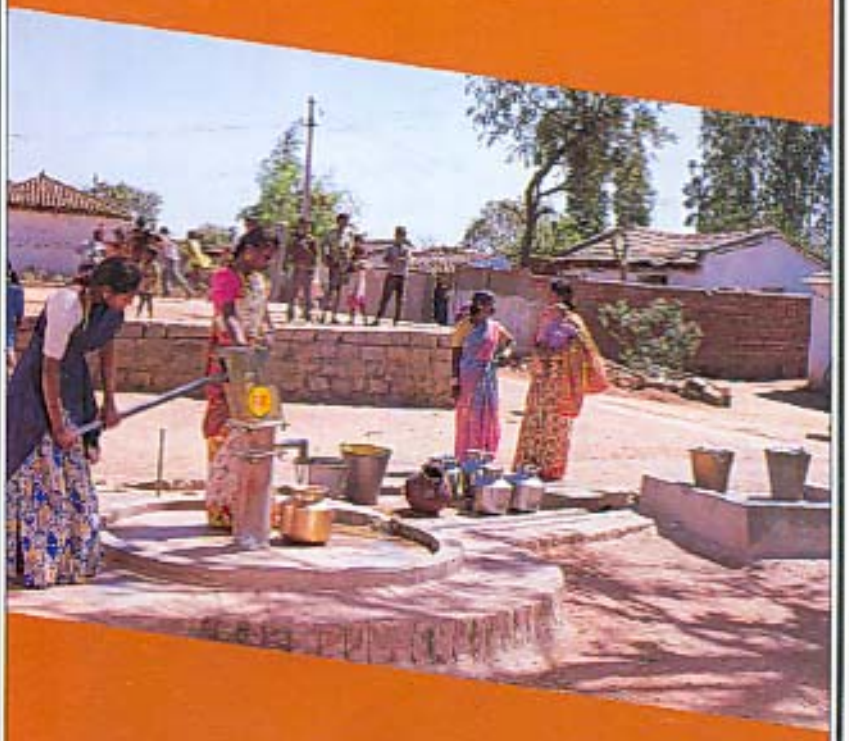
# INDIA MARK III HANDPUMPS



WATER MISSION

unicef

# THE 50 mm MARK III PUMP

The world wide acceptance of the India Mark II handpump encouraged further research in India with a view to achieving the following objectives:

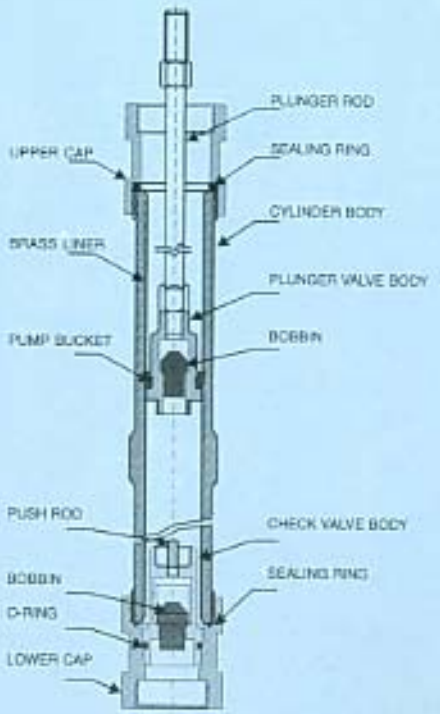
- Reduction of the unit cost of the pump through design optimisation.
- Improved ease of repairs to facilitate village level operation and maintenance through design modification.

These focussed efforts, at first, resulted in the development of the 65mm India Mark III handpump, and later, the Mark III pump with the 50mm open top cylinder (OTC) which offers significant additional advantages over the earlier model while retaining its basic structure.

The features and advantages of the 50 mm India Mark III pump are:

| Features | Advantages |
|---|---|
| • 50mm riser pipe | • Lower capital cost |
| • Interchangeable nitrile bobbin valves | • Suitable for use upto 60m |
| • 50 mm open top cylinder | • Can be installed on 100mm wells |
| • Single nitrile cup washer | • PVC Riser pipe option |
| • Pipe stabilizers | • Unlined wells can be used |
| • Monolithic piston and foot valve assembly | • Tools not required for servicing piston and foot valve |

**50 mm INDIA MARK III PUMP.**



# MARK III HAND

## EASE OF MAINTENANCE

Analysis of reports on the break-down of the Mark III handpumps suggests that in more than 75 per cent of the cases the pump can be made functional by just servicing the cylinder elements.

The design of the 50 mm India Mark III handpump facilitates quick replacement of the cylinder components such as valves and cup washer. In fact, the replacement of the bobbin valve and the cup washer can be done with bare hands!

**Replacement of bobbin valve**

**Replacement of cup washer**

The simple and light tool kit, specially developed for the village mechanic, further facilitates easy repairs. The kit also includes fast-moving spares for ensuring smooth operation of the pump for two years.

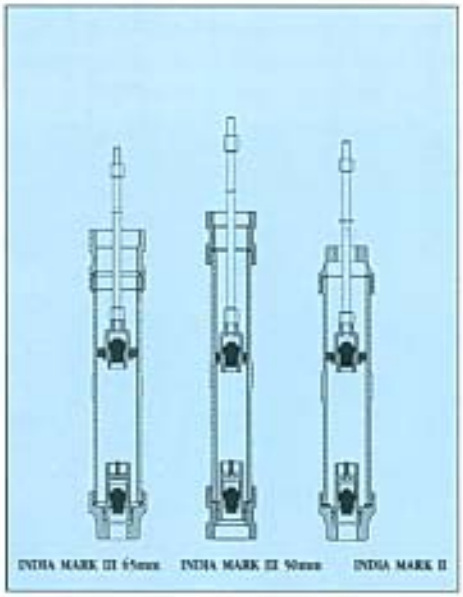
The use of ring connectors on the pump rods and the fibre glass rods with specially designed couplers, presently under field trial in Rangareddy district of the state of Andhra Pradesh, will further simplify withdrawal of the cylinder elements for easy servicing.

**Fibre glass rod**

**Ring connector**

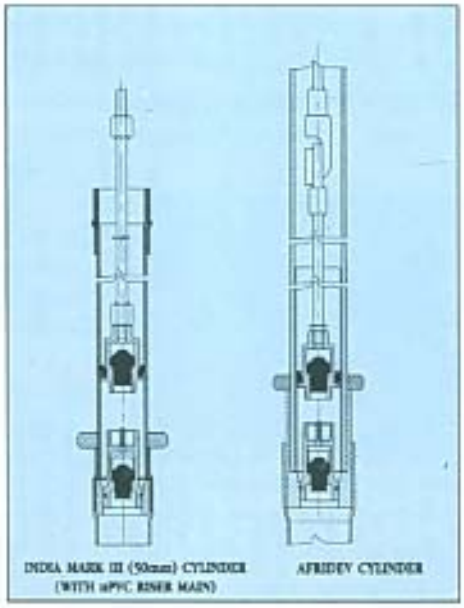
## UNIVERSAL CYLINDER

Presently, a number of deep well handpump designs are in use. In South Asian countries alone, three different cylinder designs have been standardised. Although no single pump can be identified for a global water supply programme, the below-ground assembly components of all the pumps, however, can be considered for unification and universal use.




**Unification of India Mark II and Mark III cylinders**

The use of the unified cylinder components will help to minimise spare parts inventory and will facilitate standardisation under ISO and reduce repair and maintenance costs.




**Unification of Afridev and India Mark III (PVC) cylinders**

# HANDPUMP OPTIONS IN INDIA

| Sr. No. | CHARACTERISTICS | PARAMETERS | | | | | |
|---|---|---|---|---|---|---|---|
| | | SINGUR | TARA | INDIA MARK II | INDIA MARK III(65mm) | 50 MM OTC (50mm) | EXTRA DEEPWELL |
| 1. | Pump Type | Suction | Positive displacement, direct action | Positive displacement | Positive displacement | Positive displacement | Positive displacement |
| 2. | Application Range: | | | | | | |
| | Static Water Level | Upto 7mtrs. | 7 to 15 mtrs | 15 to 40 mtrs. | 15 to 25 mtrs. | 15 to 50 mtrs. | 40 to 90 mtrs. |
| | Optimum install.depth | | 7 to 18 mtrs. | 21 to 40 mtrs. | 21 to 30 mtrs. | 21 to 60 mtrs. | 50 to 100 mtrs. |
| 3. | Min. borewell dia. | 50mm | 90mm | 100mm | 125mm | 100mm | 100mm |
| 4. | Riser main: | | | | | | |
| | Size | 40mm NB | 50mm NB | 32 mm NB | 65 mm NB | 50 mm NB | 32 mm NB |
| | Material | Galv. steel/PVC | PVC | Galv. steel | Galv. Steel | Galv. steel/PVC | Galv. steel |
| 5. | Connecting rod: | | | | | | |
| | Size | 12 mm | 32 mm OD Pipe | 12 mm | 12mm | 12mm | 12mm |
| | Material | Steel,zinc plated | PVC | Steel,zinc plated | Steel, zinc plated | Steel, zinc plated | Steel, zinc plated |
| 6. | Stroke length | 220mm | 300 to 400mm | 125mm | 125mm | 175mm/125mm | 100mm |
| 7. | Discharge/40 strokes | 40 ltrs.(minimum) | 28 ltrs.(minimum) | 15 ltrs.(minimum) | 15 ltrs.(minimum) | 14ltr/10ltr (minimum) | 12 ltrs. (minimum) |
| 8. | Suitability for VLOM | Yes | Yes | Yes | Yes | Yes | Yes |
| 9. | Installation: | | | | | | |
| | Skill level required | 2 unskilled workers | 2 trained workers | 4-5semi-skilled workers | 5-6 semi-skilled workers | 4-5 semi-skilled workers | 5-6 semi-skilled workers |
| | Ease of installation | Very easy | Very easy | Easy | Extra care required | Easy | Extra care required. |
| | Tools required | Single 19 mm spanner & pipe spanner | 2 special spanner (supplied with pump) | Set of special tools with standard tools | Set of special tools with standard tools | Set of special tools with standard tools | Set of special tools with standard tools |
| 10. | Operation & maintenance: | | | | | | |
| | Operational ease | Very easy | Very easy | Easy | Slightly heavy | Easy | Depends on depth |
| | Maintenance ease | 1 unskilled person can handle. | 2 unskilled workers can handle. | 4-5semi-skilled workers | 2-3 trained workers can handle. | 2-3 trained workers can handle. | 5-6 semi-skilled workers required. |
| | Maintenance tools | Single 19mm spanner | 2 Special spanner (supplied with pump) | Set of special tools | A part of special tools | A part of special tools | Set of special tools |
| 11. | National Standard | Under preparation | IS 14106: 1996 | IS 9301 : 1990 | IS 13056 : 1991 | Under preparation | IS 13287 : 1992 |
| 12. | Pre-delivery inspection | Mandatory | Mandatory | Mandatory | Mandatory | Mandatory | Mandatory |
| 13. | Current manfg. capacity/year | About 20,000 | About 40,000 | About 100,000 | About 30,000 | About 20,000 | About 5,000 |
| 14. | Unit cost *indicative only | $35 | $140 | *$175 | *$240 | *$205 | *$250 |

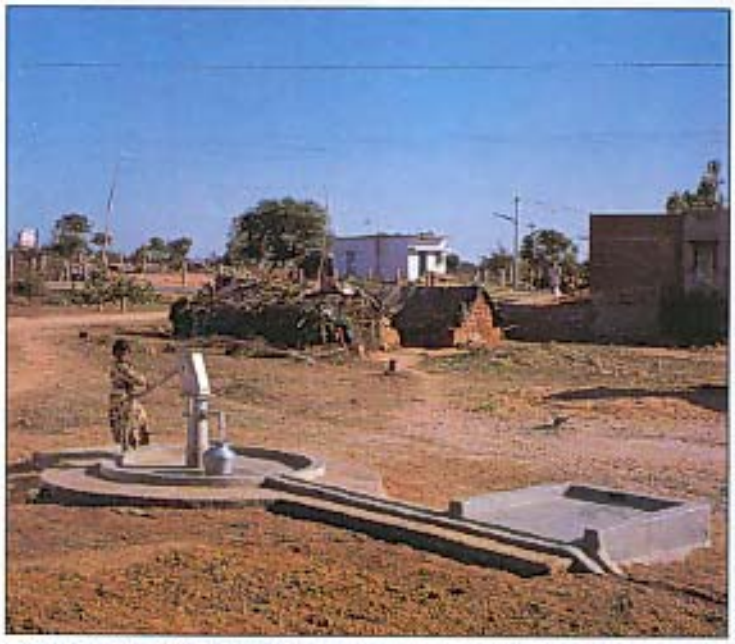
* The cost is for 30m installation depth inclusive of G.I. riser pipes, connecting rods and cylinder.

INDIA MARK

# III HANDPUMPS

## ENVIRONMENTAL IMPROVEMENT FOR WATER QUALITY CONTROL

Water quality monitoring surveys of spot sources indicate that a high percentage of the wells drilled in the hard rock areas may produce bacteriologically contaminated water. The absence of sanitary sealing around the casing pipe and accumulation of waste water around the handpump have been identified as major reasons for well contamination in many cases



The sanitary environment around the borewell handpump can be improved by providing a brick-lined apron and facilities such as a washing platform.

It is important to regularly monitor the quality of drinking water in order to identify water sources which are contaminated.

The $H_2S$ strip-bacterial vial offers a low cost, easy-to-use and dependable method for monitoring bacteriological contamination of water at the users' level.

**Contaminated water turns black**

Rajiv Gandhi National Drinking Water Mission
Ministry of Rural Areas & Employment
Government of India.

unicef
United Nations Children's Fund
Water and Environmental Sanitation Section
INDIA COUNTRY OFFICE
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NIKHIL OFFSET.