

# A HISTORY OF HYDRAULIC RAMS



The B&L Hydro-Ram is an efficient, lightweight, dependable and inexpensive hydraulic ram pump made possible by modern technology. It works on the same principles of physics that enabled its cumbersome predecessors to water the farmlands of Europe, the Mid-East and Asia over the past two hundred plus years.

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John Whitehurst is credited with inventing a non-self-acting ram pump in England in 1772. B. Montgolfier, had added a valve which made the device self-acting, making the ram pump almost a perpetual motion machine when water supplies were steady.

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In 1809, the first American patent was issued to J. Cerneau and S. S. Hallet in New York but it wasn't until 1832 that information began spreading across the eastern states about the "simple pump that pushes water uphill using energy from falling water".

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Prior to the 1840's most ram pumps in this country were imported from Europe, but in 1843, H. H. Strawbridge of Louisiana claimed to be the first to put an American-made model into use. His first ram built entirely of wood, exploded, prompting a later model boasting "cross-bolts and rivets of iron". A cast iron ram soon followed.

The pumps intrigued water-hungry rural Americans. Benson's Patent Water Ram could pump water from the powering stream or spring up a hill or it could use that power to push another water supply...potable water perhaps...uphill. Articles in magazines such as the FARMER'S CABINET and AMERICAN FARMER brought further recognition and understanding of the ram and its possibilities. A detailed book on the ram, published in 1842, was in its 16<sup>th</sup> edition by 1870.

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In 1879, THE PEOPLE'S CYCLOPEDIA included the hydraulic ram among the 55 most important inventions in the history of mankind! It defined the hydraulic ram as "A simple and conveniently applied mechanism by which the weight of falling water can be made available for raising a portion of itself to a considerable height".

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Benson's ram was said to "raise twice the water than any force pump will with the same water power". It was described as "very simple and easy to keep in order".

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Patents on the ram abounded in the 1840's and 1850's, but after 1858 none were secured until 1870 when another burst of interest saw four patents awarded in three years.

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Though many used rams for individual homes and farms, an 1852 advertisement for Birkinbine's Patent Improved Hydraulic Ram proclaimed that the ram had pumped 20,000 gallons a day to the town of Naples, N.Y. The ad invited individuals to order a "proper ram and pipe sent them with directions for putting up". One of the best-known large rams was the Rife Hydraulic Engine that could pump (under the right conditions) 50,000 gallons daily and 200 feet vertically. Cost was a major factor in growth of ram use. Not only were the machines inexpensive to buy, but they also were simple to install.... and they were almost maintenance free.

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In 1844 John Latrobe imported a ram from England at a cost of \$100.00 including 500 feet of pipe. A. J. Downing in 1847 paid only \$60.60 for an American made ram and several hundred more feet of pipe. Downing's ram itself cost only \$12.00; larger models cost as much as \$30.00. Repair cost ranged from \$5.00 every five years for replacement valves on the English models to Birkinbine's claim of "repairs not



over 25 cents a year”.

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For more than 100 years rams were major movers of water to homes, farms, industries, railroads and towns. They contributed to improved crop production, the introduction of extensive landscaping and gardening and, perhaps most importantly, to health and sanitation. But with the advent of electric pumps, interest in hydraulic rams became dormant. Ram pumps were allowed to rust in the stream until expensive parts, fossil fuel shortages, and environmental concerns brought back to the public's mind the need for a pump that is inexpensive, requires almost no repairs or maintenance, is self acting, and which can raise water to a considerable height.

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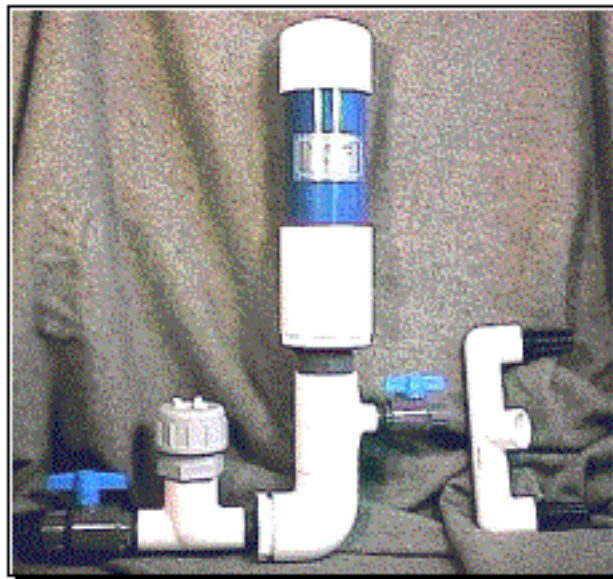
Thus ram pumps once again began to flourish. Large models can pump water hundreds of feet vertically. But the public began searching for a ram it could readily afford, pick up easily and move if necessary.

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**SO, now comes the B & L Hydro-Ram. Built with high quality (PVC) and stainless steel, the pump is efficient, and will give long and dependable service. The B & L Ram is almost maintenance-free, extremely easy to set up, and is a leader in modern ram technology.**

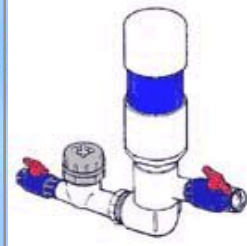
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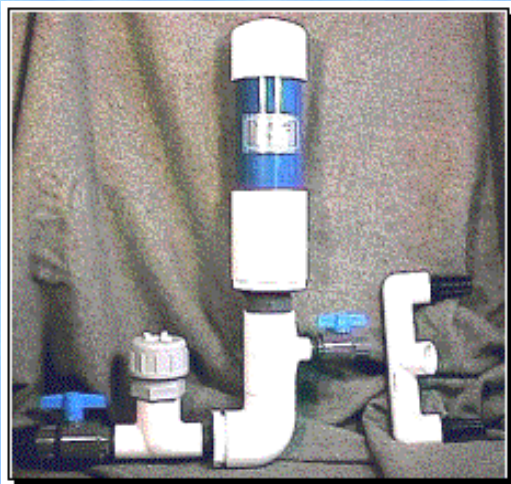
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Whether you are a weekend camper, hunter, homeowner, third-world resident or a Missionary needing to pump water a quarter of a mile away from a spring or stream, the B & L Ram Pump may well be the answer to your water needs.

**It uses NO electricity or gasoline to power, only gravity!**



B & L has been building ram pumps since 1985 and has developed one of the most efficient, dependable and cost effective pumps on the market today.

**Our pumps can deliver from 200 to 10,000 gallons of water per day, depending on the size of the pump and the installation.**

We have used a very old principle of capturing kinetic energy from moving water and combined it with modern materials to produce a very serviceable pump.

You may also contact us at:

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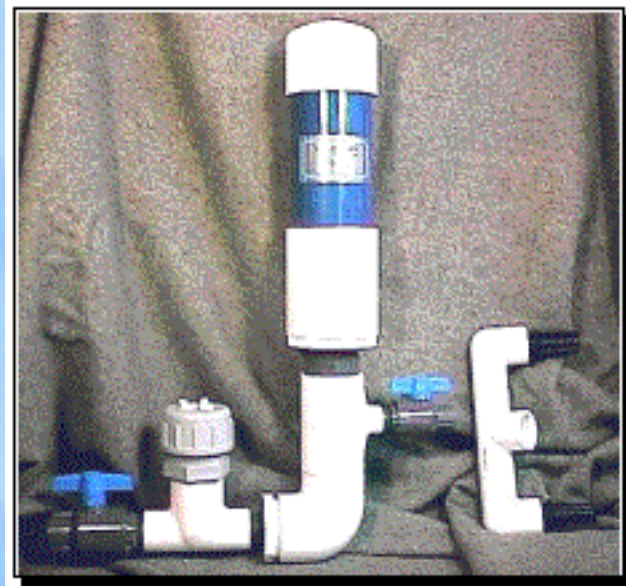
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## WHAT A B & L RAM CAN DO FOR YOU.

Whether you are a weekend camper, a back-to-nature homesteader, or a resident from another country needing to move water to a Missionary School House a half mile, or whatever, away from your source of water, the B & L Ram pump may well be the answer to your needs.



The B & L Ram uses the force of falling water to pump water uphill to where you need it most.... without using any additional source of energy and with only two moving parts. ! As little as a two foot (0.6 meters) fall from the water source to the pump at a flow rate of 3 gallons per minute will drive a small system and provide up to 20 feet of vertical lift to the discharge point.

Ram pumps are capable of supplying from 700 to 4,000 gallons of water per day, depending on the “head” (fall) of water supplying the pump, the size of the pump, the flow rate to the pump, and the height of the discharge.

With a ram and a suitable stream, spring or artesian well nearby, you can supply your homestead, farm or campsite’s needs, irrigate your garden or water your orchard.... all without the use of any outside source of energy.

“No gasoline or electricity!” Other uses of this versatile pump include filling a pond that is uphill from a spring or stream, watering livestock, or to economically supply a cooling flow of water to your heat pump’s water-to-air heat exchanger.

The B & L Ram delivers a readily usable flow of un-pressurized water at the discharge point.

If you want to use the pump to furnish water for all of your needs at a cabin or homestead, you may want to incorporate a reservoir at a slightly higher elevation than your showers, sinks or sanitary facilities, etc.



An illustration is included to show how the ram can be used with a reservoir to provide gravity-supplied pressure for your water system.

You don't need to be a plumber to install a ram pump. Setup of the system is simple and easy. Hard PVC (schedule 40) pipe is used for the drive pipe (intake) and is easily assembled using PVC cement and slip on couplings. Standard PVC, flexible plastic or vinyl pipe, or even a standard garden hose, can be connected to the discharge side of the pump.

**The B & L Ram is almost maintenance-free, and its lightweight makes it easily handled even in difficult terrain. Whether you want a pump with full portability or one for a fixed installation, there are models designed to fit your water needs.**

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# OPERATING REQUIREMENTS

Operating requirements of the **B & L Ram** are few and simple, but essential and must be known: i.e. A. Amount of water needed per day. B. Amount of flow from the source. C. Vertical fall from source to the ram pump. D. Lift or vertical height to discharge. E. Distance from source to ram. F. Distance water has to be delivered.

**HOW MUCH WATER DO YOU NEED?** The following table list estimated amounts of water needed per day for a variety of home and farm uses. Figures represent requirements for **MAXIMUM** consumption during hot summer weather.

## AROUND THE HOME AND FARM

Each person per day - all purposes.	50 gal
Each horse, dry cow or beef animal	12 gal
Each milking cow	35 gal.
Each hog per day	4 gal
Each sheep per day	2 gal
Each 100 chickens per day	4 gal

## AVERAGE AMOUNT REQUIRED BY VARIOUS HOME AND YARD FIXTURES

Each shower bath	Up to 60 gal
To fill bathtub	30 gal
To flush toilet	6 gal
To fill lavatory	2 gal
To sprinkle ¼" water on 1000 sq. feet of lawn	160 gal
Dish Washing Machine - per load	3 gal
Clothes Washing Machine - per load	Up to 50 gal

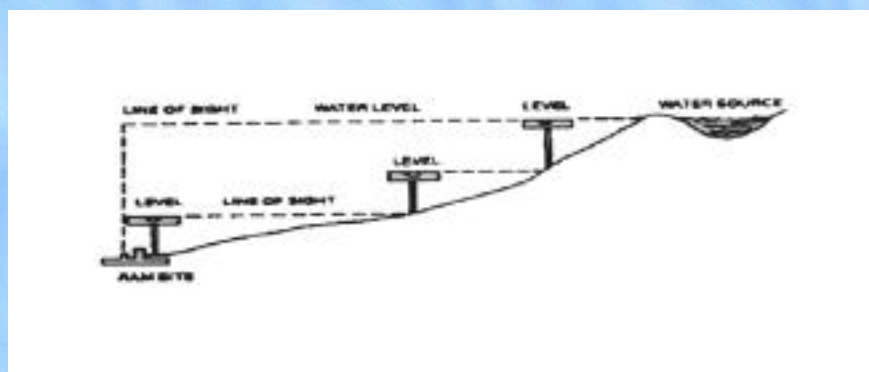
## DETERMINING AMOUNT OF FLOW



The amount of flow your source offers can be measured fairly accurately by allowing water to run into a bucket of known volume (a one gallon bucket) while timing the rate of fill accurately to the nearest second. It may be necessary to build a small dam in the creek or spring to make it easier to catch water to fill the bucket. Keep in mind; the rate of flow from the source may less during drier times of the year. A 1" ram needs a flow of 3 gallons per minute, while a 2" ram may require 3 to 5 gallons per minute.

### DETERMINING VERTICAL FALL

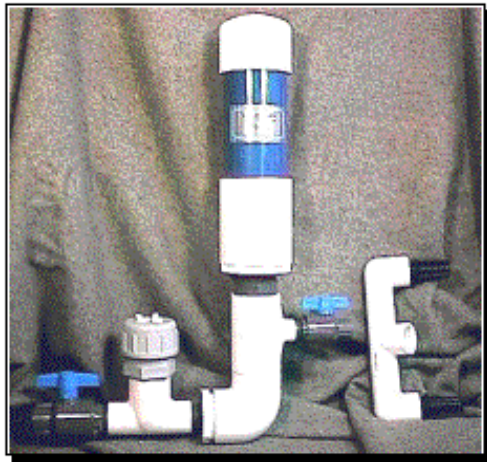
Having an adequate fall for the water from the source to the ram site is a very critical requirement. One of the easiest methods for calculating fall is to use a carpenter's level fastened securely to the top of a board cut to a specified length...5 feet makes it easy to read. (See diagram below)



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# THE STANDARD WORK-HOSSES



Our Standard 1" Ram requires 3-gpm water flows. The 1.5" and 2" models require the same minimum amount of water flow, but will pump more volume than the smaller version. **Shipping is not included in prices below, but will be added to your order when you "check out"**. Contact us for International shipping charges. NOTE..Strainer is "extra"....

Pump Size	Order Number	
1" Ram	BLS100	Price \$160.00 Quantity
1-1/2" Ram	BLS150	Price \$195.00 Quantity
2" Ram	BLS200	Price \$225.00 Quantity

## THE BIG HOSS





If you need to move a large volume of water for pond filling or irrigation, the B & L MAGNUM 3" ram will do the job for you! It will, depending on your setup and circumstances deliver from 2,000 to 10,000 gallons per day. Discharge is 2". There are NO cutoff valves or intake strainer with pump.

ORDER NO. BLS300

Price \$475.00


Quantity

## EXTRAS & ASSESSORIES


**INTAKE STRAINERS - to keep debris out of pump system---**Shipping will be added to your order when you "check out".

	1" Strainer	ITS010	Price \$20.00 Quantity
	1.5" Strainer	ITS015	Price \$25.00 Quantity
	2" Strainer	ITS020	Price \$30.00 Quantity


**BALL VALVES** - Use as replacements or in other applications

	1/2"	BV005	\$ 5.50
	1"	BV010	\$8.75
	1.5"	BV015	\$17.50
	2"	BV020	\$22.00

**TANK ADAPTERS** - Install in troughs or barrels for easy filling, etc. Slip on one side, threaded on other.

	1/2"	TA005	\$15.00
	1"	TA010	\$18.00
	1.5"	TA015	\$23.00
	2"	TA020	\$27.50

**UNIONS (THREADED)** - Install at both ends of your pump for easy placement or removal from the system.

	1/2"	UN005	\$3.25
	1"	UN010	\$6.50
	1.5"	UN015	\$11.00
	2"	UN020	\$14.25

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# THE B & L RAM PUMP

Even though the hydraulics of any ram pump is complicated, the operation of the [B & L Ram](#) is simple to follow...the water from the source, a stream, pond, artesian well or spring, is directed into a drive (intake) pipe until a necessary minimum volume is achieved.

Water flows down the drive pipe until it reaches a specially designed poppet valve. At this point water escapes through the waste valve opening until it builds up enough velocity to close the poppet.

Since the flowing water in the drive pipe can no longer escape through the waste valve (poppet) opening, it is forced to open an internal in-line check valve.

Water continues past the check valve and starts compressing the trapped air inside the bladder in the air tank. Water continues to push against the air bladder in the tank until the compressed air cushion acts like a piston, pushing the water back down and out of the air tank.

This action, in turn, closes the one-way check valve causing water to be forced out of the ram and up the discharge pipe to its destination.

Meanwhile, the closing of the check valve has created a slight vacuum or suction, which permits the waste valve poppet to drop open again.

This allows water from the drive pipe to escape through the waste valve opening, initiating a new cycle, and if properly set up, will continue to do so about 60 to 80 times per minute.

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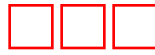
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