✶ No Pollution ✶ No Noise ✶ No Fuel Consumption

Superflow PUMPS

North America | Latin America | Europe / Africa | Asia / Pacific

CM/L-9044065-Part-2
CM/L-9921594-Part-3
CM/L-9548804-Part-4
CM/L-9562188-Part-5
CM/L-9719394-Part-6
CM/L-9686311-Part-7

IS:15500 Part- 2 to 7

IAS-ANZ ICS ISO 9001 : 2000

ISO 9001: 2000 CERTIFIED CO.

SUPERFLOW DEEP WELL HAND PUMP

The **SUPERFLOW DEEPWELL HAND PUMPS** are conventional lever action hand pump and is subject to Indian Standard IS 15500(Part1 to 8):2004. This pump has a pump head, pump stand and a handle of galvanized steel. The down hole components exist of a brass lined cast iron cylinder with a foot valve and a plunger of brass. The plunger has a double nitrile rubber cup seal, the rising main is a Ø32 mm GI pipe and the pump rods are of galvanized steel with threaded connectors. This pump is not corrosion resistant and should not be used in areas with aggressive water (pH value < 6.5).

Cylinder diameter (mm): 63.5
Maximum Stroke (mm): 125

Approx. discharge at about 75 watt input m/h:at 10 m head 1.8 at 15 m head 1.3 at 20 m head 1.0 at 25 m head 0.9 at 30 m head 0.8 Pumping lift (m): 10 – 50 Population served (nos.): 300 Households (nos.): 30 Water consumption (lpcd): 15 – 20 Type of well: borehole

Manufactured by
ASHOKA INDUSTRIES
122/1 'C' Sarojini Nagar, Kanpur - 208012
+91-9415125680, +91-7897777779, +919415130457, +91-512-2296528
www.ashokasuperflow.com ashokasuperflow@gmail.com

★ SAFETY
★ DISCIPLINE
★ CLEANLINESS
★ PRODUCTIVITY
★ QUALITY

No Pollution ✶ No Noise ✶ No Fuel Consumption

Superflow PUMPS

North America | Latin America | Europe / Africa | Asia / Pacific

CM/L-9044065-Part-2
CM/L-9921594-Part-3
CM/L-9548804-Part-4
CM/L-9562188-Part-5
CM/L-9719394-Part-6
CM/L-9686311-Part-7

IS:15500 Part- 2 to 7

IAS-ANZ ISO 9001 : 2000

ISO 9001: 2000 CERTIFIED CO.

DEEP WELL HANDPUMP STANDARD (SDWP)

Description

The INDIA Mark II Pump is a conventional lever action handpump and is subject to Indian Standard IS 9301. This pump has a pump head, pump stand and a handle of galvanized steel. The down hole components exist of a brass lined cast iron cylinder with a foot valve and a plunger of brass. The plunger has a double nitrile rubber cup seal, the rising main is a Ø32 mm GI pipe and the pump rods are of galvanized steel with threaded connectors. This pump is not corrosion resistant and should not be used in areas with aggressive water (pH value < 6.5).

Technical data

Cylinder diameter (mm):	63.5
Maximum Stroke (mm):	125
*)Approx. discharge at about 75 watt input m3/h:	
at 10 m head	1.8
at 15 m head	1.3
at 20 m head	1.0
at 25 m head	0.9
at 30 m head	0.8
Pumping lift (m):	10 – 50
Population served (nos.):	300
Households (nos.):	30
Water consumption (lpcd):	15 – 20
Type of well:	borehole

Material

Pump head	galvanised steel
Handle	galvanised steel
Pump stand	galvanised steel
Pump rods	galvanised steel
Riser pipes	galvanised GI pipe
Pump cylinder	cast iron / brass
Plunger/footvalve	brass

Local manufacturing

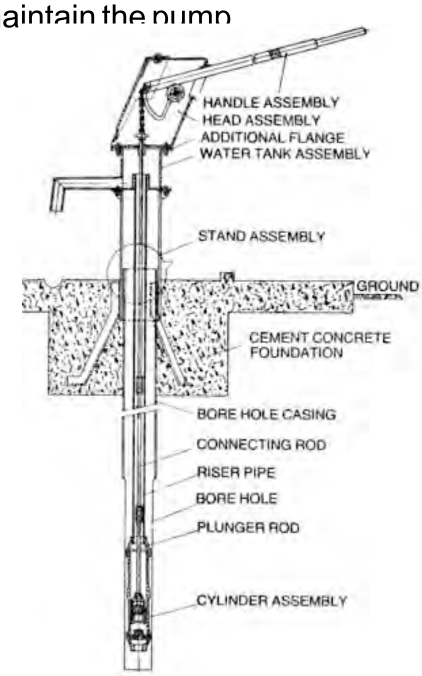
All “above ground components” have a potential for local manufacturing, the other parts need a high degree of quality control to ensure a reliable operation. The cost of the tooling requirement is substantial and therefore the number of manufacturer will be limited.

Installation

The installation of the INDIA Mark II Pump need well trained area mechanics or a mobile team with lifting tackle and comprehensive tool kit.

Maintenance

This pump has limited “Community Management Potential”, but it is reliable and popular with the communities. To service the INDIA Mark II Pump skills and tools are needed which exceeds the ability of a village-level caretaker. However trained area mechanics can successfully maintain the pump.



DEEP WELL HANDPUMP STANDARD

Manufactured by
ASHOKA INDUSTRIES
122/1 ‘C’ Sarojini Nagar, Kanpur - 208012
+91-9415125680, +91-7897777779, +919415130457, +91-512-2296528
www.ashokasuperflow.com ashokasuperflow@gmail.com

★ SAFETY
★ DISCIPLINE
★ CLEANLINESS
★ PRODUCTIVITY
★ QUALITY

No Pollution ✶ No Noise ✶ No Fuel Consumption

DEEP WELL HAND PUMP VLOM-65

Ø63.5mm CYLINDER

Description

Description

The INDIA Mark III Pump is a conventional lever action handpump and is subject to Indian Standard IS 13056. This pump has similar configurations as the INDIA Mark II, only the "down hole components" were changed in order to improve the village level maintenance. The most important improvement is the "open top cylinder", which makes it possible to remove the plunger and also the footvalve without lifting the cylinder and the rising main (Ø65 GI pipe). This pump is not corrosion resistant and should not be used in areas with aggressive water (pH value < 6.5).

Technical data

Cylinder diameter (mm):	63.5 (50)
Maximum Stroke (mm):	127
*) Approx. discharge at about 75 watt input m3/h:	
at 10 m head	1.8
at 15 m head	1.3
at 20 m head	1.0
at 25 m head	0.9
at 30 m head	0.8
Pumping lift (m):	10 – 30
Population served (nos.):	300
Households (nos.):	30
Water consumption (lpcd):	15 – 20
Type of well:	borehole

Material

Pump head	galvanised steel
Handle	galvanised steel
Pump stand	galvanised steel
Pump rods	galvanised steel
Riser pipes	galvanised GI pipe
Pump cylinder	cast iron / brass
Plunger/footvalve	brass

Local manufacturing

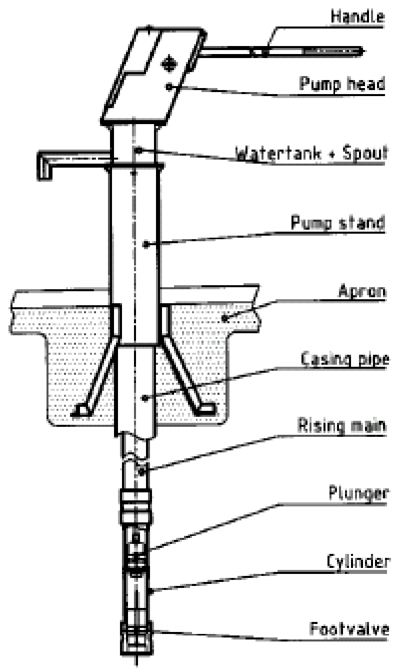
All "above ground components" have a potential for local manufacturing, the other parts need a high degree of quality control to ensure a reliable operation. The cost of the tooling requirement is substantial and therefore the number of manufacturer will be limited.

Installation

The installation of the INDIA Mark III Pump needs well-trained area mechanics or a mobile team with lifting tackle and comprehensive tool kit. Pump cylinder settings of more than 30 m are difficult, because of weight of the rising main.

Maintenance

This pump has an improved Community Management Potential" compared to the INDIA Mark II, because the "open top cylinder" gives the possibility of a simpler maintenance with less tools involved.



INDIA MARK III HANDPUMP

Manufactured by
ASHOKA INDUSTRIES
122/1 'C' Sarojini Nagar, Kanpur - 208012
+91-9415125680, +91-7897777779, +919415130457, +91-512-2296528
www.ashokasuperflow.com ashokasuperflow@gmail.com

★ SAFETY
★ DISCIPLINE
★ CLEANLINESS
★ PRODUCTIVITY
★ QUALITY

No Pollution ✶ No Noise ✶ No Fuel Consumption

DEEP WELL HAND PUMP VLOM-50

Ø50.00mm CYLINDER

Description

The INDIA Mark III Pump is a conventional lever action handpump and is subject to Indian Standard IS 13056 amendments 6,. This pump has similar configurations as the INDIA Mark II, only the "down hole components" were changed in order to improve the village level maintenance. The most important improvement is the "open top cylinder Ø50mm", which makes it possible to remove the plunger and also the footvalve without lifting the cylinder and the rising main (Ø50 GI pipe). This pump is not corrosion resistant and should not be used in areas with aggressive water (pH value < 6.5).

Technical data

Cylinder diameter (mm):	50.00
Maximum Stroke (mm):	127
*) Approx. discharge at about 75 watt input m3/h:	
at 10 m head	1.8
at 15 m head	1.3
at 20 m head	1.0
at 25 m head	0.9
at 30 m head	0.8
Pumping lift (m):	10 – 30
Population served (nos.):	200
Households (nos.):	30
Water consumption (lpcd):	15 – 20
Type of well:	borehole

Material

Pump head	galvanised steel
Handle	galvanised steel
Pump stand	galvanised steel
Pump rods	galvanised steel
Riser pipes	galvanised GI pipe
Pump cylinder	cast iron / brass
Plunger/footvalve	brass

Local manufacturing

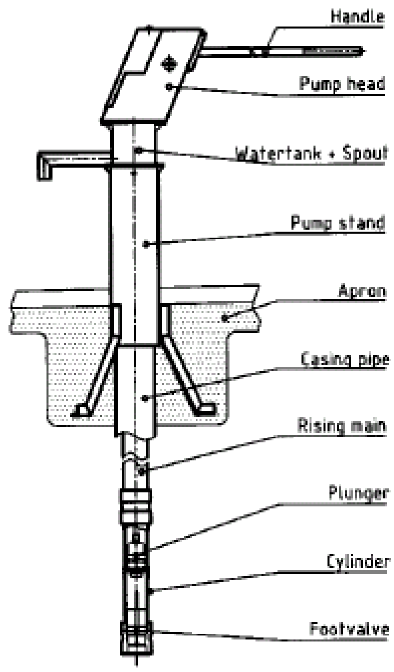
All "above ground components" have a potential for local manufacturing, the other parts need a high degree of quality control to ensure a reliable operation. The cost of the tooling requirement is substantial and therefore the number of manufacturer will be limited.

Installation

The installation of the INDIA Mark III Pump needs well-trained area mechanics or a mobile team with lifting tackle and comprehensive tool kit. Pump cylinder settings of more than 30 m are difficult, because of weight of the rising main.

Maintenance

This pump has an improved Community Management Potential" compared to the INDIA Mark II, because the "open top cylinder" gives the possibility of a simpler maintenance with less tools involved.



INDIA MARK III HANDPUMP

Manufactured by
ASHOKA INDUSTRIES
122/1 'C' Sarojini Nagar, Kanpur - 208012
+91-9415125680, +91-7897777779, +919415130457, +91-512-2296528
www.ashokasuperflow.com ashokasuperflow@gmail.com

★ SAFETY
★ DISCIPLINE
★ CLEANLINESS
★ PRODUCTIVITY
★ QUALITY

✶ No Pollution ✶ No Noise ✶ No Fuel Consumption

Superflow PUMPS

North America | Latin America | Europe / Africa | Asia / Pacific

CM/L-9044065-Part-2
CM/L-9921594-Part-3
CM/L-9548804-Part-4
CM/L-9562188-Part-5
CM/L-9719394-Part-6
CM/L-9686311-Part-7

IS:15500 Part- 2 to 7

IAS-ANZ ISO 9001 : 2000

ISO 9001: 2000 CERTIFIED CO.

EXTRA DEEP WELL HAND PUMP

Description

The Extra Deep Well Hand Pump is a conventional lever action handpump and is subject to Indian Standard IS:13287-1992. These pump has similar configurations as the INDIA Mark II, are exclusively used for extracting water from greater depths. These pumps are suitable for static water levels varying between 45 to 90metres where placement of cylinders can be between 50 to 85 metres. The inner dia of the borewell, where these pumps are installed, should not be less than 100mm. only the “down hole components” were changed. The most important improvement is the “cylinder”, which63.5mm I.D./380 mm long cast iron cylinder body fitted with brass liner having C.I. (Cast iron) caps threaded to hold 32mm NB pipe. 3 Nos. Nitrile pump bucket and 500mm plunger rod. This pump is not corrosion resistant and should not be used in areas with aggressive water (pH value < 6.5).

Technical data

Cylinder diameter (mm):	63.5
Maximum Stroke (mm):	127
*) Approx. discharge at about 75 watt input m3/h:	
at 10 m head	1.8
at 15 m head	1.3
at 20 m head	1.0
at 25 m head	0.9
at 30 m head	0.8
Pumping lift (m):	10 – 30
Population served (nos.):	300
Households (nos.):	30
Water consumption (lpcd):	15 – 20
Type of well:	borehole

Material

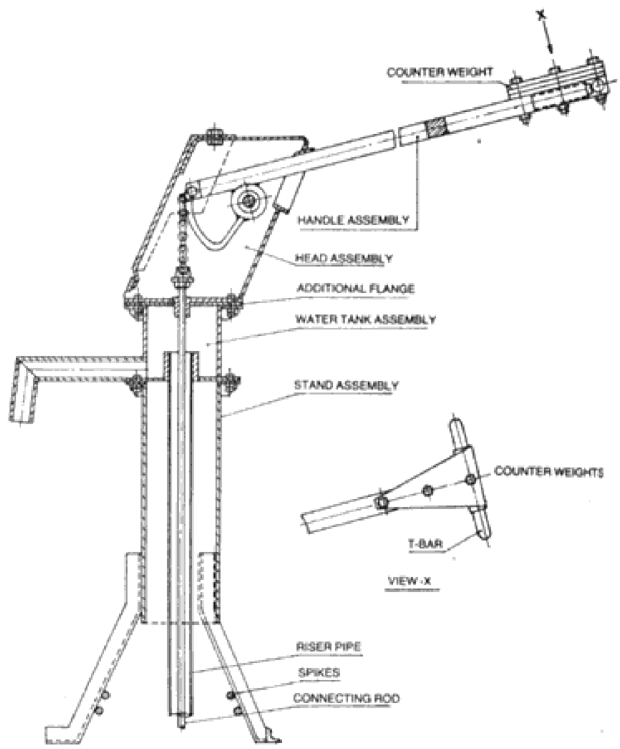
Pump head	galvanised steel
Handle	galvanised steel
Pump stand	galvanised steel
Pump rods	galvanised steel
Riser pipes	galvanised GI pipe
Pump cylinder	cast iron / brass
Plunger/footvalve	brass

Installation

The installation of the Extra Deep Well Hand Pump needs well-trained area mechanics or a mobile team with lifting tackle and comprehensive tool kit. Pump cylinder settings of more than 50 to 85m.

Maintenance

This pump has an improved Community Management Potential” compared to the INDIA Mark II, because the “open top cylinder” gives the possibility of a simpler maintenance with less tools involved.



EXTRA DEEP WELL HAND PUMP

Manufactured by
ASHOKA INDUSTRIES
122/1 ‘C’ Sarojini Nagar, Kanpur - 208012
+91-9415125680, +91-7897777779, +919415130457, +91-512-2296528
www.ashokasuperflow.com ashokasuperflow@gmail.com

★ SAFETY
★ DISCIPLINE
★ CLEANLINESS
★ PRODUCTIVITY
★ QUALITY

*No Pollution * No Noise * No Fuel Consumption

UGANDA U3 MODIFIED DEEP WELL HAND PUMP

Description

The U3M pump is a conventional lever action hand pump. The configuration includes an open top cylinder, i.e. the piston can be removed from the cylinder without dismantling the rising main. The footvalve is retractable with a fishing tool. The riser pipes are made of u-PVC. The pump rods are of stainless steel or glass fibre reinforced plastic, allowing simple removal. The pump head has similar configurations as the INDIA Mark III, the "down hole components" are similar to Afridev components. The cylinder follows the Afridev configuration. The plunger uses the 50 mm open top India MKIII brass design. This pump is fully corrosion resistant.

Technical data

Cylinder diameter (mm):	50
Maximum Stroke (mm):	150
*) Approx. discharge at about 75 watt input m3/h:	
at 10 m head	1.2
at 15 m head	1.0
at 20 m head	0.8
at 30 m head	0.6
Pumping lift (m):	10 – 45
Population served (nos.):	300
Households (nos.):	30
Water consumption (lpcd):	15 – 20
Type of well:	borehole

Material

Pump head	galvanised steel
Handle	galvanised steel
Pump stand	galvanised steel
Pump rods	SS or FRP
Rising main	u-PVC pipe 63 mm
Pump cylinder	u-PVC pipe with
brass liner	50 mm
Plunger/footvalve	brass/plastic

Local manufacturing

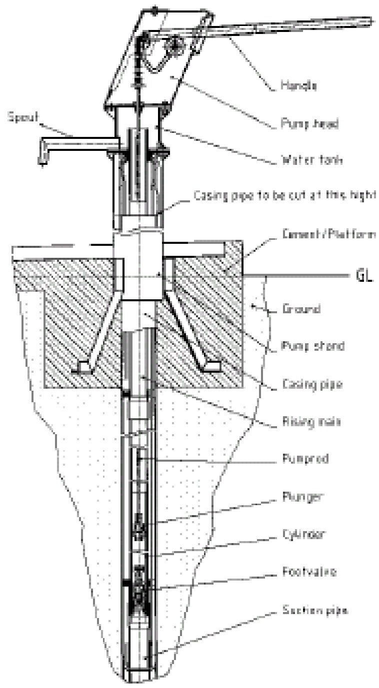
All "above ground components" and steel parts of this pump have a potential for local manufacturing. The other parts need a high degree of quality control to ensure a reliable production. Local companies who manufacture u-PVC pipes are able to produce the rising main. The cost of the tooling requirement is substantial and therefore the number of manufacturer will be limited.

Installation

The installation of the U3M Pump is not difficult and does not need any lifting equipment.

Maintenance

This pump has an excellent "Community Management Potential", it is reliable, easy to repair by a village caretaker and popular with the communities. Few tools are needed for all repairs.



U3 MODIFIED DEEP WELL HANDPUMP

No Pollution ✶ No Noise ✶ No Fuel Consumption

BUSH PUMP

Description

The Bush Pump is a conventional lever action hand pump. The typical feature of this pump is the "Hardwood block" that acts as both a bearing and lever mechanism. The pump stand is of painted mild steel and the handle is a galvanized GI pipe. The "down hole components" consist of Ø50 mm (NB) GI pipe for the rising main, pump rods of Ø16 mm galvanized mild steel, brass footvalve and cylinder (Ø75 mm), bronze plunger with leather seals. This pump is not corrosion resistant and should not be used in areas with aggressive water (pH value < 6.5).

Technical data

Cylinder diameter (mm):	75
Maximum Stroke (mm):	200– 250
*) Approx. discharge at about 75 watt input m3/h:	
at 10 m head	1.4
at 15 m head	1.1
at 25 m head	0.8
at 30 m head	0.7
Pumping lift (m):	5 – 50
Population served (nos.):	300
Households (nos.):	30
Water consumption (lpcd):	15 – 20
Type of well:	borehole or dugwell

Material

Pump stand	painted steel
Handle	galvanised steel pipe
Bearing	block Hardwood
Pump rods	galvanised steel
Riser pipes	galvanised GI pipe
Pump cylinder	brass
Plunger/footvalve	bronze/brass

Installation

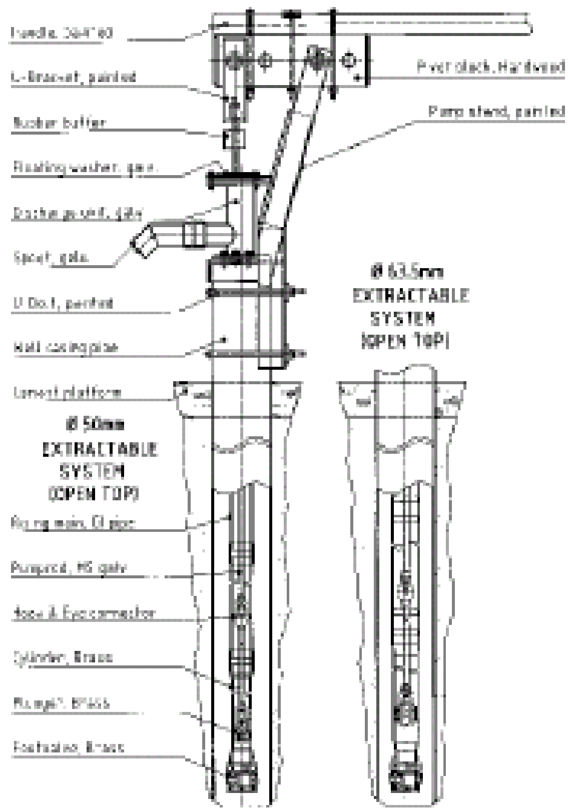
The installation of the Bush Pump needs well trained area mechanics. Lifting tackle is only used for deep applications and for large size "open top cylinders". No special tools are needed.

Maintenance

The pump with the Standard configuration has a limited Community Management Potential", but it is reliable and popular with the community. The "open top cylinder version" gives the possibility of a simpler maintenance (see remarks).

Remarks

Besides the "Standard" configuration, there exists an "Open Top Cylinder" version with different cylinder sizes (Ø50 mm/Ø63.5 mm/Ø75 mm). To make maintenance easy, pump rods with casehardened hook and eye connectors are also available.



BUSH PUMP

Manufactured by
ASHOKA INDUSTRIES
122/1 'C' Sarojini Nagar, Kanpur - 208012
+91-9415125680, +91-7897777779, +919415130457, +91-512-2296528
www.ashokasuperflow.com
ashokasuperflow@gmail.com

★ SAFETY
★ DISCIPLINE
★ CLEANLINESS
★ PRODUCTIVITY
★ QUALITY

ROPE PUMP

Description

The Rope Pump features a unique design in which small plastic pistons are lined up on a rope. The distance between the pistons is approximately 1 m. Over a crank operated drive wheel the rope is pulled through a plastic rising pipe. The pump stand is of painted mild steel and the drive wheel consists of cut old tires. A ceramic guide box leads the rope with the pistons into the rising pipe. This pump is reasonably corrosion resistant.

Technical data

Piston nominal : diameter (inch)	1", ¾", ½"
*) Approx. discharge at about 75 watt input m3 /h:	
at 10 m head	1.4
at 15 m head	1.1
at 30 m head	0.7
Pumping lift (m):	0 – 30
Population served (nos.):	70
Households (nos.):	3 – 10
Water consumption (lpcd):	15 – 20
Type of well:	dugwell or borehole

Material

Pump stand	painted steel
Crank	painted steel pipe
Drive pulley	rubber and mild steel
Pistons	plastic
Guide box	ceramic and PVC
Rising pipe	PVC pipe

Local manufacturing

The Rope Pump has an excellent potential for local manufacturing and is produced by different companies in Nicaragua as well as elsewhere.

Installation

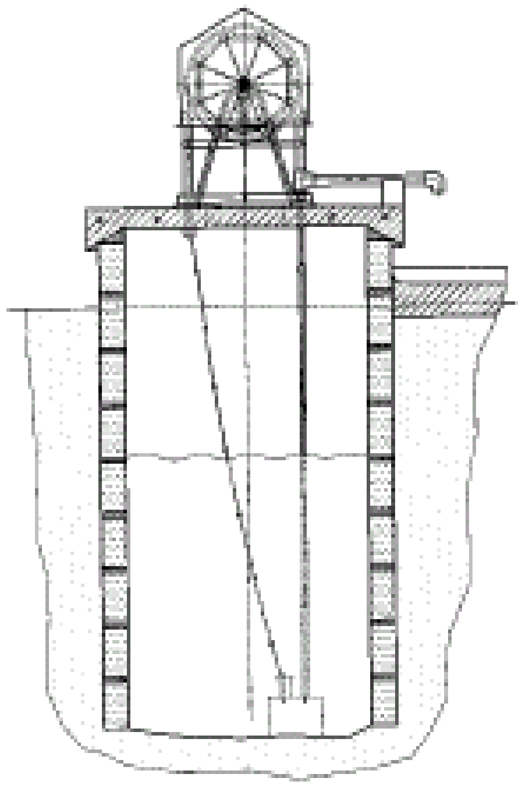
The installation of the Rope Pump is easy. It can be done by trained area mechanics. No lifting tackle and no special tools are needed.

Maintenance

The rope pump has an excellent "Community Management Potential". A torn or broken rope can be replaced without any special tools. A village caretaker can perform all maintenance operations.

Remarks

This rope pump is usually installed in dug wells. Even though it is not limited in pumping lifts, the major application range is up 15 m. The Rope pump is not designed for a high daily output, but rather a family or small community pump. Models exist for family use as well as for community use.



ROPE PUMP

Manufactured by
ASHOKA INDUSTRIES
122/1 'C' Sarojini Nagar, Kanpur - 208012
+91-9415125680, +91-7897777779, +919415130457, +91-512-2296528
www.ashokasuperflow.com ashokasuperflow@gmail.com

Superflow PUMPS

North America | Latin America | Europe / Africa | Asia / Pacific

CM/L-9044065-Part-2
CM/L-9921594-Part-3
CM/L-9548804-Part-4
CM/L-9562188-Part-5
CM/L-9719394-Part-6
CM/L-9686311-Part-7
IS:15500 Part- 2 to 7
IAS-ANZ
ISO 9001 : 2000
ISO 9001: 2000 CERTIFIED CO.

SHALLOW WELL SUCTION PUMP 6 NO.

Description

The No 6 Pump is lever operated Suction Handpump. Typically, No 6 Pumps are installed in collapsible tube wells with the screen extending to the coarse sand aquifer. The pump head and the handle are made of cast iron. Pump rod and axles are made of mild steel. The piston assembly is made of brass with a plastic bucket seal. The suction pipe and the robo screen are of PVC pipes. This makes this pump reasonably corrosion resistant.

Technical data

Cylinder diameter (mm):	89.0
Maximum Stroke (mm):	215
*) Approx. discharge about 75 watt input m3/h:	
at 5 m head	4.5
Pumping lift (m):	0 – 7
Population served (nos.):	50 – 100
Households (nos.):	5 – 10
Water consumption (lpcd):	20 – 25
Type of well:	collapsible Tubewell (Or dugwell)

Material

Pump head	cast iron
Handle	cast iron
Pump rods	mild steel
Suction pipe	PVC pipe
Cylinder	cast iron
Plunger/footvalve	brass

Local manufacturing

The No 6 Pump has an excellent potential for local manufacturing.

Installation

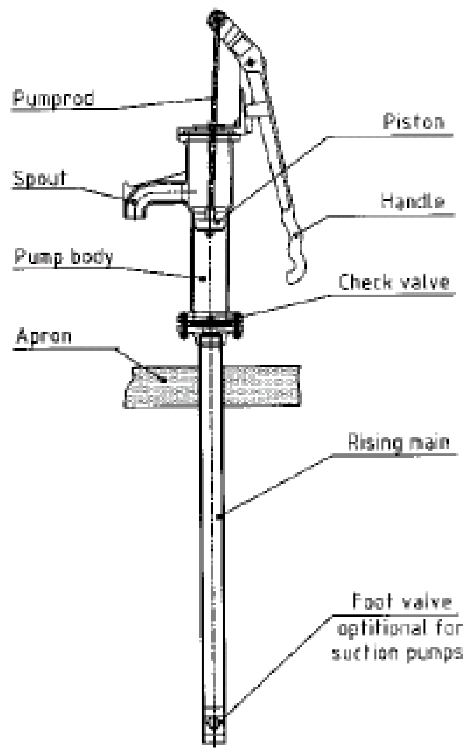
The installation of the No 6 Pump is easy and does not need any lifting equipment or special tools. The drillers who sink the tube well with the "sludger method" also install the pump.

Maintenance

This pump has an excellent "Community Management Potential". Only two spanners are needed to repair the plunger and the foot valve. A village caretaker can perform all maintenance operations.

Remarks

This pump is like all Suction pumps limited to pumping lifts of a maximum of 8 m. It is recommended not to go deeper than 6-7 m. The No 6 Pump is not designed for a high daily output, but rather a family or small community pump.



SHALLOW WELL SUCTION PUMP 6 NO.

No Pollution ✶ No Noise ✶ No Fuel Consumption

Manufactured by
ASHOKA INDUSTRIES
122/1 'C' Sarojini Nagar, Kanpur - 208012
+91-9415125680, +91-7897777779, +919415130457, +91-512-2296528
www.ashokasuperflow.com ashokasuperflow@gmail.com

★ SAFETY
★ DISCIPLINE
★ CLEANLINESS
★ PRODUCTIVITY
★ QUALITY

No Pollution ✶ No Noise ✶ No Fule Consumption

Superflow PUMPS

CM/L-9044065-Part-2
CM/L-9921594-Part-3
CM/L-9548804-Part-4
CM/L-9562188-Part-5
CM/L-9719394-Part-6
CM/L-9686311-Part-7

IS:15500 Part- 2 to 7

IAS-ANZ ICS ISO 9001 : 2000

ISO 9001: 2000 CERTIFIED CO.

DIRECT ACTION HANDPUMP

Description

The Direct Action Handpumps are based on a buoyant pump rod that is directly articulated by the user, discharging water at the up- and down stroke. The pump head and the standing plate are made of galvanised steel and the handle of stainless steel. Pump rod and rising main are of HDPE or PVC pipes (with threaded connections) and the rest of the down-hole components are made of plastics. This makes these pumps completely corrosion resistant.

Technical data

Cylinder diameter (mm):	50 – 53.4
Maximum Stroke (mm): ~	400
Approx. discharge lt./min: (depending on installation and well)	30 – 60
Pumping lift (m):	2 – 15
Daily output (m3):	1 – 5
Population served (nos.):	300
Households (nos.):	30
Type of well:	borehole Or dugwell

Material

Pump head:	galvanised steel
Handle:	SS
Pump rods:	HDPE/PVC pipe
Rising main:	HDPE/PVC pipe
Plunger/footvalve:	plastic

Installation

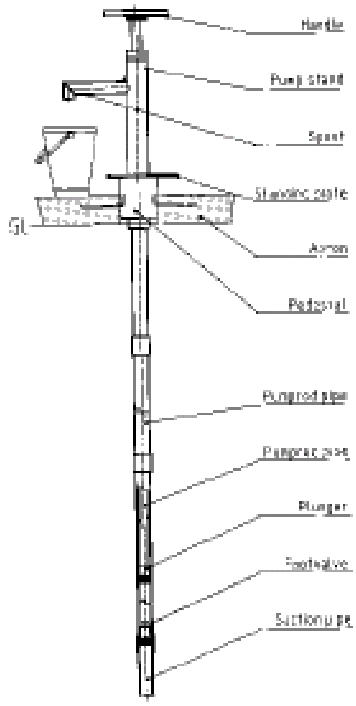
The installation of direct action pumps is easy and does not need any lifting equipment or special tools. The rising main with footvalve and pumphead as well as the pump rod with handle and plunger can be assembled on the ground. When laid next to each other the correct length can be checked. Both, the rising main and the pump rod can be easily lowered into the well.

Maintenance

These pumps have an excellent "Community Management Potential". Only simple tools are needed to pull out the entire pumping element as well as the foot valve and rising main. Direct action pumps are reliable and normally popular with the communities.

Remarks

Direct action pumps are limited to pumping lifts of a maximum of 15 m. It is recommended not to go deeper than 12 m. Direct action pumps are designed as "family" pumps (50-70 users) as well as "community" pumps (up to 300 users).



DIRECT ACTION HANDPUMP

Manufactured by
ASHOKA INDUSTRIES
122/1 'C' Sarojini Nagar, Kanpur - 208012
+91-9415125680, +91-7897777779, +919415130457, +91-512-2296528
www.ashokasuperflow.com ashokasuperflow@gmail.com

★ SAFETY
★ DISCIPLINE
★ CLEANLINESS
★ PRODUCTIVITY
★ QUALITY

Superflow PUMPS

North America | Latin America | Europe / Africa | Asia / Pacific

CM/L-9044065-Part-2
CM/L-9921594-Part-3
CM/L-9548804-Part-4
CM/L-9562188-Part-5
CM/L-9719394-Part-6
CM/L-9686311-Part-7
IS:15500 Part- 2 to 7
IAS-ANZ ICS ISO 9001 : 2000
ISO 9001: 2000 CERTIFIED CO.

No Pollution ✶ No Noise ✶ No Fule Consumption

DIRECT ACTION TARA HANDPUMP

Description

The TARA Pump as a Direct Action Handpump is based on a buoyant pump rod that is directly articulated by the user, discharging water at the up- and down stroke. TYPICALLY, TARA pumps are installed in collapsible tube wells with the screen extending to the coarse sand aquifer. The pump head and the handle are made of galvanised steel. Pump rod and rising main are of PVC pipes and the rest of the down hole components are made of rubber, plastic, stainless steel and brass. This makes this pump corrosion resistant. The TARA Pump is subject to Indian Standard IS 14106.

Technical data

Cylinder diameter (mm):	54.2
Maximum Stroke (mm):	600
*) Approx. discharge at about 75 watt input m3/h:	
at 5 m head	3.5
at 10 m head	1.8
at 15 m head	1.2
Pumping lift (m):	2 – 15
Population served (nos.):	100
Households (nos.):	10
Water consumption (lpcd):	20 – 25
Type of well:	borehole (Or dugwell)

Material

Pump head:	galvanised steel
Handle:	SS
Pump rods:	HDPE/PVC pipe
Rising main:	HDPE/PVC pipe
Plunger/footvalve:	different material

Installation

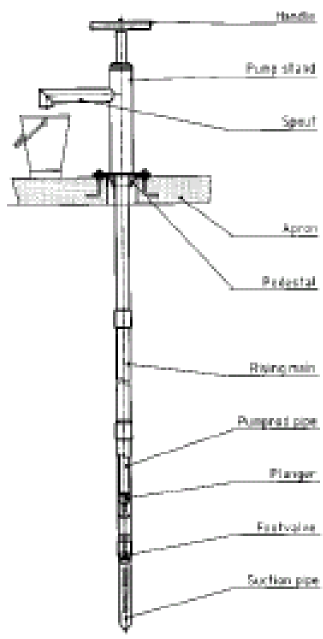
The installation of the TARA Pump is easy and does not need any lifting equipment or special tools. The drillers who sink the tube well with the "sludger method" also install the pump.

Maintenance

This pump has an excellent "Community Management Potential". Only simple tools are needed to pull out the entire pumping element and the footvalve. A village caretaker can perform all maintenance operations.

Remarks

This pump is like most of the "Direct Action Pumps" (DAP) limited to pumping lifts of a maximum of 15 m. It is recommended not to go deeper than 12 m. The TARA Pump is not designed for a high daily output, but rather a family or small community pump.



DIRECT ACTION TARA HANDPUMP

Manufactured by
ASHOKA INDUSTRIES
122/1 'C' Sarojini Nagar, Kanpur - 208012
+91-9415125680, +91-7897777779, +919415130457, +91-512-2296528
www.ashokasuperflow.com ashokasuperflow@gmail.com

★ SAFETY
★ DISCIPLINE
★ CLEANLINESS
★ PRODUCTIVITY
★ QUALITY

Superflow PUMPS

North America | Latin America | Europe / Africa | Asia / Pacific

CM/L-9044065-Part-2 | IS:15500 | IAS-ANZ
CM/L-9921594-Part-3
CM/L-9548804-Part-4
CM/L-9562188-Part-5
CM/L-9719394-Part-6
CM/L-9686311-Part-7 | Part- 2 to 7 | ISO 9001 : 2000

ISO 9001: 2000 CERTIFIED CO.

No Pollution ✶ No Noise ✶ No Fule Consumption

MALDA DIRECT ACTION HANDPUMP

Description

The MALDA Pump as a Direct Action Handpump is based on a buoyant pump rod that is directly articulated by the user, discharging water at the up- and down stroke. The pump head, standing plate and the handle are made of galvanised steel. The sleeve, which protects the handle bar against wear, is made of stainless steel. Pump rod and rising main are of HDPE pipes and the rest of the down hole components are made of plastics. This makes this pump completely corrosion resistant.

Technical data

Cylinder diameter (mm):	50.0
Maximum Stroke (mm):	410
*) Approx. discharge at about 75 watt input m3/h:	
at 5 m head	3.5
at 10 m head	1.8
at 15 m head	1.2
Pumping lift (m):	2 – 15
Population served (nos.):	300
Households (nos.):	30
Water consumption (lpcd):	15 – 20
Type of well:	borehole or dugwell

Material

Pump head	galvanised steel
Handle	galvanised steel
Handle sleeve	stainless steel
Pump rods	HDPE pipe
Rising main	HDPE pipe
Cylinder	HDPE pipe
Plunger/footvalve	HDPE

Installation

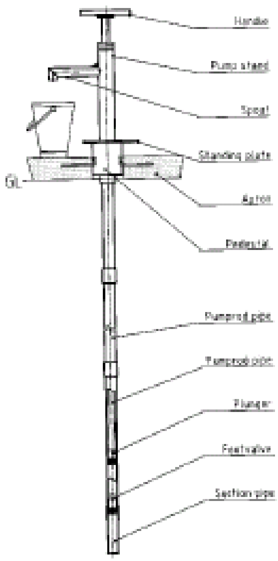
The installation of the MALDA Pump is very easy and does not need any lifting equipment or special tools. The rising main with footvalve and pump head as well as the pump rod with handle and plunger can be assembled on the ground. When laid next to each other the correct length can be checked. For the installation both, the rising main and the pampered do not need to be dismantled again.

Maintenance

This pump has an excellent “Community Management Potential”. Only simple tools are needed to pull out the entire pumping element as well as the footvalve and rising main.

Remarks

This pump is like most of the “Direct Action Pumps” (DAP) limited to pumping lifts of a maximum of 15 m. It is recommended not to go deeper than 12 m.



MALDA DIRECT ACTION PUMP

Manufactured by
ASHOKA INDUSTRIES
122/1 'C' Sarojini Nagar, Kanpur - 208012
+91-9415125680, +91-7897777779, +919415130457, +91-512-2296528
www.ashokasuperflow.com ashokasuperflow@gmail.com

★ SAFETY
★ DISCIPLINE
★ CLEANLINESS
★ PRODUCTIVITY
★ QUALITY

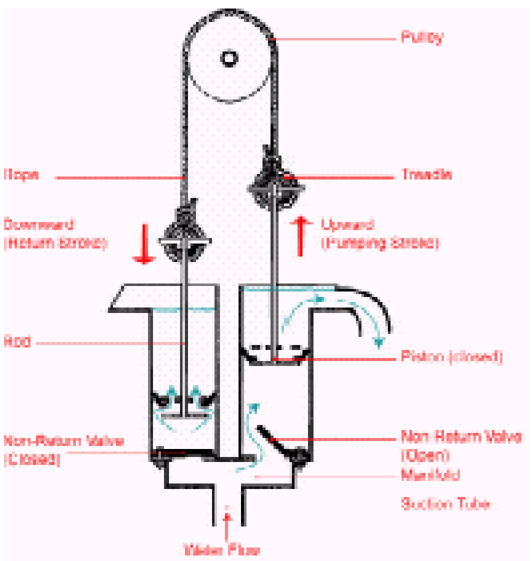
SUPERFLOW TREADLE PUMPS

HOW ITS, WORK

A treadle pump comprises a cylinder fitted with a piston and some means of pushing the piston up and down (Figure 1). A pipe connects the pump to the water source and at the end of this pipe is a nonreturn valve that allows water to enter the pipe and stops it from flowing back into the source. The piston and the cylinder must have a very close fit, so that when the piston is raised, it creates a vacuum in the cylinder and water is sucked into the pump. When the piston is pushed down, the water is pushed through a small valve in the piston to fill up the space above it. When the piston is raised again, it lifts this water until it pours out over the rim of the cylinder and into an irrigation channel or tank. At the same time, more water is drawn into the space below the piston. The downward stroke of the piston once again pushes water through the small valve into the space above the piston and the process is repeated.

This is a very simple principle that has been used for centuries for lifting water from streams and wells. The amount that can be lifted in this way is usually small, however, because pumps that use this idea are normally hand operated and the effort required to lift water is considerable. This has generally restricted their use to domestic purposes and for watering animals. This idea has now been skilfully adapted for use in irrigation, where much greater volumes of water are needed. The most important innovation has been to change the driving power from arms and hands to feet and legs. These have much more powerful muscles and so are capable of lifting much more water. Two cylinders are used instead of one. They are positioned side by side and a chain or rope, which passes over a pulley or a rocker bar, connects the two pistons so that when one piston is being pushed down, the other one is coming up. Each piston is connected to a treadle. The operator stands on the treadles and presses them up and down in a rhythmic motion – like pressing the pedals on a bicycle. Some have also described it as similar to walking. This rhythmic method of

Figure 1: Treadle pump operating principles



No Pollution ✶ No Noise ✶ No Fuel Consumption

SUPERFLOW TREADLE PUMPS

driving the pump has gained wide acceptance among farmers and seems to be preferable to any mechanism that requires only one foot or arms and hands.

This pump has become known as the *suction pump* and it is used to draw water up from a well or river and discharge it into a canal for irrigation. But since its advent another form of treadle pump has been developed which is commonly known as the *pressure pump*. This operates on exactly the same principle as the suction pump but the delivery end has been modified so that water can be fed into a pipe rather than an open channel. Instead of water flowing over the top of the cylinders into a channel, the upward movement of the pistons pushes water through a second valve into a delivery pipe. This valve closes on the downward stroke to stop the flow from reversing. In this way it is possible to maintain a pressure in the delivery pipe that can be used to drive sprinklers or drippers or deliver water to a header tank. Hence the name *pressure pump*.

These are not the ideal names, because they imply that the two pumps are different, when in reality they both work on the same suction principle. However, these are the names that have been generally accepted and so in accordance with common use they are used throughout this manual.

SOME BASIC HYDRAULICS

Many professionals without an engineering background often do not have a good understanding of basic hydraulics and pumping. This section is designed to clarify some of the important issues such as pressure, head and discharge and what is meant by such terms as suction lift and delivery head.

PRESSURE AND HEAD

Pressure is defined as a force acting uniformly over an area. It is normally measured in kilo-Newtons per square metre (kN/m2). In some European countries, kilograms force per square centimetre (kgf/cm2) is still used. Another common unit is the bar. One bar is the equivalent of atmospheric pressure and is equal to 1 kgf/cm2. Many non-engineering professionals find kilo-Newtons confusing and much prefer to work in kilograms force (kgf), as it can be easily related to the common understanding of kilograms as a measure of weight. This is the unit of measurement used throughout the manual. Pressure is often referred to as a *head of water*. To understand this, imagine a long vertical tube, in which the pressure is to be measured, connected to a pipe. Water will rise up the tube, because of the water pressure in the pipe. The height to which it will rise is a measure of the pressure. This is called the head and is another way in which pressure is expressed. It has the advantage of allowing changes in land topography that can affect pumping pressure to be taken easily into account when working out pressure requirements. It must, however, be linked to the fluid in the pipe, as different fluids would rise to different heights because of their different densities. So the correct term to use is head of water. The relationship between pressure and head is a simple one:

Head of water (m) = 0.1 ´ pressure (kN/m2)
or = 10 ´ pressure (kgf/cm2)
or = 10 ´ pressure (bar)

As an example, a pressure of 3 bar or (3 kgf/cm2) would result in water rising to a height of 30 m in the tube. (For more explanation of pressure and other aspects

Manufactured by
ASHOKA INDUSTRIES
122/1 'C' Sarojini Nagar, Kanpur - 208012
+91-9415125680, +91-7897777779, +919415130457, +91-512-2296528
www.ashokasuperflow.com ashokasuperflow@gmail.com

SUPERFLOW TREADLE PUMPS

of hydraulics, see Kay, 1998.)
Atmospheric pressure, which is important for pumping water, is equal to 10 m head of water. The reasons for its importance are discussed in the next section.

SUCTION LIFT

For operating convenience, pumps are usually located above the water source and a short length of pipe is used to draw water into the pump. This is called the suction pipe. The difference in height between the water surface and the pump is called the *suction lift*. The idea of suction lift and its limitations is one that is not well understood, so a word of explanation is perhaps appropriate here.
Pumps do not actually suck water, as is often imagined. A pump takes water from the source in much the same way as you would suck up water through a drinking straw. In fact you do not actually suck up the water; you suck out the air from the straw and create a vacuum. Atmospheric pressure does the rest, pushing down on the water surface and forcing water up the straw to fill the vacuum. Atmospheric pressure thus provides the driving force but puts a limit on how high water can be lifted in this way. It does not depend on the ability of the person sucking. At sea level, atmospheric pressure is approximately 10 m head of water, so in theory it can push water up to 10 m. But if you were relying on a straw 10 m long for your water needs, you would die of thirst! A 7 m straw would improve your chances of survival and 3 m would be even better. In other words the shorter the straw, the easier it becomes to get water.
This principle applies to all pumps, including motorized pumps and treadle pumps. Ideally, it should be possible to lift water by suction up to 10 m. In practice, a sensible limit is 7 m, because of friction losses in the suction pipe and the effort required to create a vacuum under these conditions. Even at this level, there will be difficulties in keeping out air fromleaky pipe joints and seals to maintain the vacuum. The lower the suction lift, the easier it will be to operate the pump.
The question of how to lift water from a borehole deeper than 7 m often arises. Clearly, in this situation, water cannot be lifted by any pump operating at ground level. The only way to deal with this problem is to lower the pump into the ground, so that it is less than 7 m above the water surface. This can be done either by using a submersible pump – in which case the pump is below the water level, so there is no suction – or excavating down and placing the pump on a shelf within 7 m of the water surface.
For pumps operating at high altitudes, where atmospheric pressure is less than at sea level, the practical limit will be lower than 7 m.

TOTAL PUMPING HEAD

Total pumping head is another term that needs careful use. It is the sum of the *suction lift* and the *delivery head* and is more important for the pressure pump. The delivery head is the pressure created on the delivery side of the pump; it is measured from the pump to the point of water delivery. So if the suction lift is 4 m and the pump then delivers a 7 m head to some sprinklers or hose pipe, the pumping head would be 11 m. This represents the total height through which the water must be lifted from source to delivery point. If 11 m were the maximum that a pump could deliver, any change in the suction lift would affect the delivery head. For example, if the suction lift increased to 6 m, then the delivery head would reduce to 5 m, resulting in the same total pumping head of 11 m. Just quoting delivery heads without any reference to suction lift does not provide enough information about what a pump can

Manufactured by
ASHOKA INDUSTRIES
122/1 'C' Sarojini Nagar, Kanpur - 208012
+91-9415125680, +91-7897777779, +919415130457, +91-512-2296528
www.ashokasuperflow.com
ashokasuperflow@gmail.com

SUPERFLOW TREADLE PUMPS

then the delivery head would reduce to 5 m, resulting in the same total pumping head of 11 m. Just quoting delivery heads without any reference to suction lift does not provide enough information about what a pump can do in terms of pressure.

In many pumping installations, the total pumping head would include any losses in head resulting from friction in the suction pipes and losses as the water flows through filters and valves. Flow through treadle pumps is low, so for simplicity these effects have been ignored.

Remember: Total pumping head is the suction lift **plus** the delivery head.

THE BASIC COMPONENTS

Although there are different designs of treadle pump available, there are several components which they all have in common (Figure 2).

Pump Cylinders

The use of two pump cylinders provides a nearly continuous flow of water. Although this is not so important for gravity irrigation, it can be an advantage for pressurized irrigation, where the build up of pressure is important to create a spraying action. Cylinders are normally between 75 mm and 150 mm in diameter. A common diameter is 100 mm.

Materials used include steel plate bent into a cylinder, PVC pipe, concrete and bamboo. The choice of material is strongly influenced by local availability and cost. Steel is a good choice if there are sufficient skills and machinery available to bend it into the right shape. Bamboo has been used where it is plentiful. It has the advantage that it can be maintained at farm level, but it does have a short working life. It is not suitable for pressure pumps.

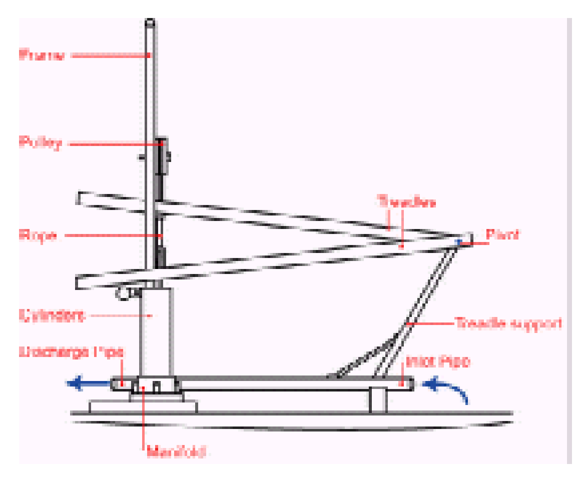
Pistons

Pistons move up and down in the cylinders when the operator presses down on the treadles. Steel rods connect the pistons to the treadles. The pistons can be made of steel, wood or plastic, with leather or rubber cups or rings to form the seal with the cylinders. The seals must also stand up to the rigours of continually moving up and down against the cylinder wall

Pump Manifold

The manifold is a steel box in a pressure pump that connects the inlet and outlet pipes to the pump cylinders. It comprises two parts: the inlet side, which allows water into the cylinders, and the outlet side, which allows water to exit from the cylinders into a delivery pipe. The suction pump only has an inlet manifold, as water spills over the top of the cylinders via a spout and discharges into a channel.

Figure 2: The basic components of a treadle pump



Non-return valves

Non-return valves allow water to flow one way and stop it from flowing back to the source. Treadle pumps can have several non-return valves. One can be located at

SUPERFLOW TREADLE PUMPS

the entrance of the suction pipe to stop it from draining every time pumping stops.Interestingly, very few pumps use this valve, which means that the pump must be re-primed every time pumping begins. A second valve is located at the top of the suction pipe in the inlet manifold to stop reverse flow during pumping. Pressure pumps have a third non-return valve in the outlet manifold, to stop reverse flow once the water has been pressurized.

Treadles

The operator stands on the treadles and pushes them up and down to work the pump. They can be about 1 metre long, hinged at one end and supported at the other by a rope or chain running over a pulley. They are connected to the piston rods so that the movement of the treadles is transferred to the pistons. Treadles can be made from steel, wood or bamboo. Treadles need to be strong enough to take the forces applied by the weight of the operator.

Pulley wheel or rocking bar

The pulley wheel and rope connect the two treadles and enable the operator to work the treadles up and down in a reciprocating movement. The pulley is usually made of wood soaked in oil to preserve it and to lubricate the movement. An alternative to the pulley is a rocking bar, which is pivoted in the middle

Frame

The components of the treadle pump are mounted on a frame, which keeps all the parts together and provides support for the operator. Some pump frames are made from wood and are very portable. This can be important when security is a problem and pumps cannot be left in the field overnight. However, some designs use sturdy metal frames which can stand up to the rigours of continual use; one design is encased in concrete (see Swiss “concrete” pump) which makes it difficult to move and hence difficult to steal.

Pump Design Features

Treadle pumps provide one of the best ways of using human power to lift water. Sizing of the components and careful design are essential to ensure that this is done in the most efficient manner. Pump output requirements of discharge and pressure must be matched with the mechanical components, such as the diameter of the pistons, their stroke length, the weight of the operator and the cadence – the frequency with which the treadles are pushed up and down. This process of design is complicated by the wide variations of possible pumping needs of different sites and the wide range and ability of operators, who must be comfortable when using the pump and not bent over in some awkward position. The design must be as simple as possible in terms of its manufacture and maintenance. This section looks at these issues and explains, for example, why some treadle pumps have small diameter cylinders while others have large ones.

Human power – what can be achieved?

It is generally accepted that a reasonably fit, wellfed human being between 20 and 40 years old can produce a steady power output of around 75 watts for long periods (Fraenkel, 1986). This may not be the case in many developing countries, so a more realistic output may be around 30 to 40 watts. This power is transferred to the pump when the operator stands with one foot on each treadle and pushes them up and down in a reciprocal motion. This is a very natural movement for the human body; it can be sustained for several hours, if the parameters of stroke length and the

SUPERFLOW TREADLE PUMPS

cadence are matched with the ability of the operator.

A steady output of 75watts is the equivalent of walking up stairs at home in 20 seconds. This may not seem such a difficult task but try doing it continuously for 4–6 hours each day.

Assuming a 75 watt output, it is possible to calculate what can be done with this human power. In theory, if a suction pump has a suction lift of 1.0 m, then 75 watts would produce a discharge of 7.5 Liters / Second. At 2.5 m suction, this would fall to 3 Liters / Second and at 5 m it would be 1.2 Liters / Second. As the suction lift increases, the discharge that can be achieved decreases. It is not possible to convert all the 75 watts into useful water pumped: some will inevitably be lost through friction in the pipes and in the pump and valves. Introducing an efficiency factor of 50 percent for the conversion of human power into water power would reduce the discharge at 2.5 m suction from 3 Liters / Second to 1.5 Liters / Second

Fraenkel (1986, p.137) summarizes this by calculating the discharge and head for an input power of 75 watts at 50 percent efficiency as shown in Table 4.

Table 4. Discharge and Head

Head (m)	0.5	1.0	2.5	5.0
Discharge (Ltr / Sec)	7.6	3.8	1.52	0.6

Of course, if two people operate the pump at the same time, as is often done in some countries, then obviously the input power and the output in terms of pressure and discharge will be much greater.

This puts upper limits on what can be realistically achieved with human power.

Remember! There is no such thing as a free lunch. If you want to lift a given quantity of water from a given depth, you must provide the human power to do it. The pump just provides a more efficient means of converting human power into waterpower. But there are limits to what can be achieved.

Pump ergonomics

Ergonomics is the science of matching people with machines – in this case matching operators with treadle pumps. In this way, the pump component sizes and dimensions are chosen to get the best out of the human power input and ensure that the pumps are comfortable to operate.

Piston / cylinder diameter

Pistons and cylinder diameters range between 75- 150 mm, with 100 mm being a common choice. Piston diameter puts an upper limit on the pressure that can be achieved (see Discharge).

Stroke length

There are two stroke lengths to consider: the foot stroke length and the piston stroke length. The foot stroke length is the vertical distance between the feet when one foot is raised and the other is at its lowest point. If the stroke is too short, the leg muscles tire quickly; if it is too long, the leg muscles are straining.Bicycles are one of the best known ways of using human leg power. The distance between bicycle pedals is approximately 340 mm, which would be a long stroke for a treadle pump and the pumping speed (cadence) would be slow. The stroke is governed by what is a comfortable speed to operate the pump. A stroke length of 100-350 mm is a typical range but it depends on how the pump will be used. Given a choice, an operator would normally choose a short stroke length for high heads and a longer stroke for low heads.