easypipe

COLUMN PIPES

For submersible borehole pumps

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Advantages of uPVC RISER / DROPPIPE

- Long Life
- No rusting, corrosion or deterioration
- Light in Weight
- Easy Installation
- Cost Saver
- Power Saver
- 10 to 30% extra discharge water, Compared to steel pipes
- No Electrolytic DEPOS

Recommended for installations up to 300 meters

1. What is u-PVC?

The u-PVC is a thermoplastic polymer belonging to the family of polyvinyl chloride (PVC's), but with the proviso that it is unplasticized.

That is, components such as plasticizers, lubricants, stabilizers are removed in the manufacturing process, thus obtaining a much purer resin of polyvinyl chloride.

The main difference to conventional PVC resin is the remarkable improvement of the mechanical properties of the material, particularly the rigidity.

At present, the u-PVC has many applications which mainly replace metallic materials which require moderate effort and the great advantage of his long life is to avoid being attacked by environmental and chemical phenomena (such as rusting).

Some of its applications are:

1. Pipes.
2. Grid for the manufacturing of lightweight structures.
3. Grid for the manufacturing of elements for metalwork (windows, doors ...)
4. Moldings.

2. u-PVC Column Pipes for Bore Wells

The u-PVC pipes are rapidly replacing the main applications for submersible pumps such as flexible hoses or flanged metal pipes.

Its main advantages are:

1. Unlimited life. The u-PVC does not suffer corrosion processes as metals.
2. Light weight. Therefore, the mounting is cheaper which lowers costs crane.
3. Easy to Install. Assembly is simple and fast, with threaded fittings, lowering the costs associated with installing assembly.
4. The u-PVC does not suffer by saline water electrolysis.
5. High resistance to pressure and tension.
6. The energy costs of the installation substantially decrease. The completely smooth finishing of the interior of the pipe decreases the frictional head loss
7. The cost of the pipes is lower than other pipes of metal materials.
8. The life of the u-PVC is not affected by weather.
9. You do not need to use joints and or screws for the assembly.

3. Main Features

Square Type Threads

The junction between the pipes is made by means of specially designed squared thread to ensure a quick assembly and tightness. These high friction threads cannot be opened by forward or reverse torque generated by the pump.

Relationship between thickness / tapping.

The threads of the pipes are manufactured by a special process, whereby it is achieved that the tube has a greater thickness at the end of the thread. Thus, the loss of thickness and resistance of the pipe produced by the thread is compensated, thereby producing a higher tensile strength.

O-Ring Seal

The O-Ring at the end of the pipe and the tightness system are developed to ensure the tightness of the pipe and at the same time it absorbs the vibrations produced by the operation of the pump, thereby extending the life of pump and its bearings.

4. Loads and pressures.

The following table shows:

1. – The final load of failure, i.e. the maximum tensile load that a pipe supports, always in longitudinal direction before breaking.

2. - The maximum recommended load to be submitted to the tube always in longitudinal direction in the ordinary assembly operations, before beginning interior permanent deformations or interior defects that may cause breakage by fracture.

3. – The maximum permissible hydraulic pressure in the tube as well as the maximum recommended depth of installation. (Considering as maximum lift height, the height of the well itself).

ND= Nominal Dia Øe= Outer Dia in mm. Type: Standard / Heavy	Final Load of failure (Kg).	Maximum recommended load (Kg).	Maximum Hydraulic Pressure (Kg / cm ²).	Maximin Depth of Bore Well (mt).
ND40-1 1/2" (Øe= 48 mm)				
Standard	3.000	1.700	25	250
Heavy	4.000	2.000	35	350
ND50-2" (Øe= 60 mm)				
Standard	3.800	2.100	20	200
Heavy	4.700	2.850	27	270
ND65-2 1/2" (Øe= 76 mm)				
Standard	5.000	2.700	16	160
Heavy	7.000	4.200	26	260
ND80-3" (Øe= 88 mm)				
Standard	7.000	4.000	17	170
Heavy	9.500	5.700	26	260
DN100-4" (Øe= 114 mm)				
Standard	10.300	5.700	15	150
Heavy	16.000	9.500	26	260
DN125-5" (Øe= 140 mm)				
Standard	16.400	9.650	16	160

In the table below we can see a comparison between the load that can occur, i.e. in a 100 mtrs. installation and the maximum recommended load of the pipe.

	STANDARD					HEAVY				
ND	Weight of 100 meters of pipes	Weight of 100 meters of column of water. -B-	Pump estimated weight -C-	Total Weight (A+B+C)	Maximum recommended load	Weight of 100 meters of pipes. -A-	Weight of 100 meters of column of water -B-	Pump estimated weight -C-	Total Weight. (A+B+C)	Maximum recommended load
1 1/2"	105	110	150	365	1.700	140	85	150	375	2.000
2"	130	175	200	505	2.100	185	155	200	540	2.850
2 1/2"	175	295	250	720	2.700	260	240	250	750	4.200
3"	237	410	300	947	4.000	350	355	300	1.005	5.700
4"	355	725	350	1.430	5.700	580	640	350	1.570	9.500
5"	580	1210	500	2.290	9.650					

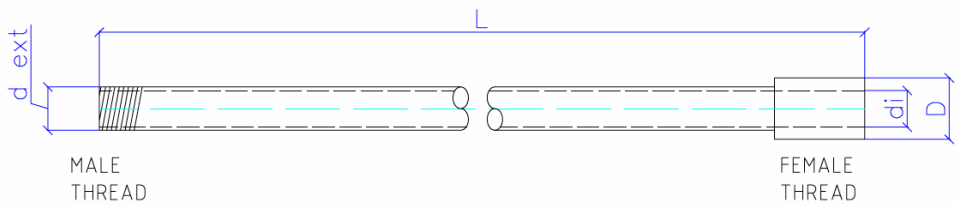
5. Main features of the Pipes

Thread Dimensions Table (in mm)

ND= Nominal Dia. Øe= Outer Dia. in mm. Type: Standard / Heavy.	Thickness		Outer Dia	Pipe length
	Tube thickness in the threaded end (max and min).	Pipe Thickness (max and mín).	Maximun and minimum (mm).	(mm).
ND40-1 1/2" (d ext= 48 mm)				
Standard	6,0 / 7,2	4,1 / 5,1	47,5 / 48,2	3.000 ± 10 mm
Heavy	8,4 / 9,9	5,9 / 7,1	47,5 / 48,2	3.000 ± 10 mm
ND50-2" (d ext= 60 mm)				
Standard	6,4 / 7,9	3,9 / 5,0	59,5 / 60,1	3.000 ± 10 mm
Heavy	7,8 / 9,7	5,3 / 6,6	59,5 / 60,1	3.000 ± 10 mm
ND65-2 1/2" (d ext= 75 mm)				
Standard	6,5 / 8,0	4,0 / 5,1	74,5 / 75,2	3.000 ± 10 mm
Heavy	9,0 / 10,7	6,3 / 7,6	74,5 / 75,2	3.000 ± 10 mm
ND80-3" (d ext= 88 mm)				
Standard	7,5 / 9	5,5 / 6,4	87,5 / 88,2	3.000 ± 10 mm
Heavy	9,8 / 11,9	7,3 / 9,0	87,5 / 88,2	3.000 ± 10 mm
DN100-4" (d ext= 113 mm)				
Standard	8,2 / 9,80	5,7 / 7,2	112,5 / 113,2	3.000 ± 10 mm
Heavy	12,2 / 14,3	9,4 / 11,5	112,5 / 113,2	3.000 ± 10 mm
ND125-5" (d ext= 140 mm)				
Standard	10,10 / 12,40	7,60 / 9,10	139.5 / 140.2	3.000 ± 10 mm

Pipe Dimensios Table(in mm):

	STANDARD				HEAVY			
ND	D	di	OD	L	D	di	OD	L
1 1/2"	68	39	48	3.000 ± 10	68	35	48	3.000 ± 10
2"	84	51	60	3.000 ± 10	84	48	60	3.000 ± 10
2 1/2"	96	66	75	3.000 ± 10	96	61	75	3.000 ± 10
3"	120	76	88	3.000 ± 10	120	72	88	3.000 ± 10
4"	140	100	113	3.000 ± 10	140	93	113	3.000 ± 10
5"	165	124	140	3.000 ± 10				



6.- Head Loss.

Another major advantage of the use of u-PVC pipes is the remarkable improvement of the energy efficiency of the installation.

Due to the completely smooth finish / polishing of the inside of the pipe, the head loss is less than that suffered in equal conditions for carbon steel pipe. For example, the head loss can be 30% lower.

The head loss in m.w.c every 100 meters of depth in an installation is shown in the table below.

	DRIVEN FLOW = in liters per minute											
	40	*60*	*80*	*100*	*120*	*150*	*180*	*240*	*300*	*360*	*400*	*500*
ND	**S T A N D A R D**											
1 1/2"	0,662	1,404	2,391	3,616	5,067	7,661	10,740	18,293	27,659	38,772		
2"	0,184	0,392	0,667	1,009	1,414	2,138	2,997	5,105	7,719	10,821	13,152	
2 1/2"	0,053	0,113	0,193	0,293	0,410	0,620	0,870	1,482	2,240	3,141	3,818	5,771
3"	0,025	0,053	0,090	0,137	0,192	0,291	0,408	0,695	1,051	1,474	1,792	2,708
4"	0,006	0,014	0,024	0,037	0,052	0,079	0,111	0,189	0,287	0,402	0,489	0,739
5"				0.013	0.019	0.029	0.040	0.069	0.104	0.146	0.178	0.269

	DRIVEN FLOW = in liters per minute											
	40	*60*	*80*	*100*	*120*	*150*	*180*	*240*	*300*	*360*	*400*	*500*
DN	**H E A V Y**											
1 1/2"	1,057	2,243	3,818	5,775	8,091	12,234	17,149	29,210	44,163			
2"	0,254	0,520	0,885	1,339	1,876	2,837	3,977	6,775	10,244	14,360	17,453	
2 1/2"	0,076	0,162	0,277	0,419	0,587	0,888	1,245	2,121	3,207	4,492	5,464	8,259
3"	0,034	0,072	0,123	0,186	0,261	0,395	0,553	0,943	1,426	1,999	2,430	3,673
4"	0,009	0,021	0,036	0,054	0,076	0,115	0,161	0,274	0,415	0,582	0,707	1,069
5"				0.019	0.027	0.041	0.058	0.099	0.150	0.210	0.256	0.387

In addition, we attach the head loss table in m.w.c for comparative calculations every 100 meters of column pipes of porous finishing as metallic pipes:

	DRIVEN FLOW = in liters per minute											
	40	*60*	*80*	*100*	*120*	*150*	*180*	*240*	*300*	*360*	*400*	*500*
ND	**IRON PIPE**											
1 1/2"	1,150	2,570	4,580	7,160	10,300	16,100	23,200	41,250	64,450			
2"	0,380	0,840	1,500	2,360	3,380	5,300	7,600	13,520	21,120	30,410	37,550	
2 1/2"	0,100	0,220	0,400	0,630	0,910	1,420	2,050	3,640	5,690	8,190	10,110	15,800
3"	0,030	0,080	0,140	0,220	0,320	0,500	0,720	1,290	2,010	2,900	3,580	5,590
4"	0,010	0,030	0,050	0,070	0,110	0,170	0,240	0,420	0,660	0,950	1,170	1,830

Example

Next, we are going to calculate the head loss for a 100 meters installation of carbon steel pipes and u-PVC pipes of ND50 (2") and a 18m3/h flow.

Firstly, we have to convert the flow to / min = 18 m³ / hx 1000-1060 = 300 l / min.

IN u-PVC STANDARD PIPE.

In the table we obtain the pressure LOSS to 300 l / min, 2 " pipe = 7,719 mwc

Then, the total height to raise is 100 + 7719 = 107 719 mwc

The gauge height difference is 121.12 - 107 719 = 13 401 mwc

Which corresponds to a saving in m.w.c. of almost 12%?

This benefit will become in:

1. - Lower energy consumption of the facility.

2. - Less Operating Time of the installation.

3. - Less assembly costs since less powerful pumps can be installed.