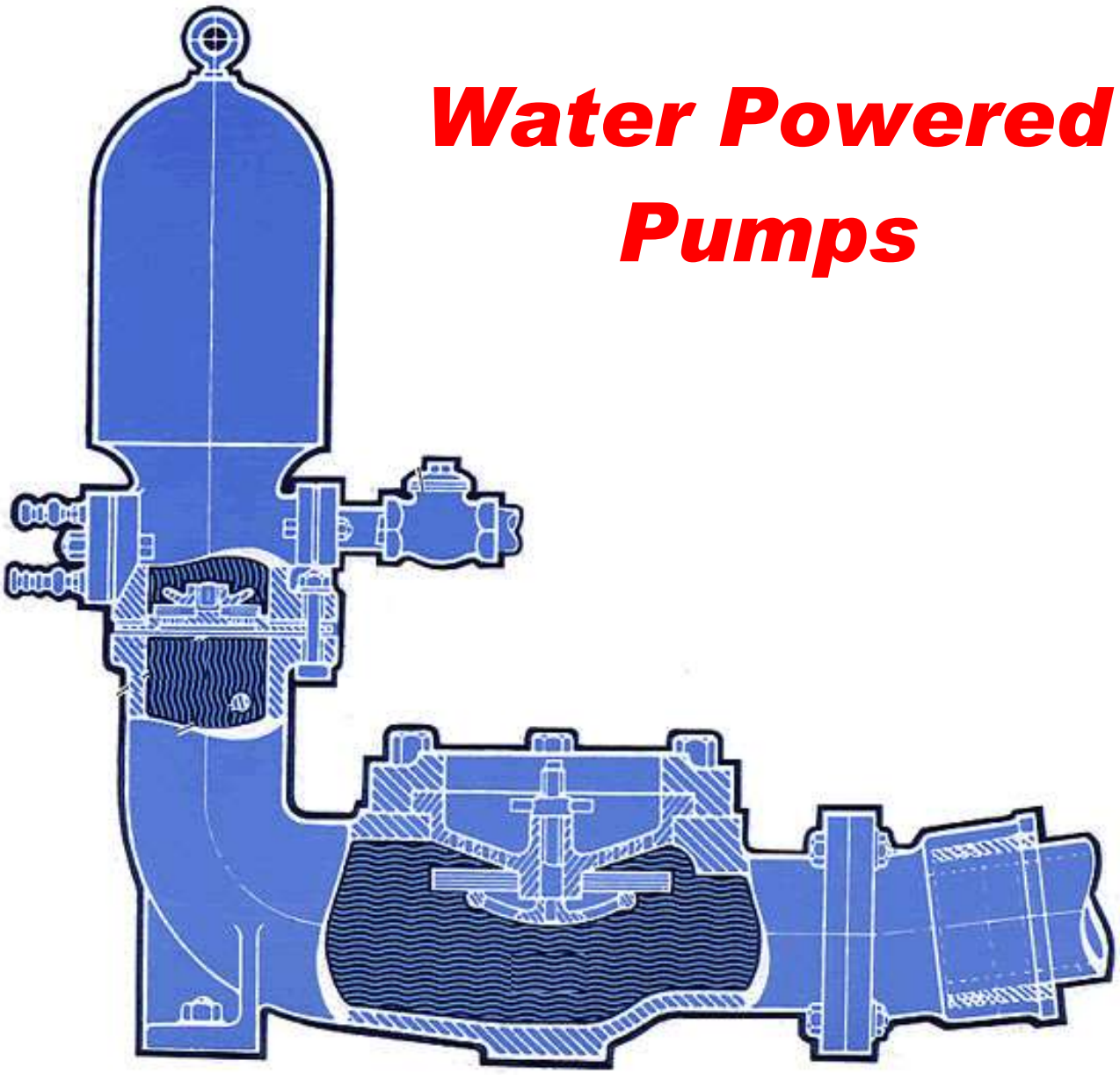
BLAKE HYDRAM

Water Powered Pumps



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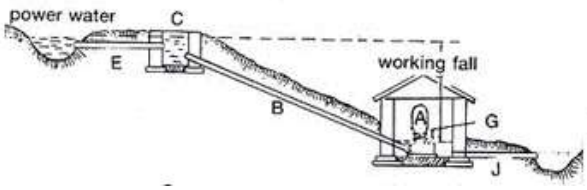
How the Hydram Works

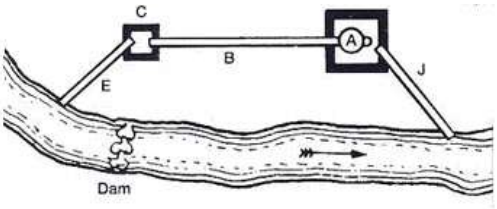
The modern Hydram uses a very old principle of physics in a simple but effective way to move water from a stream or river to places where it is most needed. Where there is suitable clean water available, it can provide supplies to remote houses or communities, allow irrigation of inaccessible areas and maintain feed water for stock in areas at a distance from water sources.

The working parts are limited to rubber valve discs and maintenance is simply a matter of ensuring waterways are clear and flowing freely.

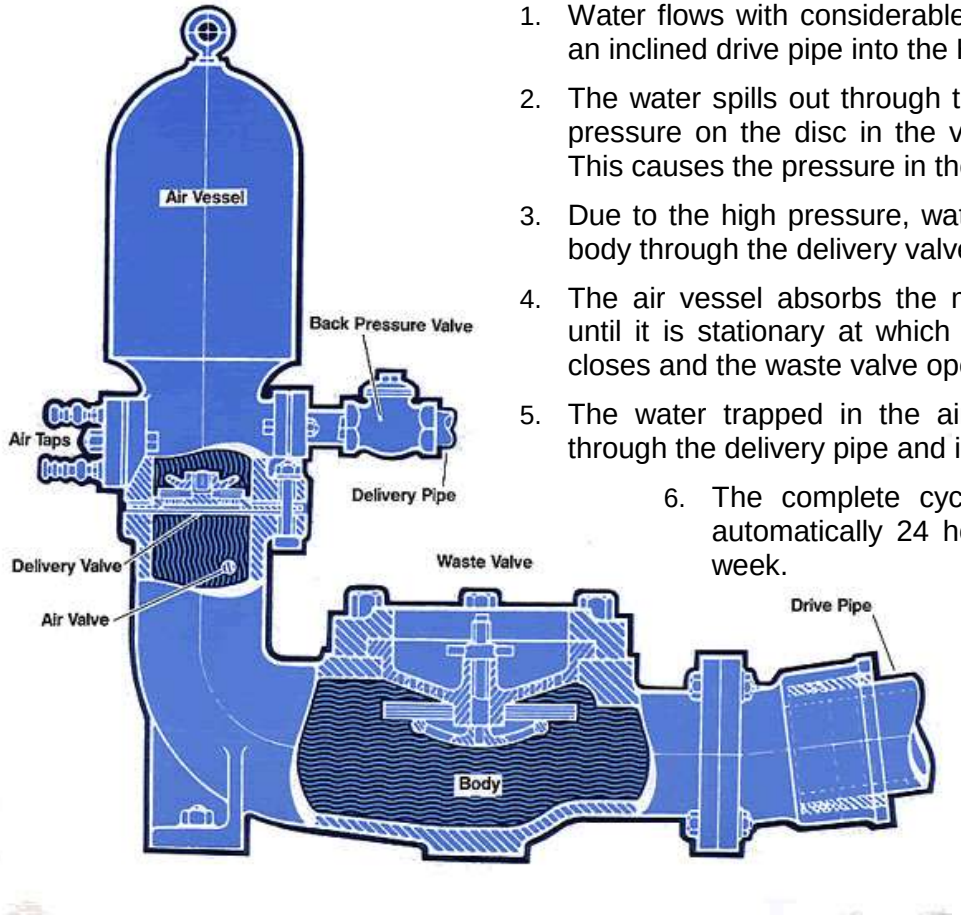
View 1



View 2



The Hydram has two requirements in order to work, a supply of continuously flowing water and the ability to locate the Hydram at a point lower in height than the flowing water. The Hydram can work off falls as low as 1 metre and under suitable conditions can pump water up to heights of 150 metres. Within reason distance is no object.



1. Water flows with considerable force and speed down an inclined drive pipe into the Hydram.
2. The water spills out through the waste valve until the pressure on the disc in the valve causes it to close. This causes the pressure in the body to rise.
3. Due to the high pressure, water flows from the pump body through the delivery valve into the air vessel.
4. The air vessel absorbs the momentum of the water until it is stationary at which point the delivery valve closes and the waste valve opens.
5. The water trapped in the air vessel is pushed out through the delivery pipe and into the storage tank.
6. The complete cycle then repeats again, automatically 24 hours a day, 7 days per week.

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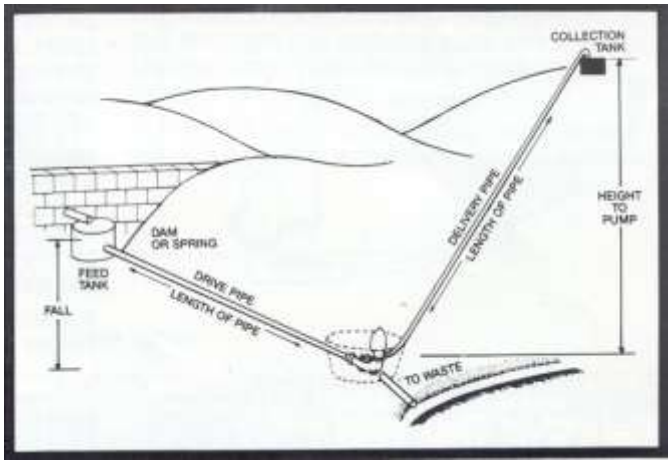
Hydram Installation – Basic Requirements

The use of a Hydram requires the availability of a suitable supply of continuously flowing water. The site needs to be suitably prepared to provide water input to the Hydram and also output side pipes for waste and delivery.

Installation of the Hydram couldn't be easier -

1. Create a feed well to collect the source water
2. Lay a concrete slab on which to bolt the Hydram
3. Fix a drive pipe between the two
4. Install a delivery pipe from the Hydram to where the water needs to go!

The diagram below illustrates the information which is needed to allow for quotations to be made and advice to be given. We are willing to do this for you however if you want to work out the size yourself the following pages give the necessary technical information.



Question	Answer
The quantity of water to be pumped per 24 hours (litres)	
The approximate quantity of water available from the spring or stream (litres per minute)	
Working fall which can be obtained from the water source (metres)	
The vertical height to which the water is to be pumped above the level of the Hydram (metres)	
The distance in which the working fall can be obtained (length of drive pipe) metres	
The distance the water has to be pumped (length of delivery pipe) metres	

Please provide your contact details in order for us to deal with your enquiry.

Name:	
Address:	
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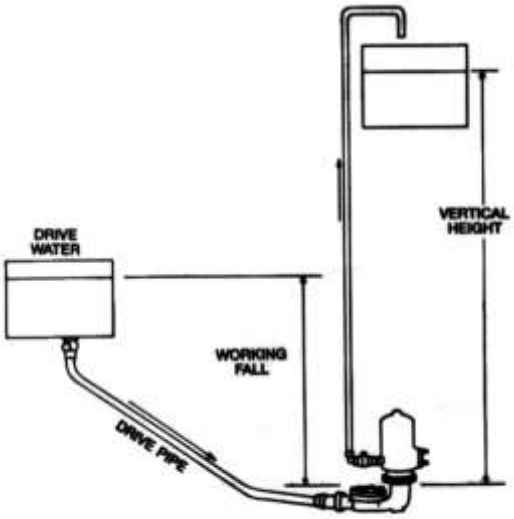
Hydram Performance

The performance of a Hydram is determined by the working fall down which the driving water has to travel and by the vertical height to which the pumped water must be raised.

This diagram shows these distances. The horizontal distance over which the pumped water travels is taken into account by selecting suitable pipe sizes.



The tables below show the performance figures for the Hydrams. The first table lists the amount of water pumped in 24 hours for a litre of water flowing down the drive pipe in a minute.

Therefore by knowing the working fall (m) and the vertical height (m) the output for 24 hours can be determined.

Example

Step 1

If the working fall is 6m and the vertical lift above the Hydram is 20m, from table 1 a factor can be found (in this example the factor is 282). For every litre per minute of water flowing into the Hydram, the amount delivered will be this factor in litres per day. Therefore, if 10 litres per minute flows into the Hydram then (10 x 282) 2820 litres per day will be delivered.

Alternatively, if the total daily requirement of water is known per day, then divide this quantity by the factor, to find the amount of water in litres per minute that must be supplied to the Hydram. For example if 20,000 litres per day was required, then 20,000 ÷ 282 = 70 litres per minute would have to be delivered to the Hydram.

Table 1

Working Fall (metres)	Vertical height to which water is raised above the Hydram (metres)											
	5	**7.5**	**10**	**15**	**20**	**30**	**40**	**50**	**60**	**80**	**100**	**125**
1	144	77	65	33	29	19.5	12.5					
1.5		135	96.5	70	54	36	19	15				
2		220	156	105	79	53	33	25	19.5	12.5		
2.5		280	200	125	100	66	40.5	32.5	24	15.5		
3			260	180	130	87	65	51	40	27	17.5	12
3.5				215	150	100	75	60	46	31.5	20	14
4				255	173	115	86	69	53	36	23	16
5				310	236	155	118	94	71.5	50	36	23
6					282	185	140	112	93.5	64.5	47.5	34.5
7						216	163	130	109	82	60	48
8							187	149	125	94	69	55
9							212	168	140	105	84	62
10	**Litres pumped in 24 hours per litre/min of drive water**						245	187	156	117	93	69
12							295	225	187	140	113	83
14								265	218	167	132	97
16									250	187	150	110
18									280	210	169	124
20										237	188	140

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Step 2

Now that the amount of water to be delivered to the Hydram is known, refer to Table 2 to select the required Hydram. In the previous example where 70 litres per minute is required it can be seen that a No. 3.5 Hydram would be required. This size can accept up to 96 litres per minute and can be throttled down to use 45 litres per minute during times of drought etc.

Step 3

Now that the size of Hydram is known, check with Table 2 that the size chosen will pump to the height required e.g. a No. 3.5 Hydram will pump to 120m. The table also shows the required size of drive pipe, in this example a 65mm bore.

For a reliable installation, the lift should not be less that three times the fall. In the example with a fall of 6m, the minimum lift must be 18m. Since in the example we require 20 metres, this will be acceptable.

Hydram Selection

The table below shows the different sized Hydrams together with the volume of water per minute that each Hydram can accept.

Using the previous example it was determined that to obtain 20,000 litres per day at a height of 20m above the Hydram, then 70 litres per minute would be needed when the fall on the input side was 6m.

Therefore looking at the table a 3.5 Hydram will accept the required drive water, and will allow for the volume on the input side to vary between 45 and 96 litres per minute. The lower limit indicates the minimum flow rate, which the Hydram will accept during periods of drought, and at that throughput half the maximum amount of water would be pumped.

Table 2

Size of Hydram			**1**	**2**	**3**	**3.5**	**4**	**5**	**6**	**7**	**8**	**10**
Input capacity of Hydram	litre per minute	min	7	12	27	45	68	136	180	364	545	770
		max	16	25	55	96	137	270	410	750	1136	1545
Max. height to which the Hydram will pump	metres		150	150	120	120	120	105	105	105	105	105
Nominal diameter of the drive pipe	m.m. bore		32	40	50	65	80	100	125	150	175	200