

Gaviotas Hydraulic Ram



Installation, operation and maintenance
manual

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Gaviotas Center's design, performance and coordination

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INTRODUCTION

The technological development of the "Gaviotas" High head type HYDRO ARIETE was performed based on the experience and operation of it, on a number of different working conditions, so it has been redesigned and changed during a long time.

Today it is an implement of high reliability requiring minimum maintenance. It is required only water and a small drop or waterfall of 1 to 4 meters for operating these pumps without a motor.

It pumps thousands of gallons of water, day and night, at a maximum distance of 1000 meters with a height of 100 meters, without consuming electricity or fuel.

For its innovative design, manufacturing and maintenance, it is a more efficient Hydro ram than the traditional one.

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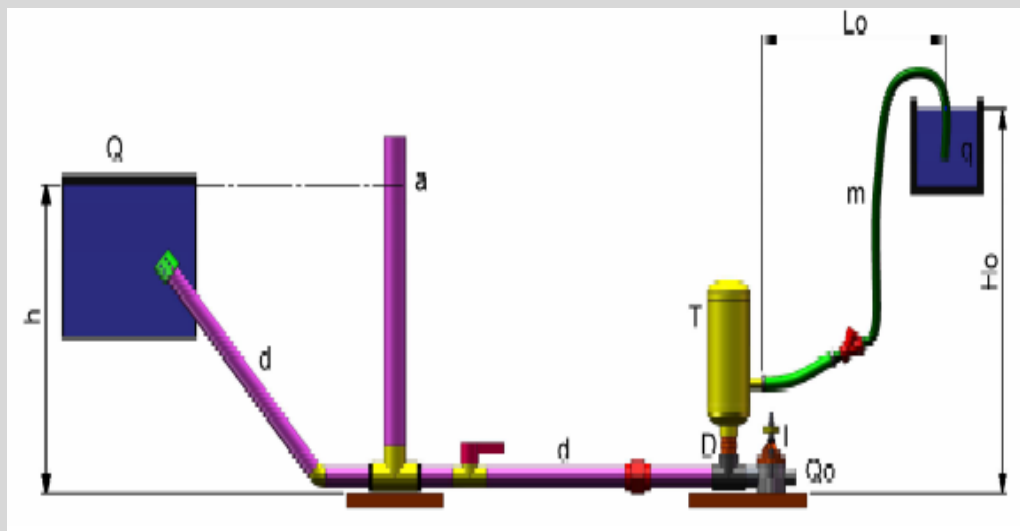
General description

The hydraulic ram is an automatic pump for lifting water. It was designed and developed for taking advantage of small waterfalls with little flow using the only energy of the water force of a small pound or creek.

Functioning

The falling water into the reservoir (Q) through the feed pipe increases its speed

(d) makes the force of the water close the valve button (I); it acquires suddenly much more pressure, opening the high pressure seal (D) and entering the camera air (T), whose air momentarily compressed will expand closing (D) and driving the water to the upper reservoir, (I) the water then descends by its own weight and so it begins another cycle.



d: Supply pipe

m: Feed hose

I: Valve

Q available flow

Qo: Wasted flow

T: Air chamber

a: Surge tank

h: Waterfall (m)

q: Delivery rate (l / min)

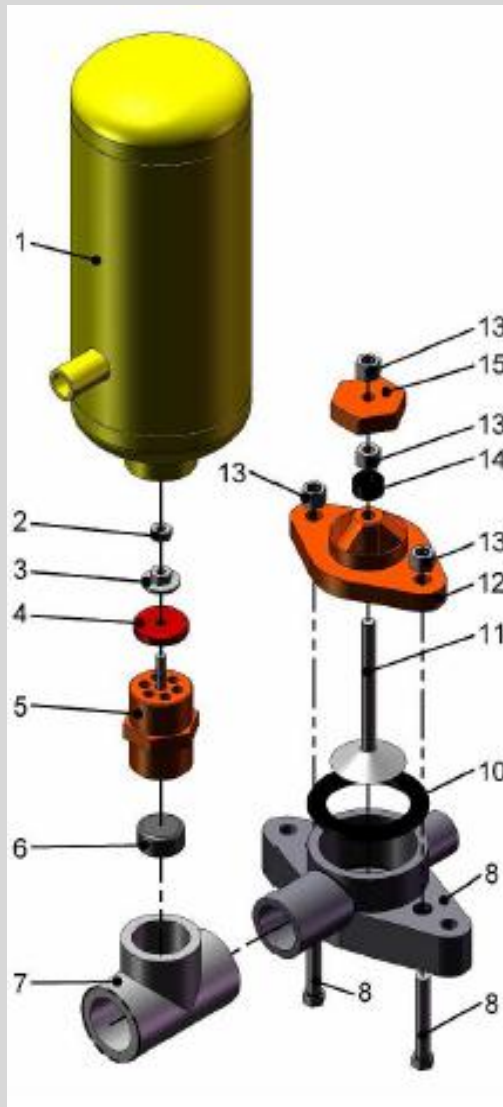
D: High pressure seal

Ho: Pumping Height (m)

I: Pumping length (m)

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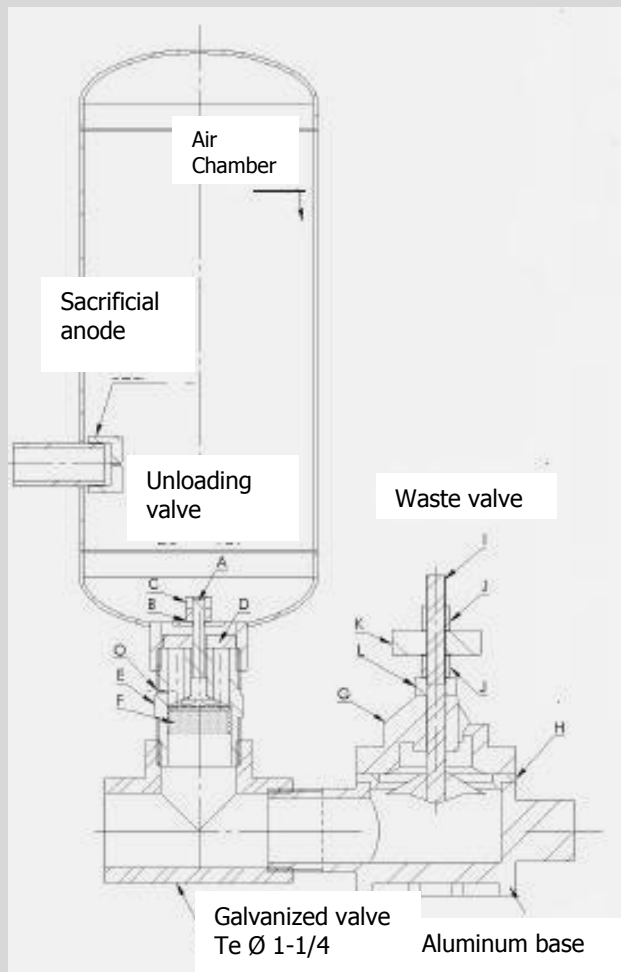
The Gaviotas Hydraulic Ram parts



1. Air chamber
2. Retainers nut fixing
3. Retainer
4. High pressure sealing
5. Release valve body
6. Mesh (filter)
7. Galvanized tee $\text{Ø}1\text{-}1/4''$
8. Zinc screw $\text{Ø}3/8'' \times 2\text{-}1/2''$
9. Aluminum base
10. Rubber gasket
11. Valve
12. Waste valve body
13. Zinc nuts $\text{Ø}3/8''$
14. Valve's rubber
15. Hexagonal nut (weight)

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Gaviotas Hydraulic Ram Ensemble



Unloading valve parts

- A Pin
- B Retainer
- C Retainer nut
- D High pressure sealing
- E Unloading valve body
- F Mesh
- O Ear

Waste valve parts

- G Waste valve body
- H Rubber packing
- I Valve
- J Zinc nuts Ø 3/8"
- K Hexagonal nut (weight)
- L Valve rubber

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Mounting requirements

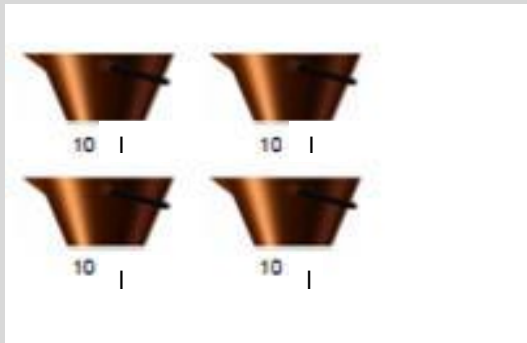
The Hydraulic Ram requires

The ram has a range of daily 12,000 l to 10 meter high or 1,000 l to 100 ms (see supply chart)

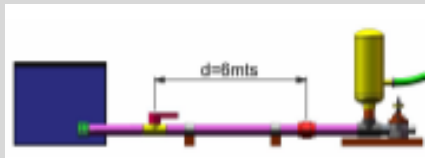
- The maximum pump length (L_0) 1,000
- A natural or artificial waterfall from 1 to 4 m



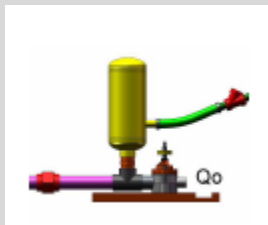
- An available flow (Q) of 40 l/min equivalent to 4 buckets/min



The length of the galvanized pipe (d) should be 6 ms and the diameter 1-1/4"



- The waste flow (Q_0) must have a drain so that the ram do not flood



- If any of these requirements are not present or do not comply, do not install the ram pump

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Waterfall

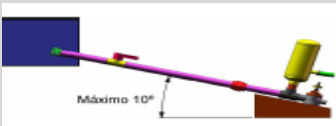
As noted above, The striker requires a drop of water (h) at least 1 meter, and up to 4 meters high.

Generates a smaller drop operation unstable and more wear or breakage occurs pulsating valve (I).

- The ideal setup is to allowing the tube supply (d) to lie horizontally on the ground



In case the installation place does not allow placing the ram and feeding tubing horizontally, a water flow consisting of a tilt less than 10° is acceptable.



- When available flow (Q) is taken from a stream, is necessary to install the ALMENARA or surge tank (a) that has its level at outdoors. This ALMENARA not aims to store large amounts of water, but rather as a buffer that absorbs any sudden increase in pressure in the pipes and avoid the ram stop working.



- The ram pump consumption depends of: · The available decline in water (h)
- The pumping height (H₀)
- The valve stroke pulsating
- The magnitude of the weight of the hexagonal nut

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Flow Supply Chart

Q: 1/day

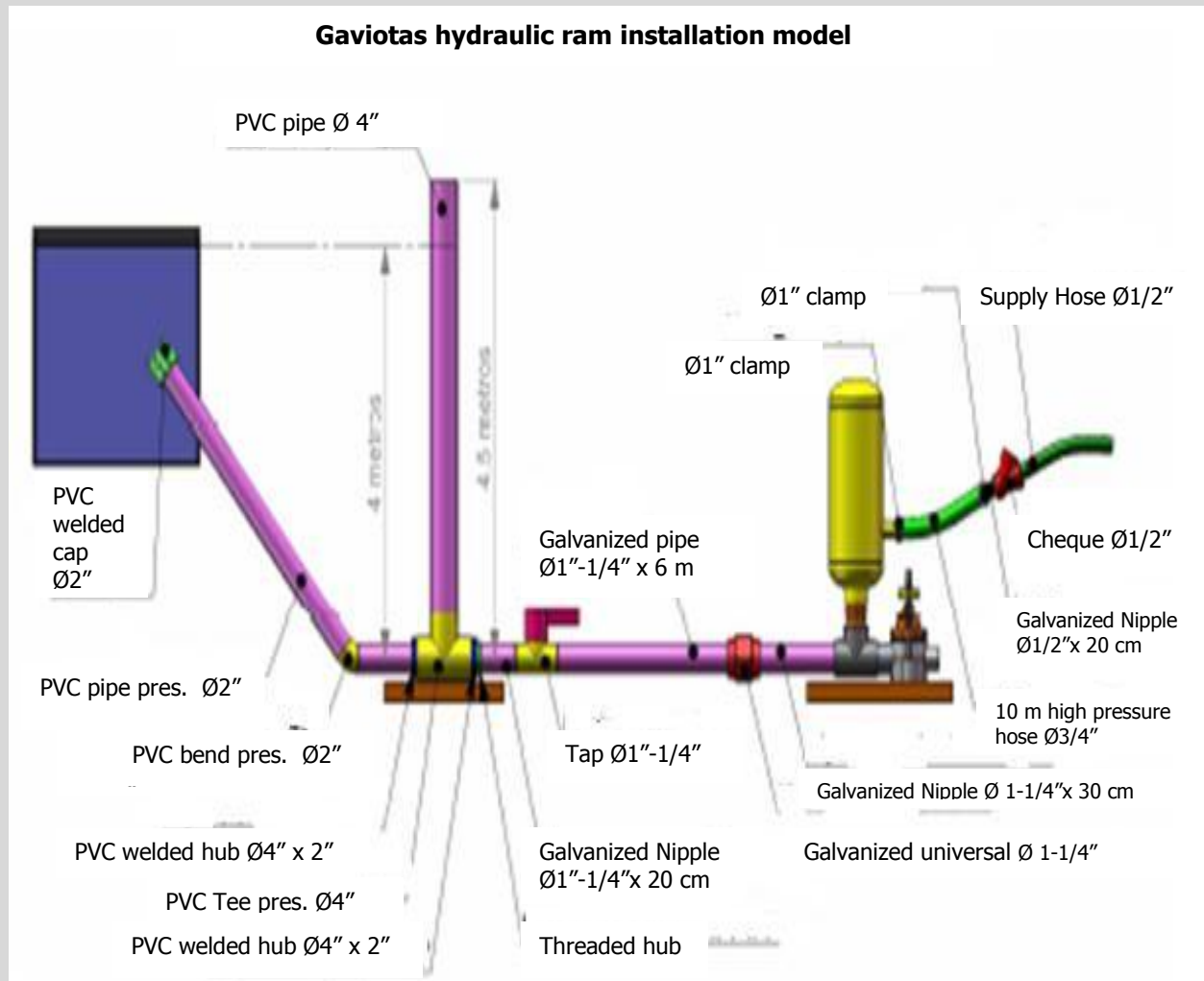
Ho:ms		Available waterfall						
H:ms		1.0	1.5	2.0	2.5	3.0	3.5	4.0
H i g h	10	2419	4060	5357	6566	8467	9676	12096
	15	1987	2678	3802	4925	6134	7776	9245
	20	1642	2085	3024	3888	5184	5875	7258
	25	1123	1729	2333	3283	4147	5141	5875
	30	734	1210	1987	2808	3456	4060	4838
	40	475	950	1541	2160	2592	3370	3715
	50		648	1282	1814	2074	2506	2851
	60		518	907	1296	1728	2074	2506
	70			778	1037	1296	1642	1814
	80			634	864	1123	1334	1555
	90				691	994	1209	1382
	100					800	1037	1296

Note

Water leaks each 100 meters
about 15% of the water supply.

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Installation Models



Characteristics

Each meter waterfall pushes up 25 m

Maximum fall 4 ms

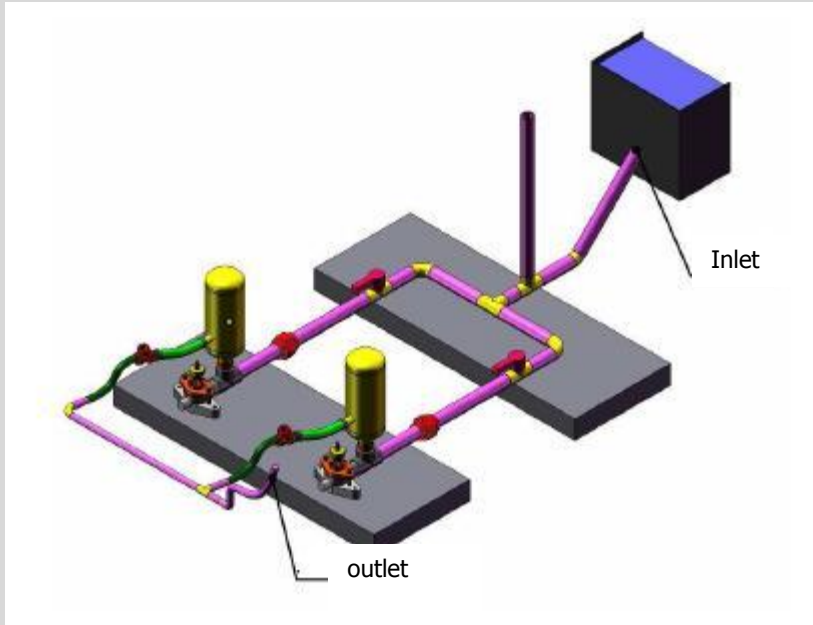
Minimum fall 1 m

Maximum pump length 1000 ms

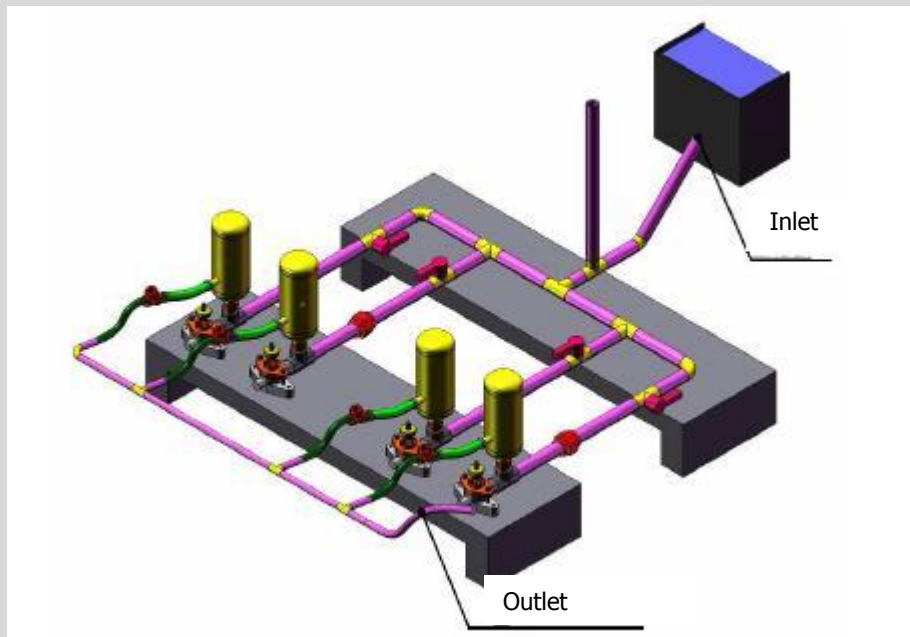
Minimum available flow

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Two Gaviotas hydraulic rams model installation

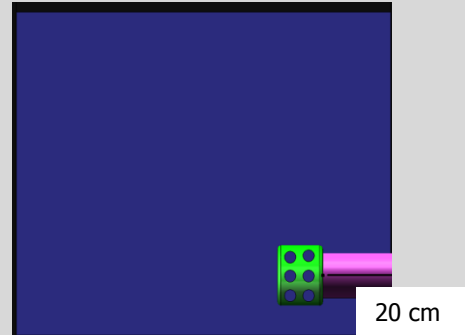


Instalacion model of four Gaviotas

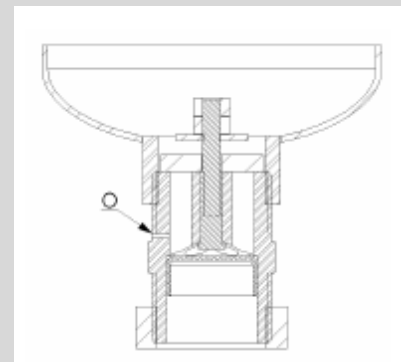
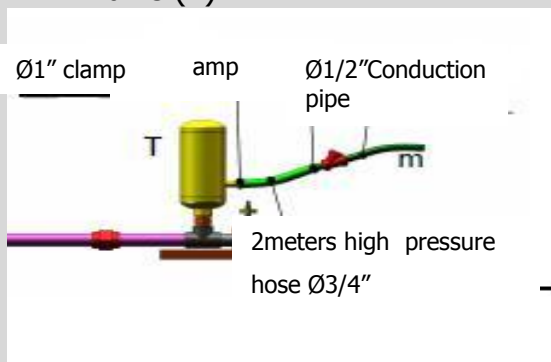


Recommendations

- Avoid leaks in both between parts of the ram as well as in the pipeline conduction (d) to avoid pressure loss, use Teflon around threads and ties.
- Connect correctly conductive hose (m) to avoid loss of flow and pressure.



- It is essential to place a high pressure hose of 2 meters in length, At the air camera output (T) before tying conduction hose (m). Failure to do that and wrongly placed a rigid or galvanized PVC pipe section makes the pneumatic chamber explodes due to vibration. On the other part connecting directly to the camera air, makes this hose burst due to the pressure generated.
- To avoid solid particles or elements in the inlet of the ram through the water, Gaviotas supplies a filter which must be installed inside to a height of 20 cm above the tanks ground.
- Avoid any obstruction of the ear, a vent (O) in the body of the unloading valve (E)



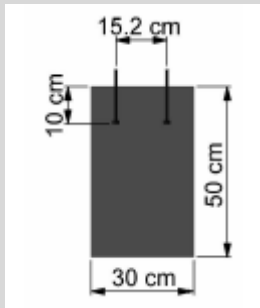
- It is convenient to fix the conduction pipe (d) in two or more points at least for

avoiding damaging vibration to the thread.



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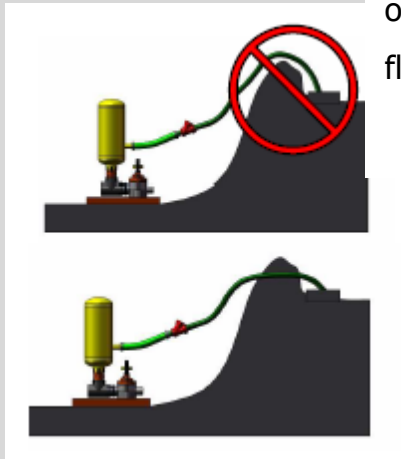
- Fix the body or the base of the ram in a block of concrete 30 cm. x 30 cms. surface and 50 cm depth with two screws anchor $\varnothing 3 / 8$ "x 6" submerged 4 " in the concrete and at 15.2 cm distance between screws.



- The conductive hose (m) installed on wavy land produce air bags, a phenomenon that

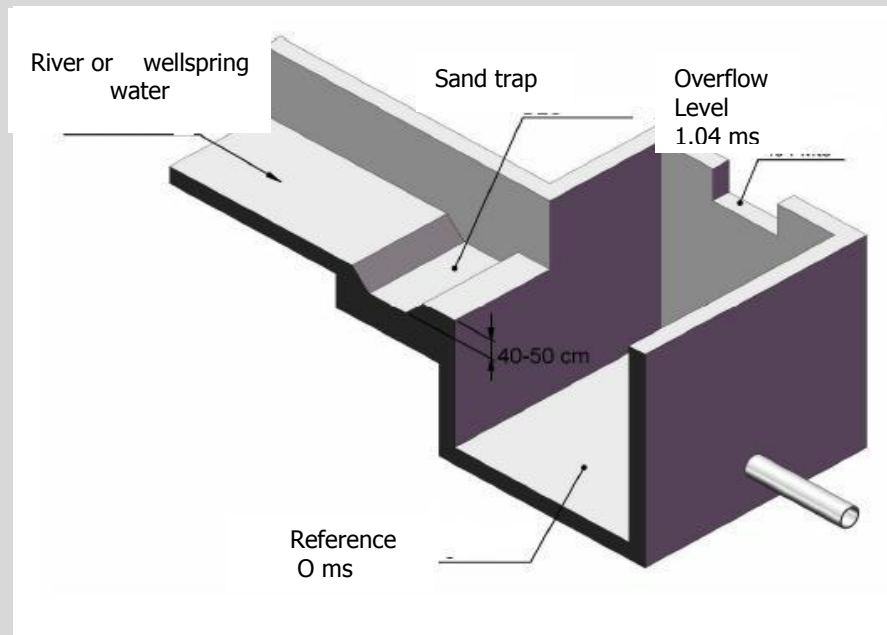
Construction of the sand trap:

- Sand traps are horizontal ponds, that keep the outgoing flow equal to the input, i.e. a continuous flow, and hence it's important function.



- In its design you have to take into account the uniform distribution of the water in the whole area previous to the entrance into the sand trap so that not suddenly burst of water can cause alterations in the sedimentation area
- Frequently the water coming from a shallow source has solid elements such as sand, peels, shells, leaves, and slags that do not decompose or crumble. If these materials are not eliminated could cause damage or disturbance in the system due to deterioration of the waste and unloading valves, as well as the obstruction of the feed pipe (see chart 1)

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Hydraulic ram maintenance

If the ram stop working or does not supply enough water these are the possible causes

Problem

No air in the air chamber

Cause

No air in the air chamber due to obstruction in the ear. It is necessary that this ear does not have any obstruction so it can allow the air coming into the chamber to receive the beat from the water into de impulsio pipe so that no breakage occurs in the pipe or in the welding that prevent the spoiling of the ram.

Solution

Make sure that the vent, ear (O) in the body of the unload valve for supplying air never be obstructed.

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Problem

The high pressure sealing (D) in the unload valve inside the air chamber is worn out and needs to be changed.

Cause

The high pressure sealing is worn, crystallized or oval.

Solution

Unscrew the inner tube and check out the seal if it is in good condition, if not replace it with a new one.

Problem

There is a limited amount of water in the feeding flow (q)

Cause

The running of the valve is too long and the ram needs more water than the available one.

Solution

You must accelerate the drive of the valve (I) and diminish the running that way you can supply more water and not too much affecting the ram.

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Las Gaviotas Center

Colombian Orinoquia

Warranty

Las Gaviotas designer and manufacturer of the high head Hydraulic Ram warrants any proved useless part due to failure in material or fabrication for a year time after the installation

Ram N° _____

Date of Sale _____

Bill Number _____

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Gaviotas, this world there was arising spontaneously from chaos to cosmos, always believing in freedom, without a predetermined pattern different from that of sustainability.

Human race was originated in the tropics and in the tropics must other homo sapiens be reborn, to help meet the extinction, this fact is vital, above all, he has to love life, and he has to be capable of illuminating the future.

Paolo Lugari

"Maturity means making our dreams come true."

For more information on other projects, visit Gaviotas Centre website

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Notes



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