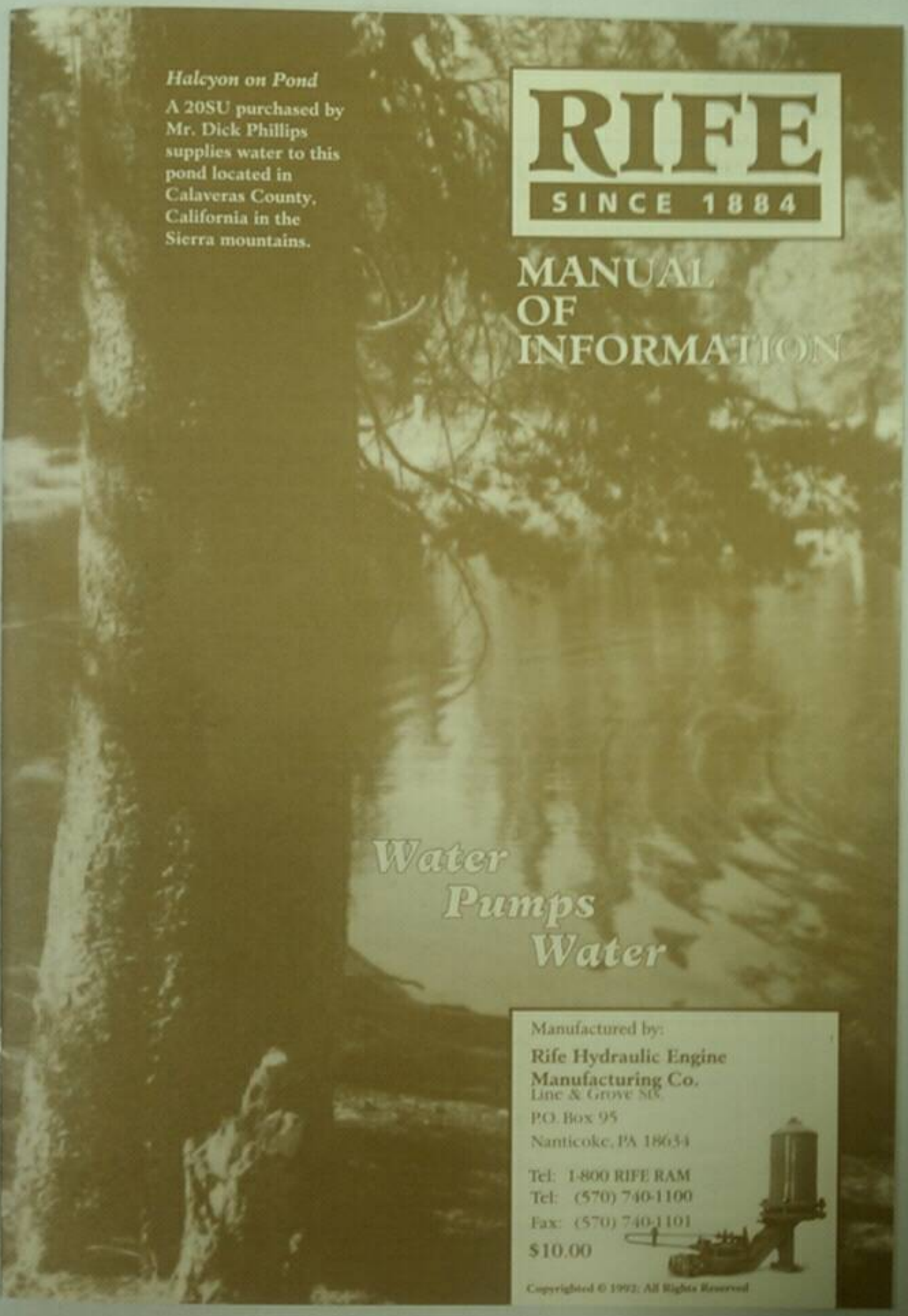


Halcyon on Pond

A 20SU purchased by Mr. Dick Phillips supplies water to this pond located in Calaveras County, California in the Sierra mountains.

RIFE

SINCE 1884

MANUAL OF INFORMATION

Water Pumps Water

Manufactured by:

Rife Hydraulic Engine Manufacturing Co.

Line & Grove Sts.

P.O. Box 95

Nanticoke, PA 18634

Tel: 1-800 RIFE RAM

Tel: (570) 740-1100

Fax: (570) 740-1101

$10.00

Rams are devices for pumping water solely by means of water-power. The flow and fall of the water powers the Rife Ram, driving a portion of this water uphill. This provides a continuous supply of water day after day, year after year, without interruption in service. Given a steady supply of water, a Ram is the closest thing to a perpetual motion machine. Since the device does not require electricity, there are no operating costs, making the Rife Ram system a highly cost efficient one. In addition, Rife Rams are self-starting and require no lubrication or priming.

A BRIEF HISTORY OF RAMS

John Whiteburst (1713-1788), of Derby, England, was the first to wittingly grasp the principle involved in the design and erection of a Ram. In 1775 he installed a "hydraulic machine" for the "service of a Brewhouse and other offices"...."at Oulton in Cheshire, the seat of Philip Eagerton, Esq." The water had a fall of 16 feet through a 1½ inch pipe, 600 feet long; water was raised somewhat about the same level as the source.

However, the biggest drawback with this machine was that the Impulse Valve was hand-operated. This machine was never improved upon by Whiteburst and was thus forgotten.

In 1797, some twenty two years later, in France, an inventor by the name of Joseph de Montgolfier, better known for his invention of the gas balloon, constructed the first self-acting or automatic Ram. Based on this and his patents in France and England he is considered the father of the hydraulic water Ram.

Rams were primarily introduced in America in the 1840's. They were quickly adapted by farmers and even country gentlemen, and owners of large estates. They continued to be used into the early 20th century.

Amongst these installations of the early 20th century was one that was sold to a Pierre Samuel du Pont for use in his Chester county, Pennsylvania farm called Pierce Park. This would later be converted into the now famous Longwood Gardens. The Ram was a Rife Model 40.

The last several years have seen a renewed interest in this proven old technology. With greater emphasis on conservation, more regard for the environment, people are once again looking towards Rams as an alternative way of moving water. Government agencies such as the Soil Conservation Service are helping in bringing awareness for Rams by demonstrating and recommending Ram usage for some of their programs.

A BRIEF HISTORY OF RIFE

1885 – Rife Hydraulic Engine Manufacturing Company is incorporated with a Sales Office in New York and a Foundry in Waynesboro, Virginia. The Company introduces the "Regular" Model in sizes 10 through 40, a "Series A", and a "Series C" (in sizes 60 and 80).

1915 – The Waynesboro Foundry, using the name Rife Ram and Pump Works, introduces "Series B" Rams. New York continues to sell the "Standard" Model, a Ram similar to "Series A".

1945 – New York discontinues size 80 Rams as too large for efficient manufacturing. A new manufacturing facility is established in Andover, New Jersey.

1950 – Waynesboro drops "Series C" from its lineup.

1953 – New York adds "Series B" to its line and integrates the best features of "Series A" in its "Standard" Model.

1961 – Offices are moved from New York to Millburn, New Jersey.

1969 – The Davey line is added to Rife.

1974 – The simplified model lines, BU, SU, and HDU are introduced.

1984 – Company relocates to Norristown, Pennsylvania.

1989 – Sales offices are moved to Montgomeryville, Pennsylvania and manufacturing to Wilkes-Barre, Pennsylvania.

1993 – Moved complete operation to Wilkes-Barre, Pennsylvania.

1998 – Expanded into new facility in Nanticoke, Pennsylvania.

RIFE

HOW A RIFE RAM WORKS

Briefly, here's how a Rife Ram operates: Water flows down the Drive Pipe to the Ram, developing power in accordance to its weight and velocity. The water then flows through the Outside Valve until it reaches a certain velocity. The Valve then closes shut and water continues through the Inside Rubber Valve. When the pressure in the Air Chamber equalizes and overcomes the driving force behind it, the water in the Drive Pipe rebounds, or backs up. When the rebound takes place a small amount of air is in sucked through the Air Feed Valve and lodged in the upper portion of the Base. It is then forced into the Air Chamber when the next blow takes place; this prevents the Air Chamber from filling up with the water.

This operation is repeated from 25 to 100 times per minute working on a Hydraulic principle, building up pressure in the Air Chamber, which in turn forces water through the Delivery Pipe up to where it is desired.

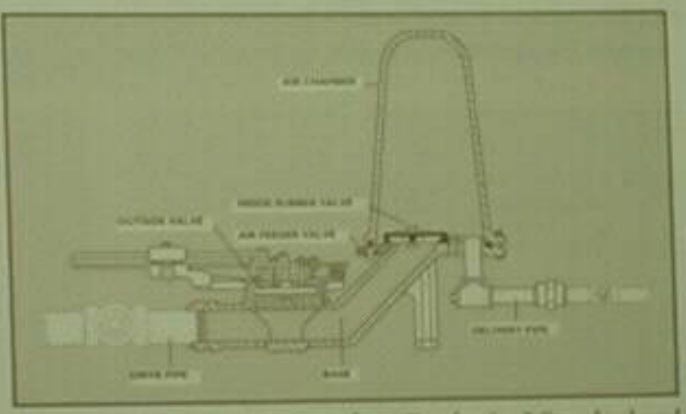


Figure 1 Section Drawing of an "Everlasting" Standard and "Universal" Heavy Duty Rife Ram.

INFORMATION REQUIRED

For each installation, the following information is necessary:

- The Flow of water at the source of Supply (in gallons per minute).
- The vertical Fall (in feet) from the source of Supply to the planned location of the Ram.
- The vertical Elevation above the Ram to which the water is to be pumped.
- The distance between the point of Supply and the Ram location, as well the pipe line distance over which the water is to be delivered.
- The number of gallons required per day.

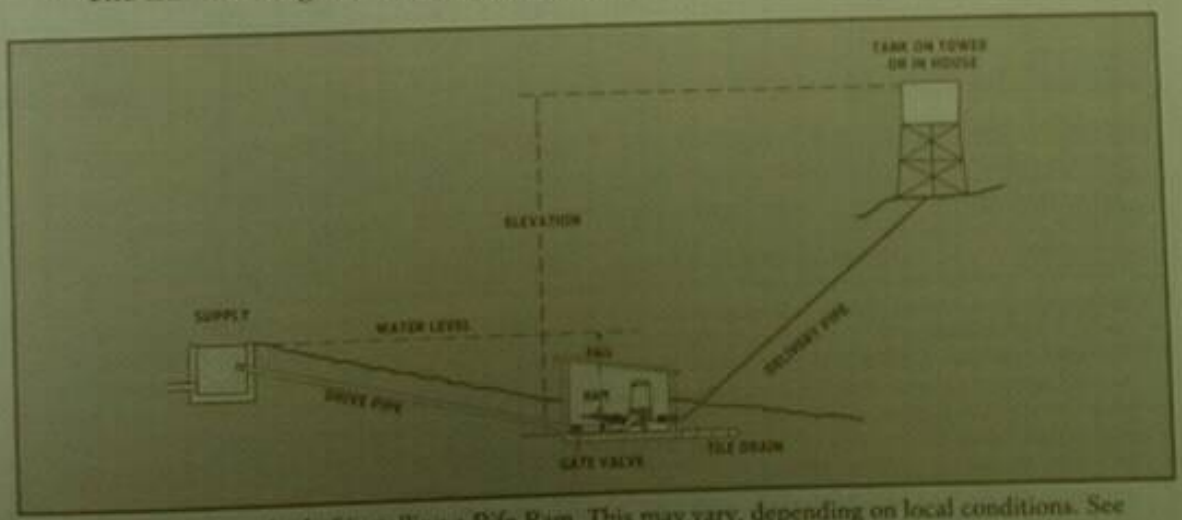


Figure 2 Usual method of installing a Rife Ram. This may vary, depending on local conditions. See following paragraphs.

Flow Of Supply Water Available In Gallons Per Minute

Time the Flow from the Supply in gallons per minute as accurately as possible. Do not guess this—be sure to measure it. If the supply is low, run the water into a bucket or tub of known capacity. This measurement should be taken during the driest season of the year. See Figure 3.

If the water flow is large and it is not practical to measure Flow with a bucket or tub, use a "Weir" (notch in a board).

Measure the width of the notch W and the height of the water in the notch H. The height should be measured on a level 2 feet upstream from the notch as in Figure 4.

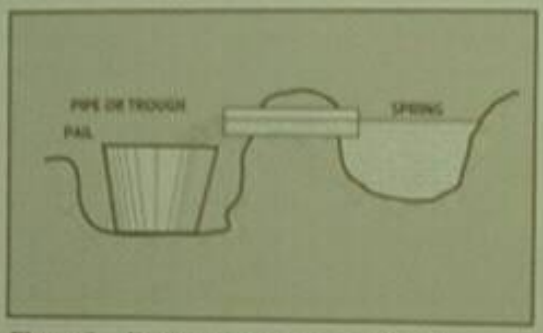


Figure 3 Determining Flow of Supply by running water into a bucket of known capacity.

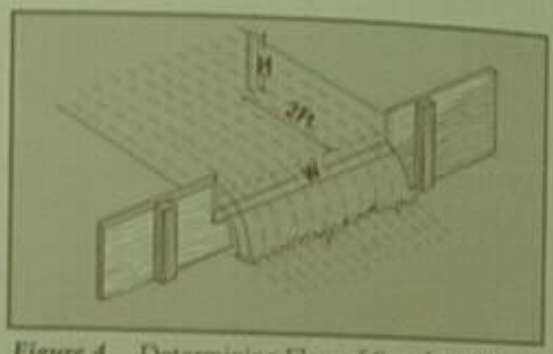


Figure 4 Determining Flow of Supply using a "Weir". This is usually done when Flow is large.

WEIR TABLE FOR DETERMINING THE FLOW OF A STREAM

INCHES	O	1/8	1/4	3/8	1/2	5/8	3/4	7/8
0	0.00	0.01	0.05	0.09	0.14	0.19	0.26	0.32
1	0.40	0.47	0.55	0.64	0.73	0.82	0.92	1.02
2	1.13	1.23	1.35	1.46	1.58	1.70	1.82	1.95
3	2.07	2.21	2.34	2.48	2.61	2.76	2.90	3.05
4	3.20	3.35	3.50	3.66	3.81	3.97	4.14	4.30
5	4.47	4.64	4.81	4.98	5.15	5.33	5.51	5.69
6	5.87	6.06	6.25	6.44	6.62	6.82	7.01	7.21
7	7.40	7.60	7.80	8.01	8.21	8.42	8.63	8.83
8	9.05	9.26	9.47	9.69	9.91	10.13	10.35	10.57
9	10.80	11.03	11.25	11.48	11.71	11.94	12.17	12.41
10	12.64	12.88	13.12	13.36	13.60	13.85	14.09	14.34

This table gives the number of cubic feet of water that will pass over a weir 1 inch wide and from ⅛ to 10⅞ inches in depth. The figures in the first upright column represent whole inches and those in the top horizontal line represent fractional parts of an inch of depth over the weir. The figures in the second upright column indicate the number of cubic feet of water that will flow per minute over the weir for whole inches in depth, and in succeeding columns, whole inches and fractions under which they occur. Then the number of cubic feet thus found, multiplied by the width of the weir in inches, will give the capacity of the stream.

Example: To find the required number of cubic feet of water that will flow over a weir 4⅛ inches in depth and 30 inches in width; follow down the left-hand column of figures in the table to 4, then across until directly under the ⅛ in the top line, to 4.14; this, multiplied by 30 (width of the notch in the weir) will give 124, the number of cubic feet of water that passes over the weir per minute. To reduce to gallons per minute multiply by 7½ to get 930 gallons per minute.

Determining The Vertical Fall

The difference in vertical elevation between the level of the water at the source and the planned location of the Ram is known as the Fall. This can be easily and quickly measured by using an ordinary carpenter's level on a stick. Start at the planned location of the Ram and go upwards, as shown in the following illustration.

Bear in mind that, all other conditions being the same, the more Fall available, the more water the Ram will pump. For example, the Ram will pump twice as much water with a Fall of 8 feet as it would with a Fall of 4 feet. Therefore, it is advisable to take advantage of as much Fall as possible. In most cases, merely locating the Ram further downstream will provide more Fall.

Vertical Elevation

The vertical Elevation is the height to which the water will be pumped above the Ram location. It too can be easily determined by using an ordinary carpenter's level on a stick as illustrated in Figure 5. Start measurements at the planned location of the Ram and work upward to the highest point at which water will be delivered.

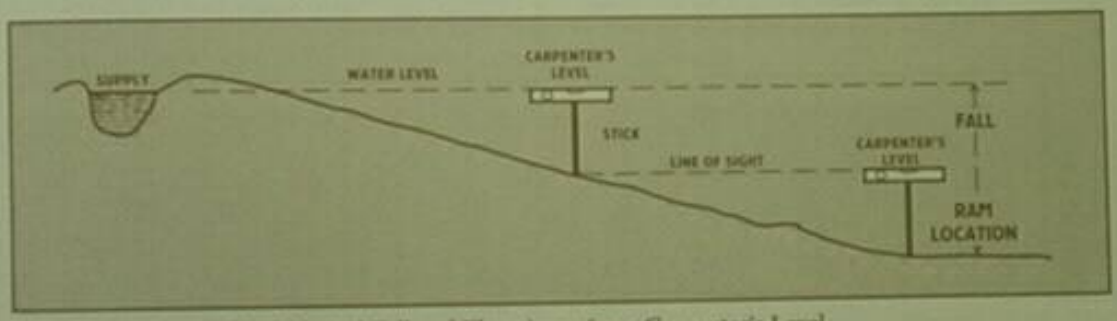


Figure 5 Determining Vertical Fall and Elevation using a Carpenter's Level.

Distance Water Is To Be Delivered

This is the pipe line distance from the planned location of the Ram to the farthest point water will be delivered.

Calculating The Number Of Gallons Of Water Required Per Day

AVERAGE DAILY WATER REQUIREMENTS IN A HOME AND FARM

Each person	50 gallons
Each Horse, dry cow or beef animal	12 gallons
Each milking cow	35 gallons
Each hog	4 gallons
Each sheep	2 gallons
100 chicken	4 gallons

AVERAGE AMOUNT OF WATER REQUIRED BY SOME COMMON HOME FIXTURES

Shower Bath	Up to 60 gallons
A filled Bathtub	30 gallons
Each Flush Toilet	6 gallons
Each load of a Dish Washing Machine	3 gallons
Each load of an Automatic Washer	Up to 50 gallons

SOME MORE WATER FACTS

There are 325,828 gallons of water in a one acre pond one foot deep
Every day you will lose a fraction on an inch of water due to evaporation. Check with your local Soil Conservation Service for rates pertaining to you.

DELIVER WATER TO AN ELEVATION OF 500 FEET

Calculating The Number Of Gallons Of Water A Rife Ram Will Pump

Once you know the Flow, Fall, Vertical Elevation, and distances to and from the Ram, you are ready to calculate the amount of water the Ram will deliver for you. Multiply the available Flow in gallons per minute (V) by the vertical Fall in feet (F). Divide that by the vertical Elevation (E). Multiply the result by $^{6}/_{10}$ (60%), the normal efficiency of a Rife Ram installation:

$$V \times F/E \times {}^{6}/_{10} = D$$

This will give you the delivery (D) in gallons per minute using all available water supply. To obtain gallons per hour, multiply this amount by 60. For gallons per day, multiply by 1440.

PERFORMANCE CHART FOR RIFE HYDRAULIC RAMS

SHOWING PERCENTAGE OF WATER USED THAT A RIFE RAM WILL DELIVER UNDER VARIOUS CONDITIONS OF VERTICAL FALL AND ELEVATION

Vertical Fall in Feet	Vertical Elevation in Feet with Delivery Pipe Friction Factored in												
	8	16	25	50	75	100	125	150	200	250	300	400	500
4	22.5%	12.5%	8.0%	3.6%	1.6%								
8		22.5%	16.0%	9.6%	6.4%	4.8%	3.5%	2.7%	2.0%				
12			21.3%	13.2%	9.6%	7.2%	5.7%	4.8%	3.3%	2.4%	2.0%		
16				16.0%	11.7%	9.6%	7.7%	6.4%	4.8%	3.8%	2.9%	2.0%	
20				18.0%	14.7%	12.0%	9.6%	8.0%	6.0%	4.8%	4.0%	2.5%	2.0%
25				22.5%	16.7%	13.8%	12.0%	10.0%	7.5%	6.0%	5.0%	3.8%	2.5%
30					18.0%	15.0%	13.2%	12.0%	9.0%	7.2%	6.0%	4.5%	3.3%
35					21.0%	17.5%	15.2%	14.0%	10.5%	8.4%	7.0%	5.3%	4.2%
40						18.0%	16.0%	14.7%	12.0%	9.6%	8.0%	6.0%	4.8%
50						22.5%	18.0%	16.7%	13.8%	12.0%	10.0%	7.5%	6.0%

NOTE: The amount of water used and pumped by RIFE Hydraulic Rams increases with increase in the Vertical Fall from the source of Supply to the Ram, and with increased lift of the Lever Rest during the stroke. This lift determines the opening of the Outside Valve and is adjustable. The range of intake capacity of each model and size of Rife Rams is listed in the Table entitled "Specifications of RIFE Rams" on the back cover page.

EXAMPLE: A Rife Ram, using a vertical Fall of 12 feet, pumping to an Elevation of 125 feet, will deliver 5.7% of the water used. For a Model 30BU Rife Ram, using 40 gallons per minute, this would be about 2 1/4 gallons per minute. One gallon per minute = 60 gallons per hour, or 1440 gallons per day.

RIFE

PREPARING TO INSTALL THE RIFE RAM

Drive Pipe

The Drive Pipe should be metal, (usually galvanized steel), unless encased in concrete. In some cases people have successfully used well-anchored PVC plastic pipes. However, for trouble-free operation we recommend that the Drive Pipe be galvanized steel. It should be straight as possible without elbows, and normally the same pipe size as Intake end of the Ram. It should be watertight and rigidly anchored, with a Strainer at the source end to keep out refuse from the Ram. See Figure 6.

The Drive Pipe itself must be of the correct length. Use the following guidelines:

Vertical Fall	Length of Drive Pipe
3 - 15 feet	6 times length of Vertical Fall
16 - 25 feet	4 times length of Vertical Fall
26 - 50 feet	3 times length of Vertical Fall

Whenever special conditions exist, please ask us for the correct length and diameter of Drive Pipe to assure maximum delivery.

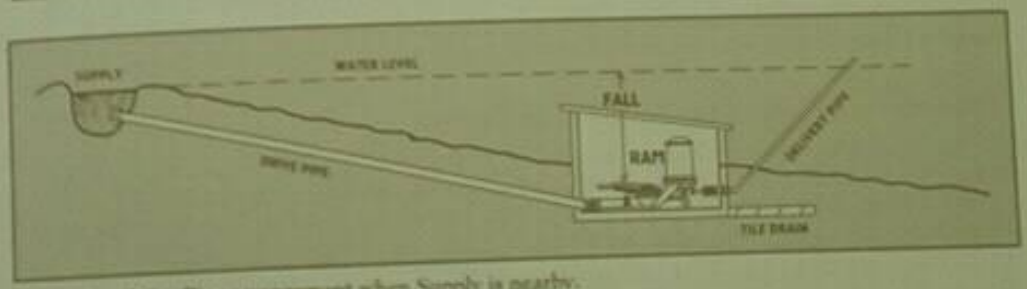


Figure 6 Drive Pipe arrangement when Supply is nearby.

If you have to go downstream some distance to obtain more Fall, it will be necessary to use a Stand Pipe and Supply Pipe. When practical, both the Supply Pipe and the Drive Pipe will need to run straight through from the source of Supply to where the Ram will be located on a straight incline. This can be done by using an open Steel Stand Pipe as illustrated in Figure 7.

The Supply Pipe must always be **one size larger** than the Drive Pipe. Where the two pipes come together, use a "T" pipe fitting into which will fit the Open steel Stand Pipe. The Stand Pipe must be **two sizes larger** than the Supply Pipe. The top of the Stand Pipe should be **a few inches above** the level of the water at source of Supply.

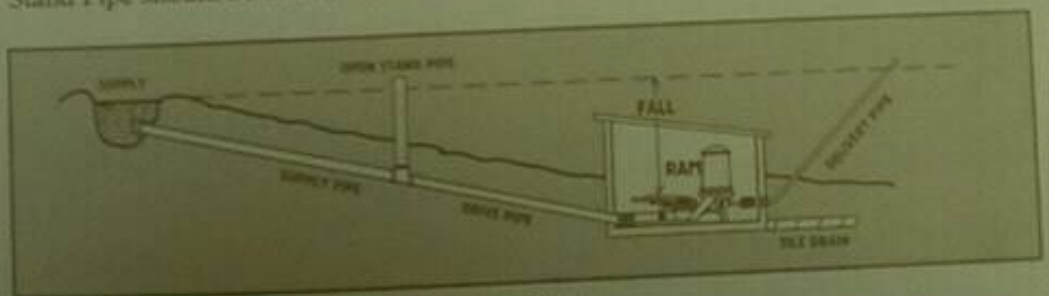


Figure 7 Drive Pipe arrangement when Supply is distant.

In cases where the Supply Pipe and Drive Pipe cannot be carried through on a straight incline, or where the Supply Pipe and Drive Pipe come together at different angles, it is necessary to install a Concrete Pit. The top of the Pit must be **several inches above** the level of the water at the source of Supply. Water can be conveyed as much as one mile through a Supply Pipe, if necessary, to get the Fall required to pump the amount of water needed.

The upper end of the Drive Pipe should be installed so that it is **at least 1 foot under** water at all times in order to avoid whirlpools forming and sucking air into the Drive Pipe.

Where economy is a matter of consideration or where it is impractical to use a Concrete Pit, a joint of large Terra Cotta Tile or a Plastic Tank can be installed as a substitute.

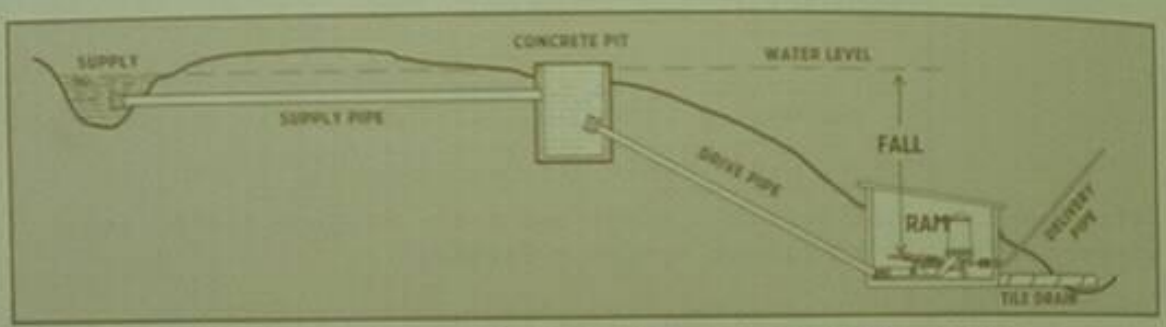


Figure 8 Drive Pipe arrangement in cases where solid rock is encountered close to Spring.

Rife Ram – Artesian Well Installation

An Artesian (flowing) Well provides an ideal source of Supply for operating a Rife Ram. Because the constantly flowing sand in the water from Artesian Wells rapidly wears Bronze or other metal valves, special composition Rubber Valves are used in Rife Rams, eliminating damage from this source.

There are various methods of connecting a Ram to an Artesian Well, as illustrated in Figure 9 below.

In this case the Drive Pipe is connected directly to the Well-Casing slightly below ground level. The Drive Pipe should be at a slight incline to the Ram, ground conditions permitting. This method is ideal for small domestic installations.

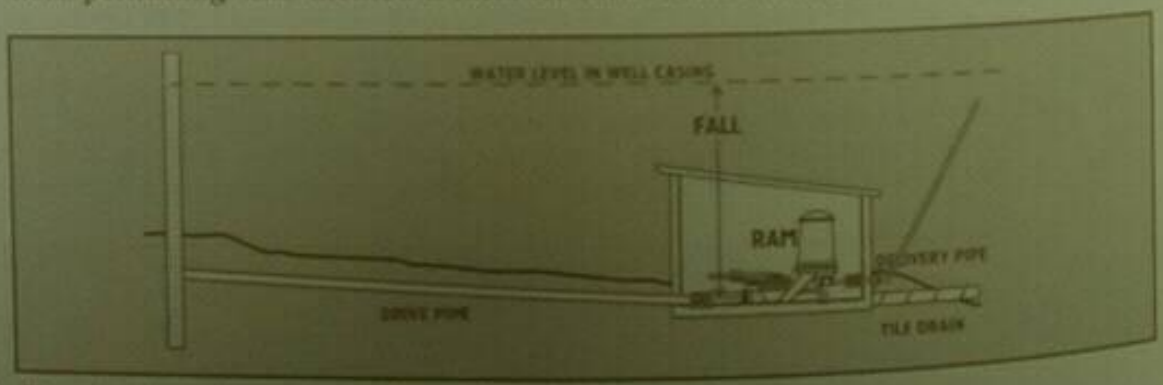


Figure 9 A simple Artesian Well installation for Rife Rams.

If it is necessary to install a smaller Well-Casing inside a larger one, and therefore impractical to connect the Drive Pipe directly to the Well-Casing below the level of the ground, the installation illustrated in Figure 10 below is ideal and inexpensive.

A "T" Pipe-fitting is installed on top of the Well-Casing with a Gate or Cut-Off Valve controlling the flow of water into the Steel Standpipe, the latter being high enough to prevent overflowing. This type of installation is particularly well adapted to Medium-sized jobs.

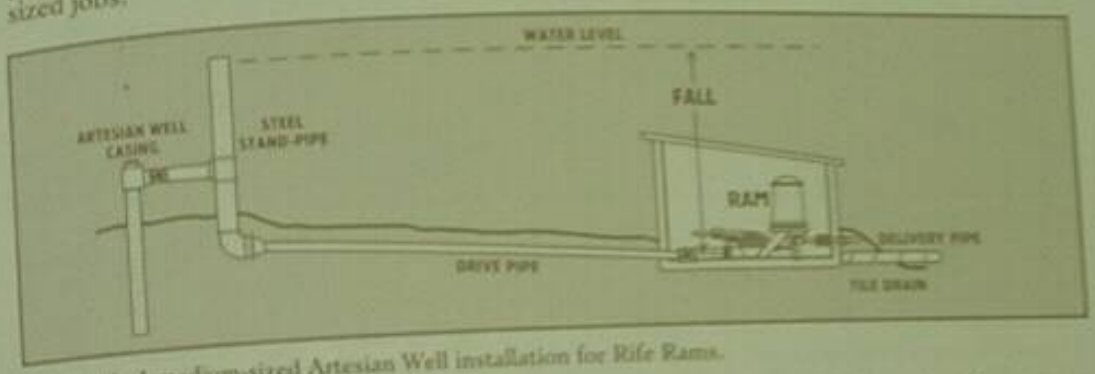


Figure 10 A medium-sized Artesian Well installation for Rife Rams.

For Irrigation, Municipal Water Supplies, and other large installations, the illustration in Figure 11 shows a very effective method of installing the Rife Ram to be operated from Artesian Wells. It is particularly well adapted where two or more Rams are installed in a battery. A Gate or Cut-Off Valve controls the flow of water from the Well-Casing into the Concrete Pit (the Pit being high enough to prevent over-flowing). Note the Drain at the bottom of Concrete Pit for removal of sand accumulations.

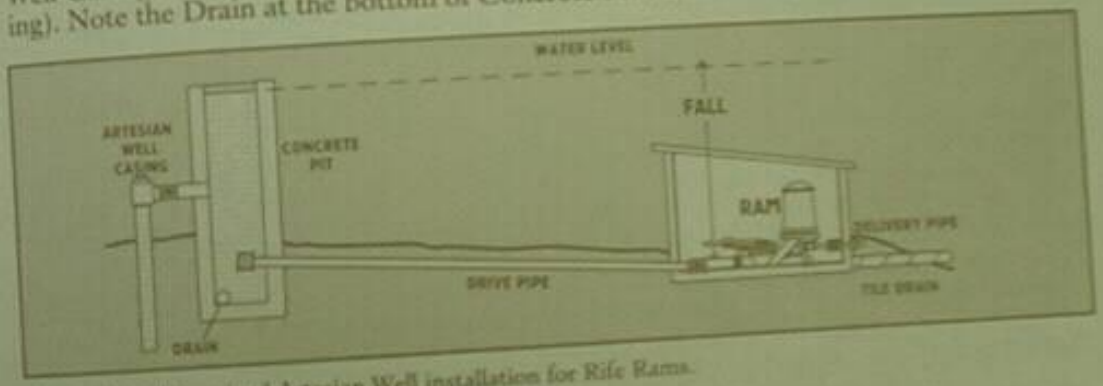


Figure 11 A large-sized Artesian Well installation for Rife Rams.

Choice Of Model And Size Of Ram

Consult the "Specifications of Rife Rams" on the Back Cover page. First select the model designed to handle your vertical Fall and Elevation. Then select the smallest size of model which will handle the available Flow in gallons per minute. You can confirm your calculation from the chart on Page 6, which gives the percentage of the water used (V) that a Rife Ram will deliver under various conditions of vertical Fall and vertical Elevation.

Double Acting Ram

Rife's Double Acting Rams can be used where there is not enough pure Spring Water available to operate a Ram, but where there is a nearby Creek with sufficient water and Fall to operate the Ram. In this instance the Creek Water is used to furnish the power to operate the Ram and pump the pure Spring Water. Up to two-thirds of the uncontaminated pure Spring Water can be pumped. The other one-third mixes with the Creek Water and is drained off through the Outside Valve. See Figure 12.

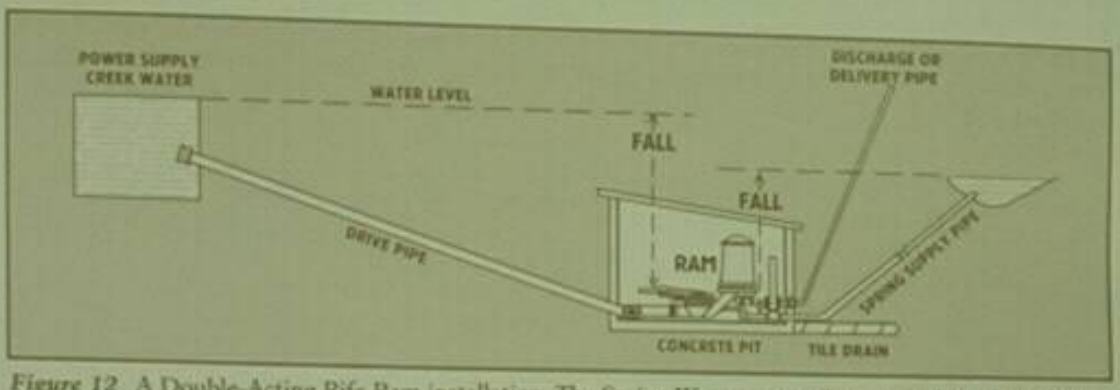


Figure 12 A Double-Acting Rife Ram installation. The Spring Water connection can be brought into the Ram from any direction. The Delivery Pipe can, likewise, be led away from the Ram at any desired angle.

A **minimum Fall of 18 inches** is required from the Spring to the Ram location. The Creek Water provides the source of power through the Drive Pipe and operates the Ram. At the end of each stroke the rebound creates a vacuum beneath the Inside Valve which draws Pure Spring Water through the Spring Supply Pipe and fills up the area in the Base between the Outside Valve and Inside Valve. This action is assisted by a reservoir of water in an Open Stand Pipe. A small part of the Spring Water comes in contact with Creek Water and is drained through the Outside Valve. The remaining uncontaminated Pure Spring Water is rammed into the Air Chamber through the Inside Rubber Valve and delivered by the Discharge Pipe to the desired location.

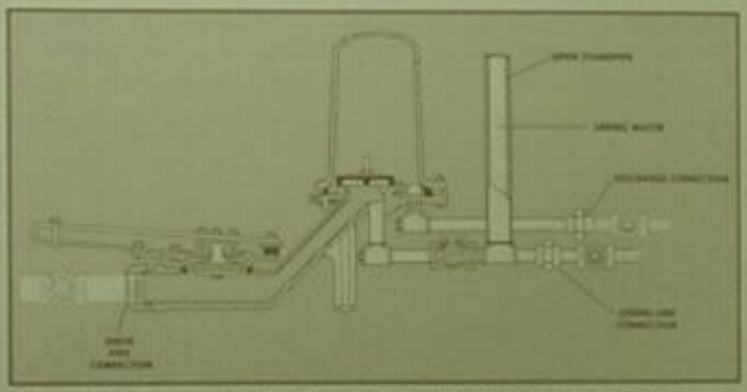


Figure 13 Section drawing illustrating a Double-Acting Rife Ram.

Spring Supply Pipe

The size of the Spring Supply Pipe for each Double Acting Ram should be the same size as the Delivery Pipe. In cases where the Fall from the Spring to the Ram exceeds 2 feet, it is necessary to install a Gate Valve in the Spring Supply Pipe to regulate the flow of the Spring Water and to avoid overflowing the Steel Standpipe of the Double Acting Connection. See Figure 14.

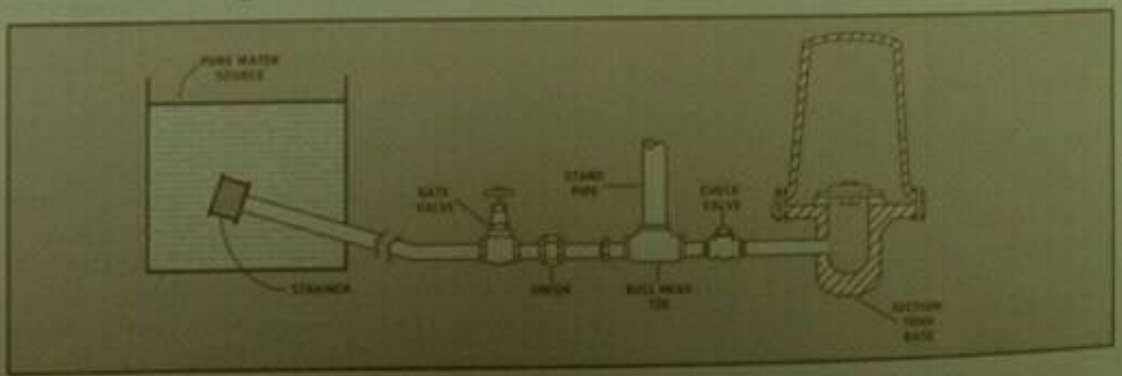


Figure 14 Details of a Double-Acting Rife Ram installation.

Pneumatic Pressure Tank Water System

A Pneumatic Pressure Tank Water System consists of an air-tight steel tank into which water is pumped by the Ram. This tank can be located in the cellar of a house, in the Ram Pit, or any other convenient place. Its location depends upon whether you want to use any extra water pumped by the Ram.

If the overflow or unused water is to be used in a Watering Trough, Dairy, Rock Garden, etc., the Pneumatic Pressure Tank should be installed in the basement or some other location near a house. If no use is to be made of the overflow or unused water, the Pneumatic Tank can be installed in the Ram Pit. See Figure 15.

A Relief Valve is installed in the Delivery Pipe. When a set pressure in the Tank is exceeded, the water bypasses through the Relief Valve. The location of the Relief Valve should be such that this unused water flows in a downward direction from the Relief Valve to where it is desired. A setting of 20 lbs. on the Relief Valve will force water approximately 45 feet above the Tank. A setting of 30 lbs. will force the water approximately 75 feet above the Tank. The water level in the Pressure Tank can be changed by the amount of air fed through the Ram's Air Feed Valve.

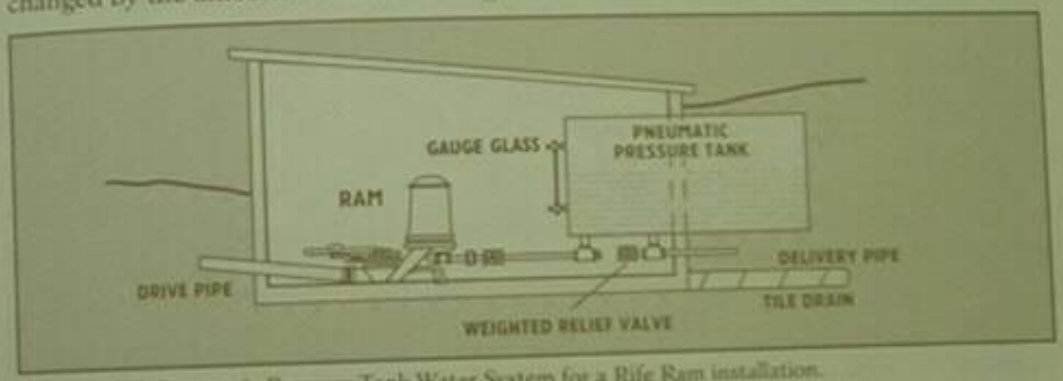


Figure 15 A Pneumatic Pressure Tank Water System for a Rife Ram installation.

Storage Of Water

To have a large supply of water available at all times for ready use it is often advisable to pump the water into a Storage Tank of some kind.

The storage can either be an outside overhead tank, a concrete pit in the side of a hill, a steel or wooden tank in the attic, or a pneumatic pressure tank in the basement. In cases where the amount of water being pumped exceeds one gallon per minute, a Storage Tank is unnecessary, except for fire protection.

Installation Of Two Or More Rams

In case two or more Rams are installed alongside of each other, it is necessary for each Ram to have its own individual Drive Pipe, but all of them can pump into one common Delivery Pipe of a size sufficient to carry the water pumped by all the Rams. See Figure 16.

On Irrigation, Municipal Water Supplies and other large projects, a battery of two or more Rife Rams offers unlimited possibilities for an efficient and economical water system. It is often desirable to install two medium sized Rams to pump the same amount of water that could be pumped by one larger sized Ram. For instance, a Golf Course requires much more water during Summer than in the Winter. With a Battery installation the number of Rams kept in operation can be governed by the amount of water required.

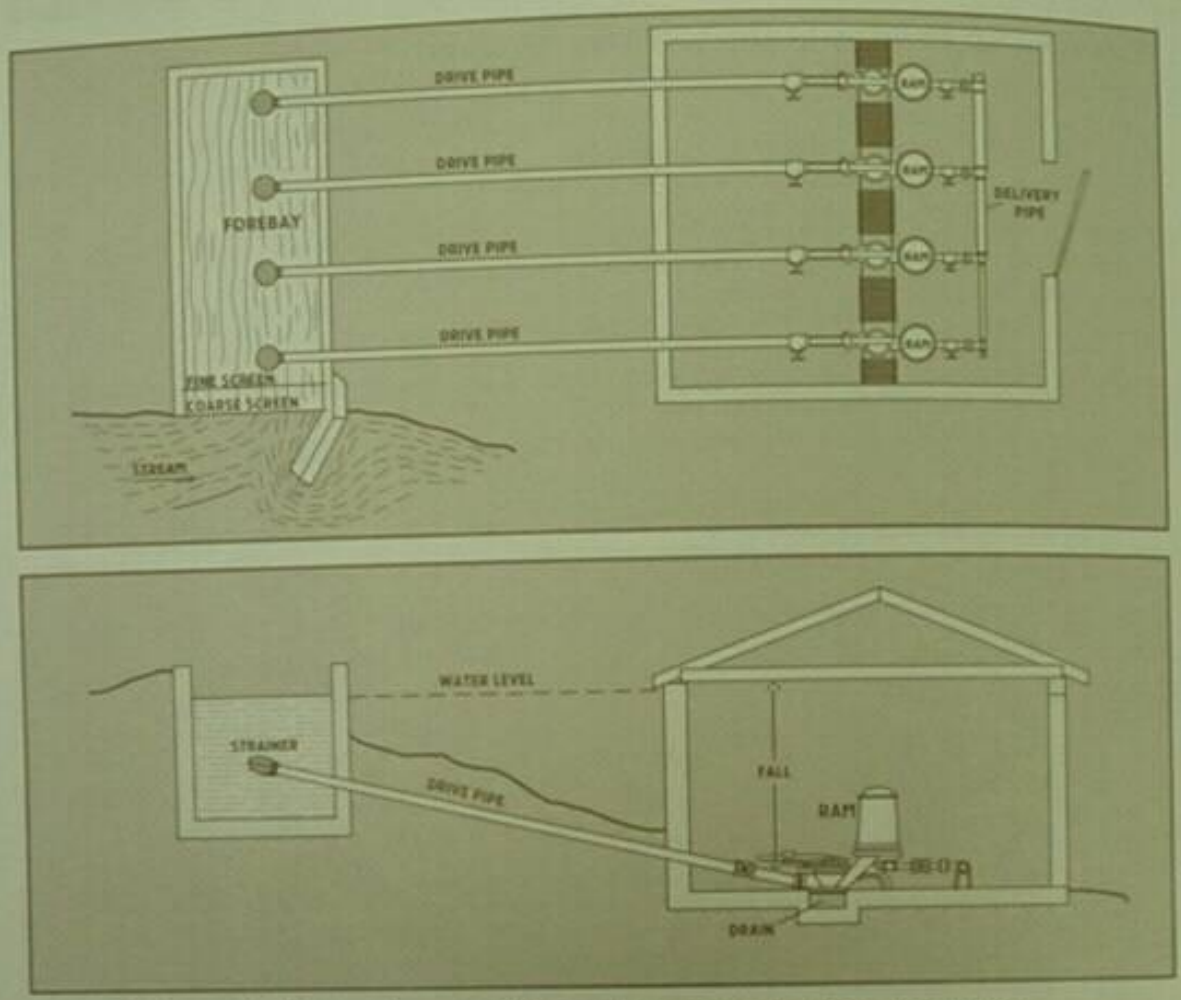


Figure 16 A top and side view of a proper Rife Ram Battery installation. Note the common Delivery Pipe connected to all Rams in the battery.

An outstanding example of a battery installation is that of Mr Bill Waddoups of Corneville, Arizona. Mr. Waddoups has two Model 80 and two Model 60 HDUs installed in a battery providing him approximately 425 gallons per minute of water for a sprinkler system irrigating a 60 acre farm growing pasture crops. The topographical layout of the system as suggested by the Soil Conservation Service in Flagstaff, Arizona while the system was designed by Rife in conjunction with the sprinkler manufacturer. The system has been in operation since 1977.

INSTALLATION

The Best Location For The Ram

Always locate the Ram as near the source of Supply and the delivery point as is possible while maintaining the lowest elevation. This location will insure the minimum expense for pipe. A deeper Ram Pit and a line for unused water will also add to the savings.

Foundation And Ram Pit

A concrete slab or a large flat rock provides a good solid foundation on which to set the Ram. The best procedure is to put in a concrete slab as a foundation, slightly slop-

ing towards the rear where the unused water will be carried away. After the Drive Pipe and Delivery Pipe are installed and the Ram is in operation, the Ram should be enclosed in a Concrete Pit. The Ram Pit should be large enough to give a clearance of 18" from the Ram on all sides in case any bolts need to be removed. The pit should be high enough to prevent flood water from getting in. A sloping shed roof of boards provides good cover, yet, in colder climates it is better to cover the Pit with a concrete slab to prevent freezing. Use a manhole or a metal cistern cover for an opening to the Ram Pit.

Delivery Pipe

The correct size Delivery Pipe should match the dimensions given for each particular size of Ram. Do not install a Delivery Pipe smaller than that specified. In doing so you increase the amount of friction loss, consequently reducing the amount of water delivered. Avoid right-angled elbows wherever possible. This will minimize friction loss. Always use a good grade of red and white lead on the joints, making sure that they are tightly screwed. Do not fill the ditch until the Ram is started and in operation. That way, leaks can be easily located and stopped before water covers the Delivery Pipe.

The installation of a Gate Valve in the Delivery Pipe at the Ram is a great convenience for cutting off water when it is necessary to adjust or repair a Ram. The ditch for the Delivery Pipe should be sufficiently below the frost line.

In case the Delivery Line goes over the top of a hill and down into a valley on its way from the Ram to the delivery point, a small Air Release Valve or Pet Cock should be installed in the Delivery Pipe at the highest point to release accumulations of air from time to time. Otherwise, accumulated air will retard the free flow of the water.

The overflow pipe should also enter the bottom of the reservoir and terminate with a sleeve joint connection. Into this sleeve joint should be screwed a piece of pipe, the length of which determines the height of the water in the reservoir. An emergency overflow should be provided at the top of the reservoir a few inches above the level of the regular overflow.

Drain Tile

The Ram pit should be provided with a Drain Tile to carry off unused water. In many cases the total amount of Fall can be increased by sinking the Ram Pit deep into the ground and carrying off the unused water through a long line of Drain Tiles of sufficient length to bring it out at water level downstream. In other cases, it is a choice between increasing the length of the Supply Pipe or running a line of Drain Tile. Usually, it is cheaper to use more tile and less pipe.

General Instructions For Installing Rife Rams

Rife Rams are easy to install when instructions are closely followed. There are many different ways Rams can be installed, depending mainly on the lay and character of the ground and other local conditions. **If your conditions are different from those described here or elsewhere in this Manual, please write to us giving full details of your conditions.** We will advise you in writing on the proper method of installing the Ram.

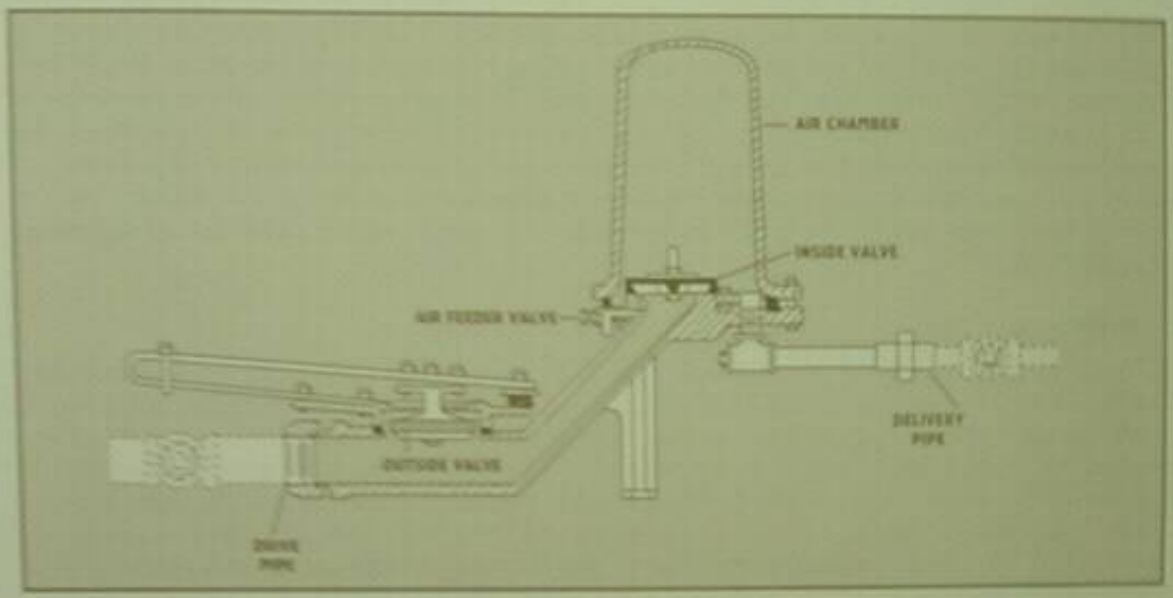


Figure 17 A section drawing of a "New Model" Series BU Rife Ram.

OPERATION

How To Start A Hydraulic Ram

First, the Drive Pipe must be full of water. If there is a valve between the Ram and the Drive Pipe, it must be open. If there is a valve between the Ram and the Delivery Pipe, it should be closed.

Next, open the Outside Valve by pushing the valve down for about 2 seconds allowing the waste from the drive pipe to escape through the valve. Then, release the valve, which will close from the pressure of the water below. The water will enter the Air Chamber through the Inside Valve. The Inside Valve will close, the Outside Valve will re-open, and the Ram will begin to work automatically, forcing water continuously into the Air Chamber. If the Ram does not begin working automatically at once, repeat the opening of the Outside Valve.

If there is a valve between the Ram and the Delivery Pipe, it should be opened after the Ram has made 10 to 15 strokes.

As soon as the Delivery Pipe is full, water will begin to flow from its upper end. If the pressure on the Outside Valve is too great to allow it to be opened by hand, the same result can be obtained by alternately opening and closing the valve between the Drive Pipe and the Ram.

The Ram is started by the same process and operates in the same manner whether or not there are valves at either end of the Ram.

The Air Feeder Valve should be set so that it gives a small spurt of water with each stroke. If the Valve is too far open, the Air Chamber will fill with air and the Ram, while continuing to operate, will only pump air. If the Valve is not sufficiently open, the water going through the Ram will absorb all the air in the Air Chamber and the Ram will begin to pound with a metallic sound. This condition can be corrected immediately by increasing the opening of the Air Feeder Valve. Neglecting to do so might result in the partial breakage of the Ram.

Setting At Maximum Capacity

To regulate the Ram to operate at maximum capacity under average conditions, the Outside Valve should operate at about 20 to 40 strokes per minute.

Setting At Minimum Capacity

To regulate the Ram to operate at minimum capacity under average conditions, the Outside Valve should operate between 60 to 100 strokes per minute.

Adjusting The Volume Of Water

The slower the strokes per minute of the Outside Valve, the more water the Ram uses and the more water it pumps. The faster the strokes per minute of the Outside Valve the less water the Ram uses and the less water it pumps.

To slow down the strokes per minute at which the Outside Valve operates, lower the Lever Rest by screwing down the nuts on the bolts that hold it in place.

To increase the number of strokes per minute of the Outside Valve raise the Lever Rest by unscrewing the nuts on the bolts that hold it in place.

Each Rife Ram can be regulated to pump a minimum and maximum amount of water. This is provided to take into account variation in the seasonal flow of Supply water. Regulation to vary the amount of water used by the Ram can, therefore, be accomplished by raising and lowering the Lever Rest.

A careful study and observance of the above instructions will enable anyone to regulate the stroke of the Ram, from full capacity during wet seasons to a minimum during dry spells.

We strongly recommend that the Ram be carefully checked once a week for several months to make certain no bolts have become loose.

Maintenance And Repairs

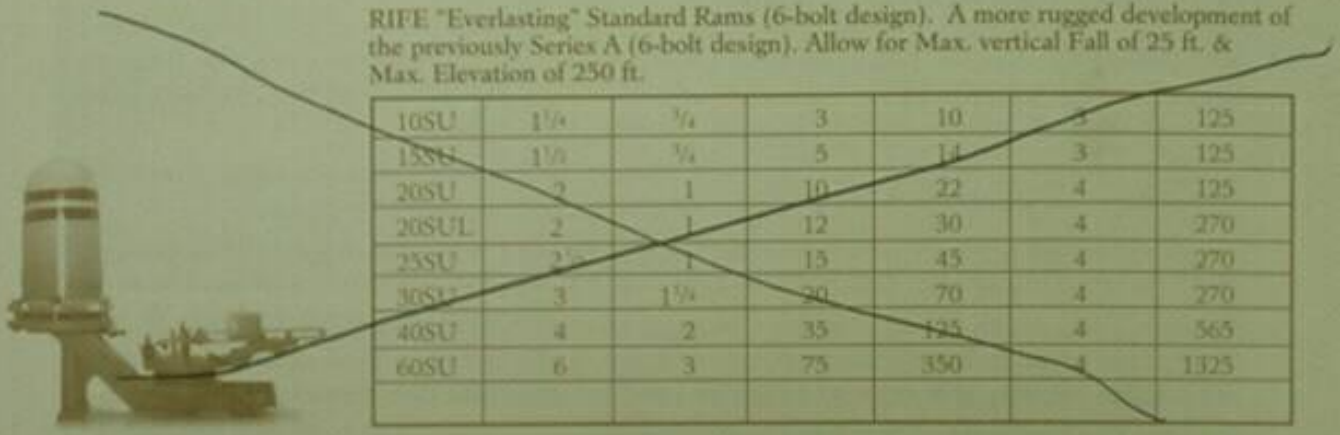
We endeavor to maintain a complete supply of replacement parts for our Rams for immediate shipment, at all times. Parts Lists and Assembly Diagrams are mailed upon request.

In ordering parts please specify Model Size and Serial Number of the Ram.

Rife Rams have been manufactured continuously since 1884. Today, thousands of Rife Rams dot countrysides all over the world. Some of these Rams have been in operation for more than 50 years.

SPECIFICATIONS OF RIFE RAMS

MODEL NO.	DRIVE PIPE SIZE (INCHES)	DELIVERY PIPE SIZE (INCHES)	MIN. INTAKE (GPM)	MAX. INTAKE (GPM)	MIN. VERTICAL FALL (FT.)	APPROX. SHIP. WT. (LB.)



RIFE "Everlasting" Standard Rams (6-bolt design). A more rugged development of the previously Series A (6-bolt design). Allow for Max. vertical Fall of 25 ft. & Max. Elevation of 250 ft.

10SU	1¼	¾	3	10	3	125
15SU	1½	¾	5	14	3	125
20SU	2	1	10	22	4	125
20SUL	2	1	12	30	4	270
25SU	2½	1	15	45	4	270
30SU	3	1¼	20	70	4	270
40SU	4	2	35	125	4	565
60SU	6	3	75	350	4	1325

Rife Series SU Ram

RIFE "Universal" Heavy Duty Rams (6-bolt design). Allow for Max. vertical Fall of 50 ft. & Max. Elevation of 500 ft.

10HDU	1¼	¾	3	10	3	170
15HDU	1½	¾	5	15	3	170
20HDU	2	1	10	25	4	170
20HDUL	2	1	12	33	4	310
25HDU	2½	1	15	45	4	310
30HDU	3	1¼	25	75	4	310
40HDU	4	2	35	150	5	565
60HDU	6	3	75	400	5	1325
80HDU	8	4	400	800	5	2000

Rife Series HDU Ram

SPECIFICATIONS OF DAVEY RAMS

"Improved" DAVEY Rams allow for Max. vertical Fall of 20 ft. & Max. Elevation of 100 ft.

2	¾	½	¾	2	3	10
3	1	½	1½	4	3	16
4	1¼	¾	3	7	3	18
5	2	1	6	14	3	28

Davey Rams

The "Improved" Davey Rams are able to handle lower flows and vertical Elevations. The Air Chamber is large and there are three valves, the Brass Impetus Valve, the Check Valve, and the Air or Snifter Valve. They operate in much the same way as other Rife Rams. All information regarding measurement of Flow, Fall, Elevation, and distances applies to Davey Rams as well. During installation it is important to remember that the Air or Snifter Valve Cap be removed when the Ram is operational and at no time must the Valve be immersed in water being carried away through the Impetus Valve. Parts are available at all times. Please specify size when ordering parts.