

NOMINAL DIAMETER		RECOMMENDED DEPTH IN (m)	PIPE WEIGHT (kg) APPROX FOR LENGTH (m)	COLUMN WATER WEIGHT (kg) FOR LENGTH (m)	PUMP SET WEIGHT (kg) APPROX.	CABLE WEIGHT (kg) APPROX.	TOTAL WEIGHT (kg)	MAX. LOAD CAPACITY (kg) FOR PULLING WITH CHAIN PULLY	ULTIMATE BREAKING LOAD (kg)
Inches	mm								
1	25	300	172	150	65	150	539	1300	1800
1¼	32	260	198	238	85	150	674	1500	2500
1½	40	260	249	329	130	150	861	1700	3000
2	50	200	271	433	170	150	1028	2100	3800
2½	65	160	282	541	290	150	1269	2700	5000
3	80	170	441	827	400	150	1826	4000	7000
4	100	150	559	1300	530	150	2551	5700	10300
5	140	160	667	1773	660	150	3250	9650	16500

### HEAVY TYPE

NOMINAL DIAMETER		RECOMMENDED DEPTH IN (m)	PIPE WEIGHT (kg) APPROX FOR LENGTH (m)	COLUMN WATER WEIGHT (kg) FOR LENGTH (m)	PUMP SET WEIGHT (kg) APPROX.	CABLE WEIGHT (kg) APPROX.	TOTAL WEIGHT (kg)	MAX. LOAD CAPACITY (kg) FOR PULLING WITH CHAIN PULLY	ULTIMATE BREAKING LOAD (kg)
Inches	mm								
1¼	32	350	324	280	90	220	917	1550	3100
1½	40	350	422	403	140	220	1188	2000	4000
2	50	270	447	491	180	220	1342	2850	4700
2½	65	260	658	758	310	220	1952	4200	7000
3	80	260	881	1200	425	220	2764	5700	9500
4	100	260	1243	2167	560	220	4202	9500	16000
5	140	260	1605	3133	500	220	5458	14600	24500
6	165	260	1967	4099	1000	220	7016	23500	40000

## 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/cm<sup>2</sup>)

NOMINAL DIAMETER		ELITE	MEDIUM	STANDARD	HEAVY	SUPER HEAVY
Inches	mm					
1	25	15	21	30		
1¼	32	15	21	26	35	
1½	40	15	21	26	35	
2	50	6	13	20	27	35
2½	65		10	16	26	35
3	80		11	17	26	35
4	100		10	15	26	35
5	125			16	26	35
6	150				26	

\* 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/cm<sup>2</sup>. 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/cm<sup>2</sup>.

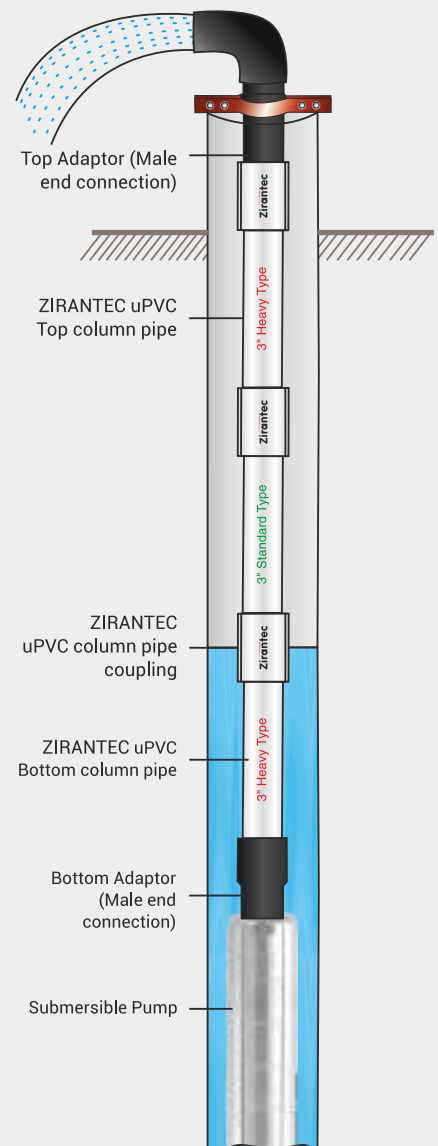
While selecting the pipe it must be ensured that the total load is very well within the recommended ultimate breaking load.

## EXAMPLE

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

## 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.



ILLUSTRATION

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

## ACCESSORIES



## STORAGE

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

### APPROXIMATE FRICTIONAL HEAD LOSS IN ZIRANTEC STANDARD TYPE COLUMN PIPES

FLOW		NOMINAL DIAMETER OF PIPE (INCHES/MM)								
m <sup>3</sup> /h	l/min.	1" / 25	1 1/4" / 32	1 1/2" / 40	2" / 50	2 1/2" / 65	3" / 80	4" / 100	HEAD LOSS IN METERS, FOR 100M LENGTH OF PIPE	
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		

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



**APPROXIMATE FRICTIONAL HEAD LOSS IN ZIRANTEC HEAVY TYPE COLUMN PIPES**

FLOW		NOMINAL DIAMETER OF PIPE (INCHES/MM)							
m <sup>3</sup> /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	

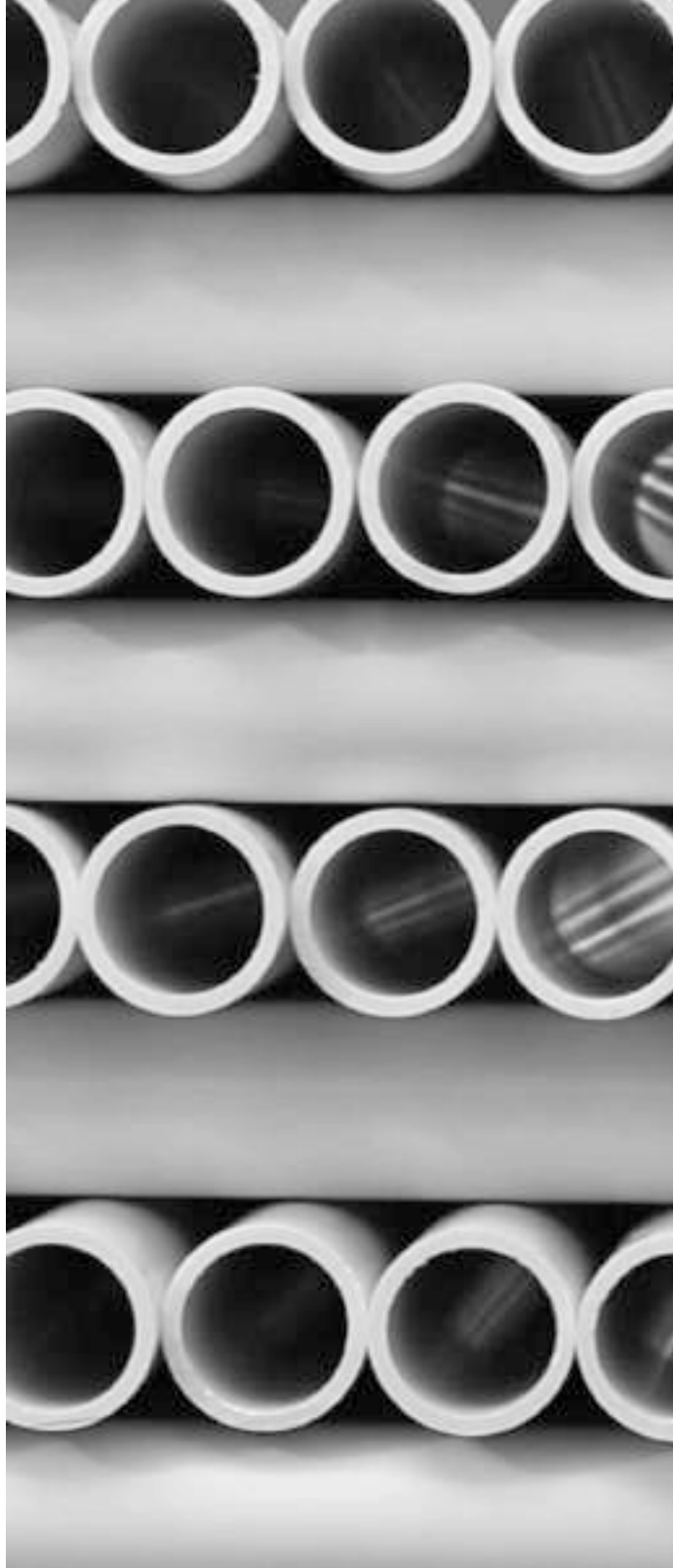
HEAD LOSS IN METERS, FOR 100M LENGTH OF PIPE

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

In view of the continuous developments the Information / Descriptions / Specifications / illustrations are subject to change without notice.







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