





Government of the People's Republic of Bangladesh
Ministry of Local Government, Rural Development & Cooperatives
Local Government Division

Design and Specifications Manual of Tara Hand Pump

Version 2018

Department of Public Health Engineering (DPHE)

July, 2018

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
জনস্বাস্থ্য প্রকৌশল অধিদপ্তর
১৪, শহীদ ক্যাপ্টেন মনসুর আলী স্বরণি
কাকরাইল, ঢাকা-১০০০।

উন্নয়নের গণতন্ত্র
শেখ হাসিনার মূলমন্ত্র

স্মারক নং-৪৬.০৩.০০০০.০০১. ১৪· ৪১৫ তারিখ - ৩০/০৭/২০১৮ খ্রিঃ

প্রেরক ঃ প্রধান প্রকৌশলী
জনস্বাস্থ্য প্রকৌশল অধিদপ্তর
বাংলাদেশ সরকার, ঢাকা ।

প্রাপক ঃ অতিরিক্ত প্রধান প্রকৌশলী (পরিকল্পনা)
জনস্বাস্থ্য প্রকৌশল অধিদপ্তর
বাংলাদেশ সরকার, ঢাকা।

বিষয় ঃ "তারা হ্যান্ডপাম্প এর ডিজাইন ও স্পেসিফিকেশনস ম্যানুয়াল ভার্সন- ২০১৮" এর অনুমোদন প্রসঙ্গে।

সূত্র ঃ অতিরিক্ত প্রধান প্রকৌশলী পরিকল্পনা, জঃস্বাঃপ্রঃঅঃ, ঢাকা এর কার্যালয়ের স্মারক নং-৪৬.০৩.২৬০০.০০৩.১৮.০০১.১৮-৮৭৬, তারিখঃ ৩০/০৭/২০১৮ খ্রিঃ।

উপর্যুক্ত বিষয় ও সূত্রের পরিপ্রেক্ষিতে, দেশের বিভিন্ন অঞ্চলে গভীর পানির স্থিতিতল বিশিষ্ট এলাকায় নিরাপদ পানি সরবরাহের জন্য তারা হ্যান্ড পাম্প প্রযুক্তির গুণগতমান নিশ্চিত করার লক্ষ্যে টেকনিক্যাল কমিটির তত্ত্বাবধানে প্রস্তুতকৃত "তারা হ্যান্ডপাম্প এর ডিজাইন ও স্পেসিফিকেশন ম্যানুয়াল ভার্সন- ২০১৮" অনুমোদন করা হলো।

সেই সাথে তারা হ্যান্ড পাম্প স্থাপন কার্যে অনুমোদিত ম্যানুয়ালটি মাঠ পর্যায়ে যথাযথভাবে অনুসরণ করার প্রয়োজনীয় ব্যবস্থা গ্রহণের জন্য অনুরোধ করা হলো। উল্লেখ্য যে, বাস্তবতার আলোকে এবং প্রয়োজনের নিরিখে টেকনিক্যাল কমিটির তত্ত্বাবধানে এ ম্যানুয়ালটি নিয়মিত পরিমার্জন, পরিবর্ধন ও হালনাগাদ করা যেতে পারে।

সংযুক্তিঃ অনুমোদিত "তারা হ্যান্ডপাম্প এর ডিজাইন ও স্পেসিফিকেশনস ম্যানুয়াল ভার্সন- ২০১৮" এর কপি।

৩০/৭/১৮
(মোঃ রশিদুল হক)
প্রধান প্রকৌশলী
জনস্বাস্থ্য প্রকৌশল অধিদপ্তর
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স্মারক নং- ৪৬.০৩.০০০০.০০১.১৪·৪১৫/১ (১০০) তারিখ- ৩০/০৭/২০১৮ খ্রিঃ

সদয় অবগতির জন্য অনুলিপি প্রেরণ করা হল (জ্যেষ্ঠতার ভিত্তিতে নয়)-

১। অতিরিক্ত প্রধান প্রকৌশলী (পরিকল্পনা/পানি সম্পদ/পূর্ত), জনস্বাস্থ্য প্রকৌশল অধিদপ্তর, বাংলাদেশ সরকার, ঢাকা।
২। তত্ত্বাবধায়ক প্রকৌশলী, জনস্বাস্থ্য প্রকৌশল অধিদপ্তর, ---------- সার্কেল, ---------- ।
৩। প্রকল্প পরিচালক, ---------- প্রকল্প, জনস্বাস্থ্য প্রকৌশল অধিদপ্তর, ঢাকা।
৪। নির্বাহী প্রকৌশলী, জনস্বাস্থ্য প্রকৌশল অধিদপ্তর, ---------- বিভাগ, ---------- ।

৩০/৭/১৮
(মোঃ রশিদুল হক)
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জনস্বাস্থ্য প্রকৌশল অধিদপ্তর
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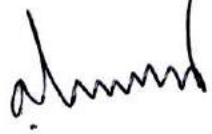
Foreward

Rural water supply in Bangladesh predominantly depends on groundwater, using low cost tubewell technology. Tara hand pump is a cost effective and green technology for safe drinking water supply in low water table areas. The Department of Public Health Engineering (DPHE) has been installing tubewells with tara hand pumps since 1984. Afterwards, several modifications were made in this technology under different projects in order to make the technology more user-friendly. As a result, different Design and Specifications Manuals are being followed by different projects which resulted difficulties for the manufacturers to maintain desired accuracy in specification. Which ultimately affects supervision of installation and performance of the pumps.

To address the challenge of groundwater table depletion along with providing quality service to the users, a unified and comprehensive Design and Specifications Manual was necessary. Therefore, based on previous experience of different projects and experts of this sector, this 'Design and Specifications Manual of Tara Hand Pump- Version 2018' has been prepared. From now on, Department of Public Health Engineering will follow this manual for installation of tubewells with Tara hand pumps.

The tremendous efforts and visionary approach of the team for compiling this unified manual with the combined effort of Project Directors, field level personnel, sector experts and the manufacturers under the guidance of the technical committee, DPHE is much appreciated.

Considering changed scenario with elapsed time this manual will be reviewed and updated by Technical Committee, DPHE periodically (preferably after every two years) and shall be followed accordingly.



(Md. Rashidul Huque)
Chief Engineer
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Government of Bangladesh

Acknowledgement

We would like to offer our sincere gratitude to Mr. Md. Mostafa, Project Director, Village Water Supply Project, Department of Public Health Engineering (DPHE) under whose leadership this manual is now completed within stipulated timeframe. His tireless and enthusiastic effort for improving Tara Hand Pump as user friendly and sustainable technology was an inspiration behind compiling this manual. During compilation of the manual, Technical Committee, DPHE provided valuable comments for making this manual more realistic and field oriented. We would like to convey our thanks and sincere gratitude to Mr. Tushar Mohon Shadhu Khan, Project Director, Arsenic Risk Reduction Project for Water Supply and Mr. Mohammed Hanif, Project Director, Preferential Rural Water Supply Project for providing experienced opinion for compiling the manual.

Special thanks to Mr. S. M. Ihtishamul Huq, National Advisor, JICA, Bangladesh and Mr. Sudhir Kumar Ghosh, Advisor, ADB, Bangladesh whose expert opinion, selfless and sincere effort to improve this manual help us at a great extent and we thank all the anonymous reviewers for their thoughtful insights.

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Preface

TARA hand pump technology for low water table area has been developed in Bangladesh during 1984. Series of modification of this hand pump has been integrated targeting easier and effective operation-maintenance and for ensuring sustainability. Meanwhile, water level has been depleted in alarming manner, as a consequence of climate change and indiscriminate use of ground water. At present, major portion of rural areas of Bangladesh requires Tara hand pump technology to extract ground water for drinking purpose and this demand is predicted to increase in future. On the other side, limited number of skilled manufacturers of Tara pump is also a challenge and their development by providing proper facilities is the demand of the time. In this situation, establishing a comprehensive and unified design and specification manual for Tara Pump has become a burning question for DPHE. From that point of view, this design and specification manual for Tara hand pump has been compiled after a series of discussions, workshops, field demonstrations and meetings of DPHE technical committee, which will be used for manufacturing, inspection and installation of this type of hand pump under different projects of DPHE.

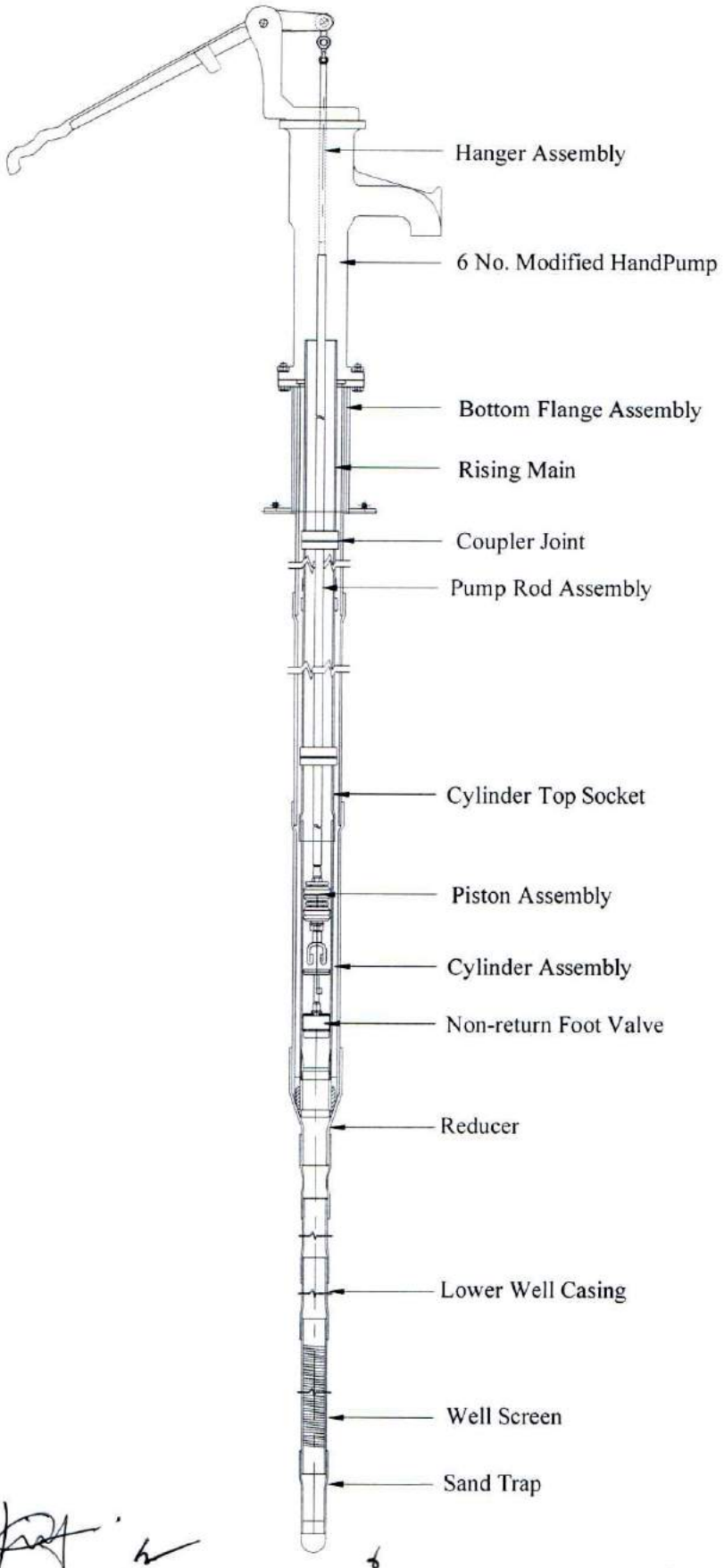
Design and specification of Tara hand pump which is presented in this manual is compiled from BRWSSP, DSP model; Tara Hand Pump (Extractable), VWSP model and outcomes of some research and development activities under Village Water Supply Project (VWSP). Tara hand pump presented in this manual is integrated with deep and shallow tube-wells in low water table areas, and with arsenic iron removal plant (AIRP) and dug-well, where it will be applicable. Installation of this set needs to be supervised and monitored strictly for smooth functioning. Materials quality (physical parameters) shall have to be inspected and certified by Crown Agents or any other assigned inspection team before installation.

This Tara hand pump has the capability to work up to a Static Water Table of about 30 (thirty) meters with manual discharge rate around 20 liters/minute. However, the pump rod, rising main and housing pipe will be adjusted based on water table of the target area. The cylinder has to be fixed at least 3(three) meters below the lowest water table. Further development can be made by manufacturing specialized pump head to reduce frictional force, using of improved quality machine made PVC socket of pump rod to increase production rate, using of improved quality foot valve or alternative and improved rubber materials for piston assembly to ensure sustainability etc.

Finally, it is suggested to install and to use this Tara hand pump with much care and responsibility to confirm its efficiency and performance.

(A.K.M. Ibrahim)
Additional Chief Engineer (Planning)
Department of Public Health Engineering.

Tara Hand Pump



List of Abbreviation and Acronyms

ARRP - Arsenic Risk Reduction Project
BRWSSP- Bangladesh Rural Water Supply and Sanitation Project
PRWSP- Preferential Rural Water Supply Project
VWSP- Village Water Supply Project
R&D- Research and Development
DPHE- Department of Public Health Engineering
DSP- Deep Set Pump
ID- Inner Diameter
OD- Outer Diameter
CI- Cast Iron
PVC- Polyvinyl Chloride
PP- Polypropylene
SS- Stainless Steel
MS- Mild Steel
3D- Three-dimensional
UOS- Unless otherwise specified

Table of Content

1. General Specifications of Modified 6 No. Hand Pump

1.1 Barrel

a) Dimension

- Length:730±5 mm
- Diameter of Barrel top part (OD):Ø125±2 mm
- Diameter of Barrel top part (ID): Ø110±3 mm
- Diameter of Barrel bottom part (OD): Ø105±2 mm
- Diameter of Barrel bottom part (ID): Ø90±1mm

b) Material: Cast Iron (CI)

c) Quantity: 1no.

d) Weight: minimum13.8 kg

1.2 Handle

a) Dimension

- Total length: 740±10 mm
- Central Distance between fulcrum pin to hanger pin:138.5±1mm

e) Material: Cast Iron (CI)

b) Quantity: 1 no.

c) Weight: minimum 5.8 kg

1.3 Head Cover

a) Dimension

- Length: 175±3mm
- Width: 165±3mm

b) Material: Cast Iron (CI)

c) Quantity: 1 no.

d) Weight: minimum 5.5 kg

1.4 Pins

a) Dimension

- Length:
  - Hanger Pin: 84±4 mm
  - Fulcrum Pin: 116±5 mm
  - Pivot Pin: 70±1 mm
  - Cottar Pin: 48±3 mm
- Hanger, Fulcrum and Pivot Pin Diameter: 16 ±0.3 mm

a) Material: Mild Steel (Electro-Galvanized)

b) Quantity:

- Hanger Pin: 1 no.
- Fulcrum Pin: 1 no.
- Cottar Pin: 6 nos.(2 nos for each hanger pin, fulcrum pin and pivot pin)

c) Weight: N/A

1. General Specifications of Modified 6 No. Hand Pump

1.5 Nut-bolt

a) Dimension

- Length: 63.5±1 mm
- Diameter: 12 mm

b) Material: Mild Steel (Electro-Galvanized)

c) Quantity: 8 nos.

d) Weight: Not Applicable (N/A)

1.6 Barrel Top flange:

a) Dimension

- Length: 165± 2 mm
- Width: 165± 2 mm
- Thickness: 17.5 ± 2 mm

b) Material: Cast Iron (CI)

c) Quantity: 1 no

1.7 Barrel Bottom flange:

a) Dimension

- OD: 170± 2 mm
- ID: 90± 2 mm
- Thickness: 19 ± 2 mm

b) Material: Cast Iron (CI)

c) Quantity: 1 no

1.8 Head Cover Safety Pad

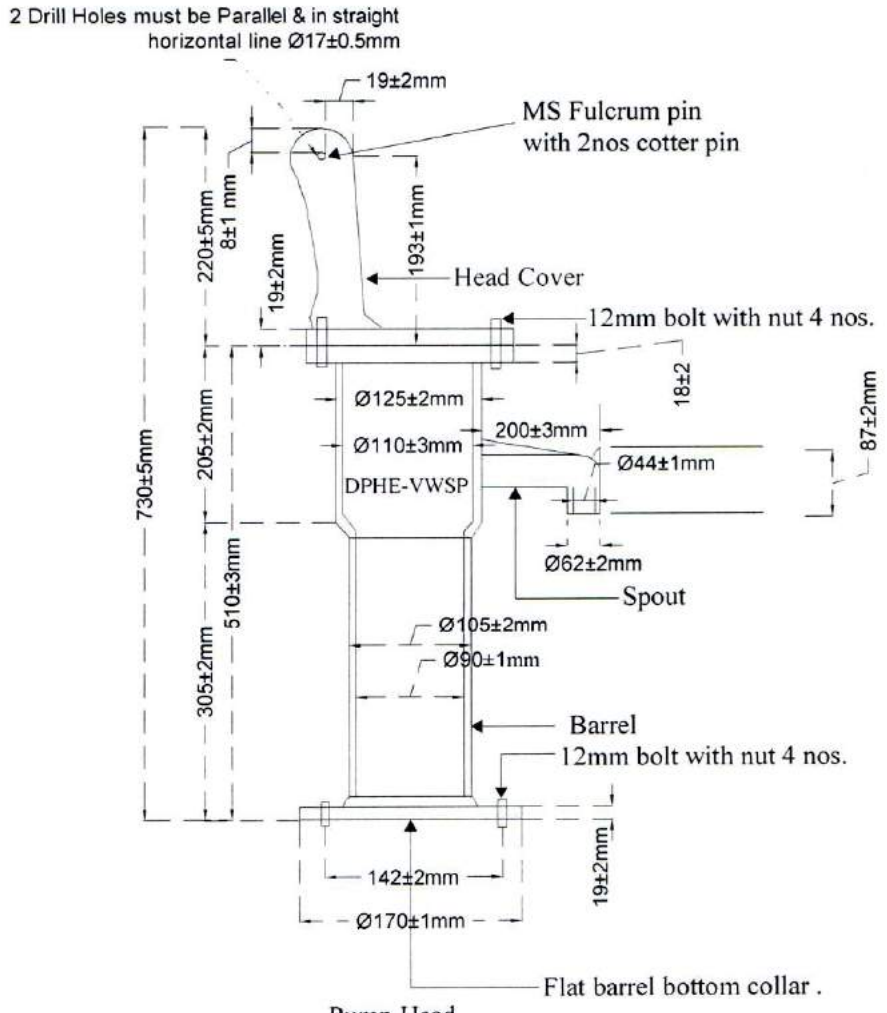
a) Dimension

- OD: 60± 2 mm
- ID: 13± 2 mm
- Thickness: 8 ± 1 mm

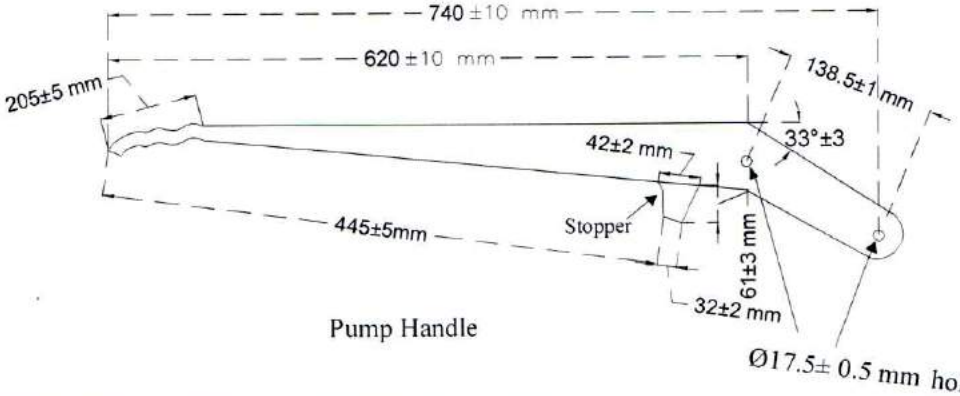
b) Material: Rubber

c) Quantity: 1 no

1. Modified 6 No. Pump Head



Pump Head



Pump Handle

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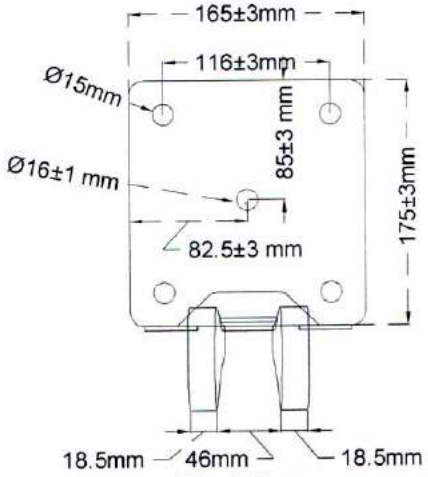
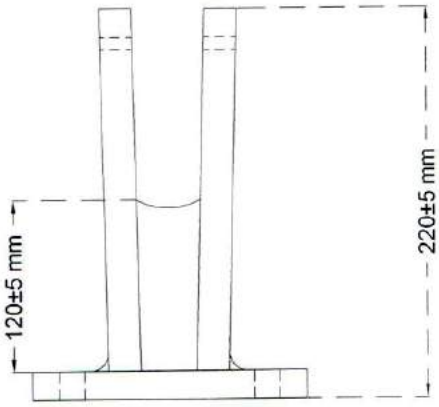
12/09/18 Md. Mostafa Project Director Village Water Supply Project, DPHE, Dhaka	22/9/18 Tushar Mohon Shadhu Khan Project Director Arsenic Risk Reduction Project for Water Supply DPHE, Dhaka	9.8.18 A.K.M. Ibrahim Additional Chief Engineer(Planning) DPHE, Dhaka

1. Modified 6 No. Pump Head

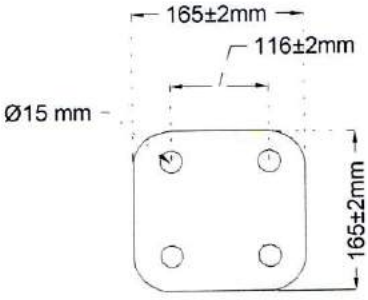


Head Cover

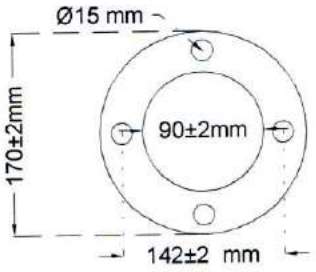


Head Cover

Head cover Safety Pad



Barrel Top Flange



Barral Bottom Flange

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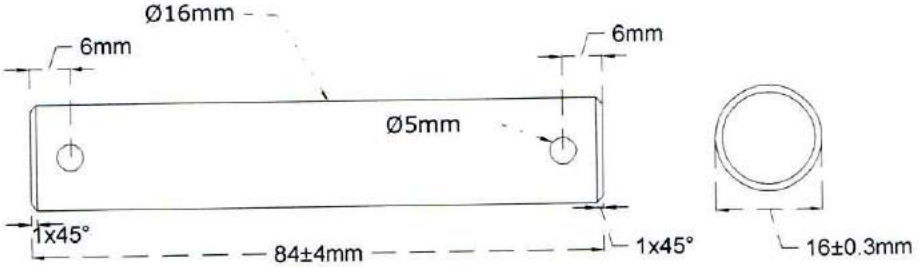
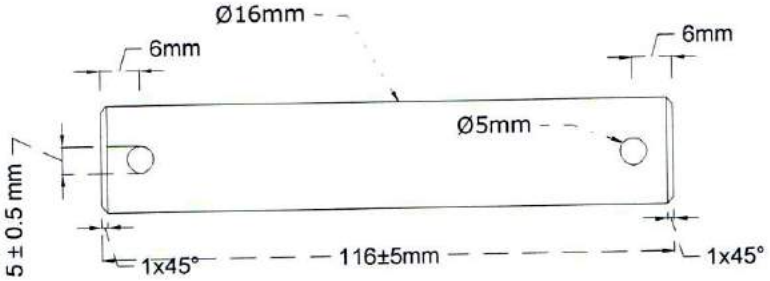
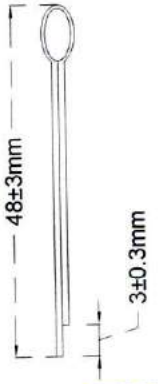
1. Modified 6 No. Pump Head



Hanger Pin



Fulcrum Pin



Cottar Pin

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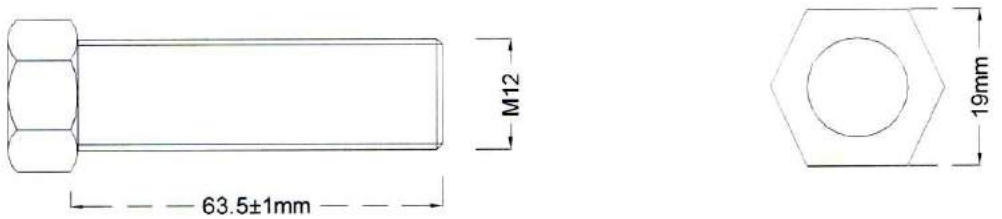
1. Modified 6 No. Pump Head



Hexa Head Bolt

Top View

Side View

Hexagonal Nut

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2. General Specifications of Bottom Flange Assembly

2.1 Pump Stand

a) Dimension
   1) Flange
      - Outer Diameter (OD): ø170±1 mm
   2) Pipe
      - Length: 400±10 mm
      - Outer Diameter (OD): 113±1 mm
      - Inner Diameter (ID): 105±1 mm
      - Thickness: 4±0.5 mm
   3) Deformed Cross Bar 4 nos
      - Each Length : 235±2 mm
      - Diameter: 12 mm

b) Material: Mild Steel (Hot Deep Galvanized)
c) Quantity: 1 no.
d) Weight: N/A

2.2 Rubber Cone Grommet

a) Dimension
   - Height: 20±1 mm
   - Top ID: ø82±1 mm
   - Bottom OD: ø166±1 mm
   - Bottom ID: ø59±1 mm

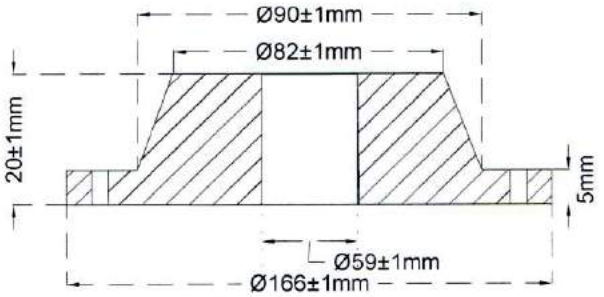
b) Material: Nitrile Rubber (Hardness: 55-70 Shore 'A')
c) Quantity: 1 no.
d) Weight: N/A

2.3 4" Centralizer

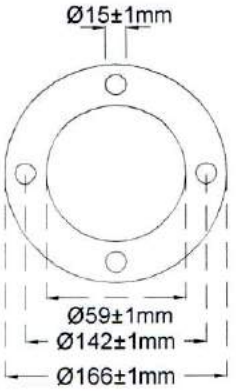
a) Dimension
   - Height: 40±1 mm
   - Outer Diameter: ø103±1 mm
   - Inner Diameter: ø87±1 mm

b) Material: Nitrile Rubber (Hardness: 65-75 Shore 'A')
c) Quantity: 1 no.
d) Weight: N/A

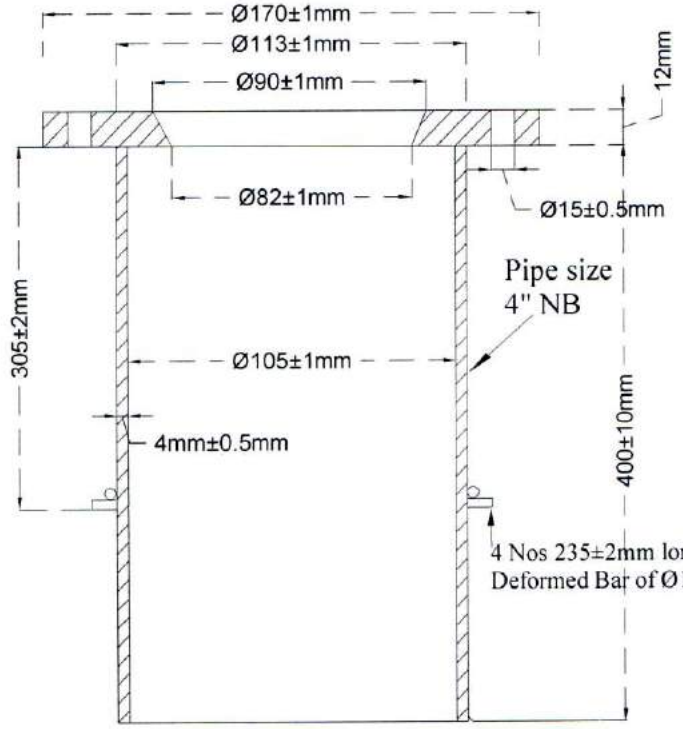
2. Bottom Flange Assembly



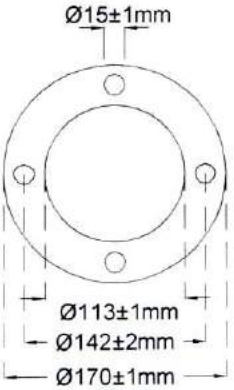
Grommet



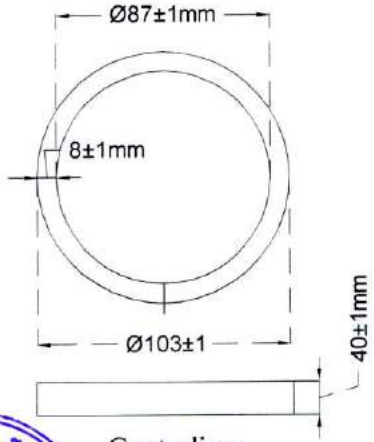
Top View of Grommet



Pump Stand



Flange



Centralizer

Note: Inside seam of stand pipe to be smoothed out as much as possible
Tolerence: U.O.S ± 1mm

Design and Specification Manual of Tara Hand Pump	Nazia Tasmin 29/7/18 **Nazia Tasmin** Executive Engineer Design Division, DPHE, Dhaka	29.07.18 **Mohammed Hanif** Project Director Preferential Rural Water Supply Project, DPHE, Dhaka
29/09/18 **Md. Mostafa** Project Director Village Water Supply Project, DPHE, Dhaka	29/9/18 **Tushar Mohon Shadhu Khan** Project Director Arsenic Risk Reduction Project for Water Supply DPHE, Dhaka	29.7.18 **A.K.M. Ibrahim** Additional Chief Engineer(Planning) DPHE, Dhaka

3. General Specifications of Hanger Rod Assembly

3.1 Hanger Pivot

3.1.1 Pivot Head

a) Dimension

- OD: ø 38 ±0.3 mm
- ID: ø17± 0.3 mm
- Thickness: 16 ±0.5 mm

b) Material: Stainless Steel (SS)

c) Quantity: 1 no.

3.1.2 Pivot Shaft

a) Diameter: ø12 mm

b) Length: 50 ±2 mm

c) Material: Stainless Steel (SS)

d) Quantity: 1 no.

3.1.3 Pivot Bush

a) Dimension

- OD: ø 25 ±0.3 mm
- ID: ø17± 0.3 mm
- Thickness: 16 ±0.5 mm

b) Material: Stainless Steel (SS)

c) Quantity: 2 nos

3. General Specifications of Hanger Rod Assembly

3.2 Hanger Rod

3.2.1 Hanger Head

a) Dimension
- OD: ø 25 ±0.3 mm
- ID: ø17± 0.3 mm
- Thickness: 16 ±0.5 mm

b) Material: Stainless Steel (SS)

c) Quantity: 1 no.

3.2.2 Hanger Shaft

a) Dimension:
- Diameter: ø12 mm
- Length: 450 ±5mm
- Length of thread: 50±5 mm

b) Material: Stainless Steel (SS)

c) Quantity: 1 no.

3.2.3 Jam Nut

a) Dimension
- Diameter: M-12
- Thickness: 10± 0.3 mm
- Flat to flat: 19 ± 0.3 mm

b) Material: Stainless Steel (SS)

c) Quantity: 1 no.

3.2.4 Pivot Pin

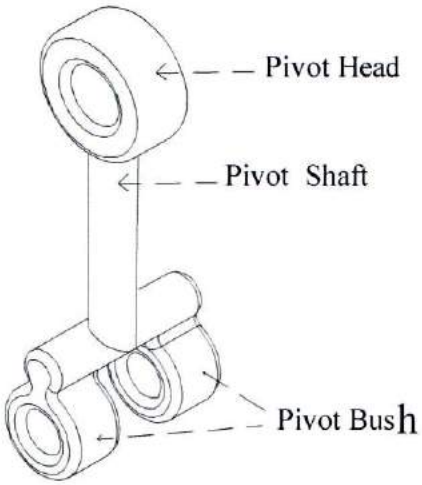
a) Dimension
- Diameter: 16 ± 0.3 mm
- Length: 70± 1 mm

b) Material: Mild Steel (Electro-Galvanized)

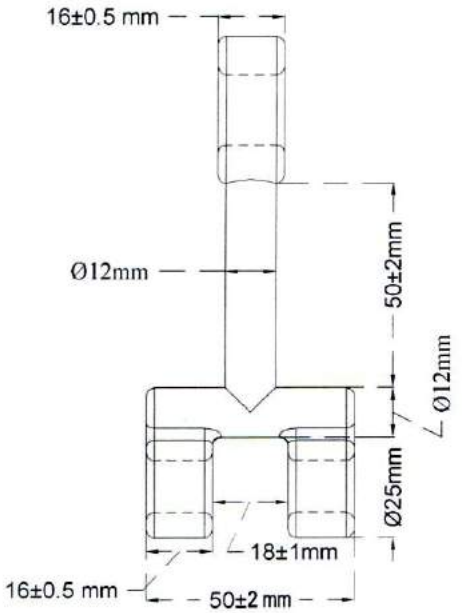
c) Quantity: 1 no.

3. Hanger Rod Assembly

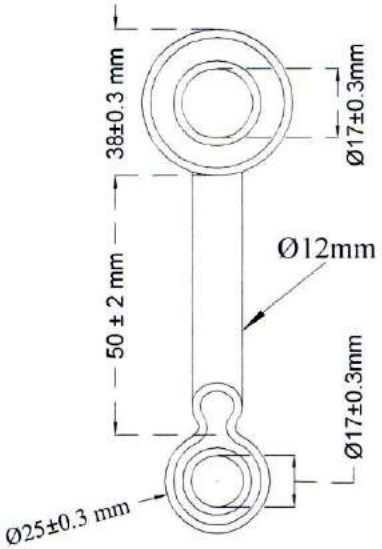
Hanger Pivot



3D View Hanger Pivot



Front Elevation



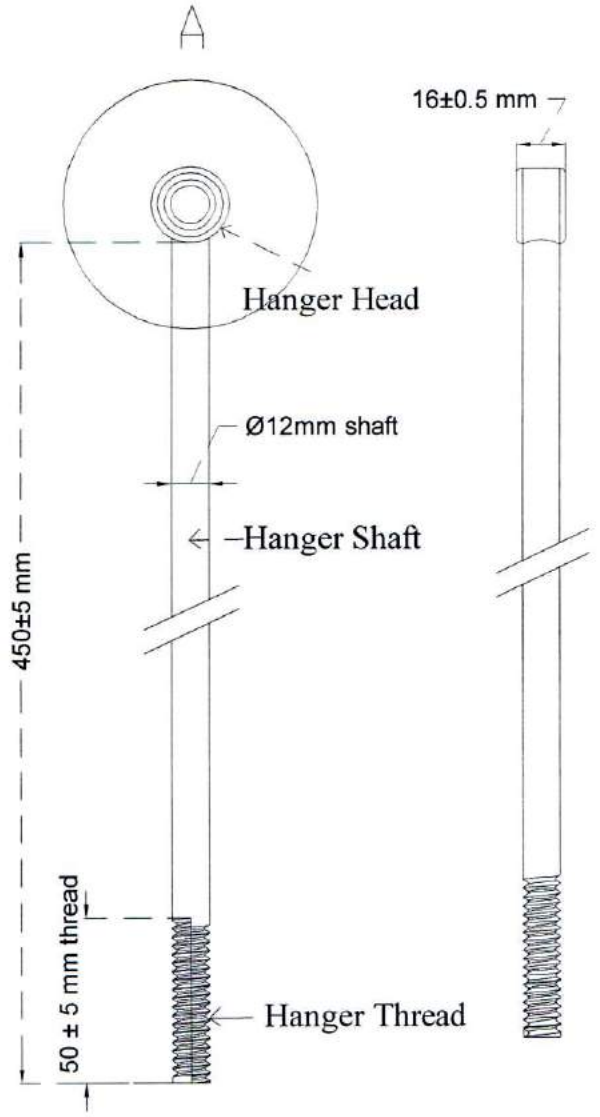
Side Elevation

Tolerence: U.O.S ± 1mm

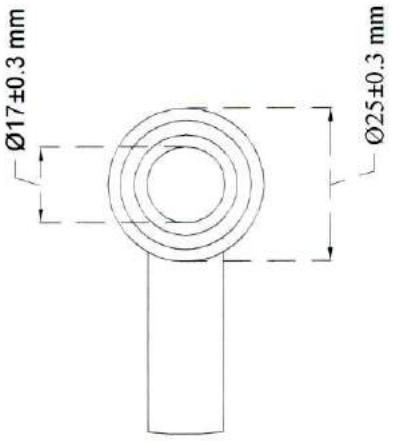
Design and Specification Manual of Tara Hand Pump	Nazia Tasmin 29/7/18 Nazia Tasmin Executive Engineer Design Division, DPHE, Dhaka	29.07.18 Mohammed Hanif Project Director Preferential Rural Water Supply Project, DPHE, Dhaka
2/10/18 Md. Mostafa Project Director Village Water Supply Project, DPHE, Dhaka	23/9/18 Tushar Mohon Shadhu Khan Project Director Arsenic Risk Reduction Project for Water Supply DPHE, Dhaka	29/7/18 A.K.M. Ibrahim Additional Chief Engineer(Planning) DPHE, Dhaka

3. Hanger Rod Assembly

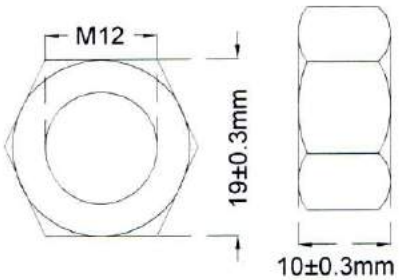
Hanger Rod



Side Elevation



Detail A



Hexagonal Jam Nut

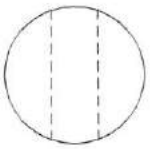
Front Elevation

Tolerence: U.O.S ± 1mm

Design and Specification Manual of Tara Hand Pump	Nazia Tasmin 29/7/18 Nazia Tasmin Executive Engineer Design Division, DPHE, Dhaka	29.07.18 Mohammed Hanif Project Director Preferential Rural Water Supply Project, DPHE, Dhaka
29/07/18 Md. Mostafa Project Director Village Water Supply Project, DPHE, Dhaka	29/7/18 Tushar Mohon Shadhu Khan Project Director Arsenic Risk Reduction Project for Water Supply DPHE, Dhaka	29.07.18 A.K.M. Ibrahim Additional Chief Engineer(Planning) DPHE, Dhaka

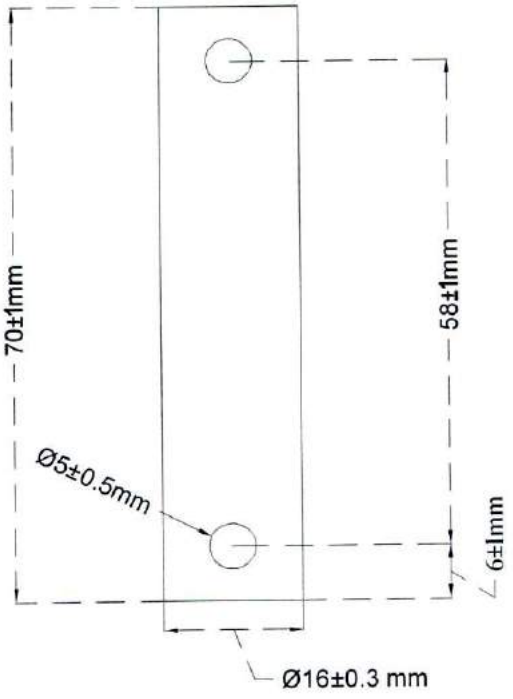
3. Hanger Rod

Pivot Pin

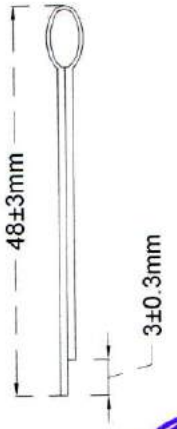


Top View

3D View



Side Elevation



Cottar Pin

Tolerence: U.O.S ± 1mm

Design and Specification Manual of Tara Hand Pump	Nazia Tasmin 29/7/18 Nazia Tasmin Executive Engineer Design Division, DPHE, Dhaka	29.07.18 Mohammed Hanif Project Director Preferential Rural Water Supply Project, DPHE, Dhaka
22/09/18 Md. Mostafa Project Director Village Water Supply Project, DPHE, Dhaka	22/9/18 Tushar Mohon Shadhu Khan Project Director Arsenic Risk Reduction Project for Water Supply DPHE, Dhaka	29.7.18 A.K.M. Ibrahim Additional Chief Engineer(Planning) DPHE, Dhaka

4. General Specifications of Pump Rod Assembly

4.1 Pump Rod

a) Dimension

- Total Length: 2885±10 mm
- Outer Dia: 33.3+.3 mm
- Wall thickness: 3+.3 mm

b) Material: Special Quality PVC (White Colour)

c) Quantity: as per requirement

4.1.1 Bottom Pump Rod

a) Dimension

- Total Length: 380±10 mm
- Outer Dia : 33.3+0.3 mm
- Wall thickness: 3+0.3 mm

b) Material: Special Quality PVC (White Colour)

c) Quantity: as per requirement

4.2 Connector (male)

a) Dimension

- Total Length: 106.5±3 mm

b) Material: Stainless Steel (SS)

c) Quantity: as per requirement

4.3 Connector (female)

a) Dimension

- Total Length: 89.5±3 mm

b) Material: Stainless Steel (SS)

c) Quantity: as per requirement

4.4 Mold for male/female connector

a) Dimension

- Total Length: 75±1 mm
- Diameter (bottom): 33.3 +0.3 mm
- Diameter(Collar): 42±1 mm

b) Material: PVC

c) Quantity: as per requirement

4.5 Jacket Pipe:

a) Dimension

- Total Length: 200 ±10 mm
- Diameter (OD): 42±1 mm

b) Material: PVC

c) Quantity: as per requirement

(1no. jacket pipe will be delivered as spare part)

4.5.1 Bottom Jacket Pipe:

a) Dimension

- Total Length: 125 ±10 mm
- Diameter (OD): 42±1 mm

b) Material: PVC

c) Quantity: as per requirement

4.6 Pumper Cap:

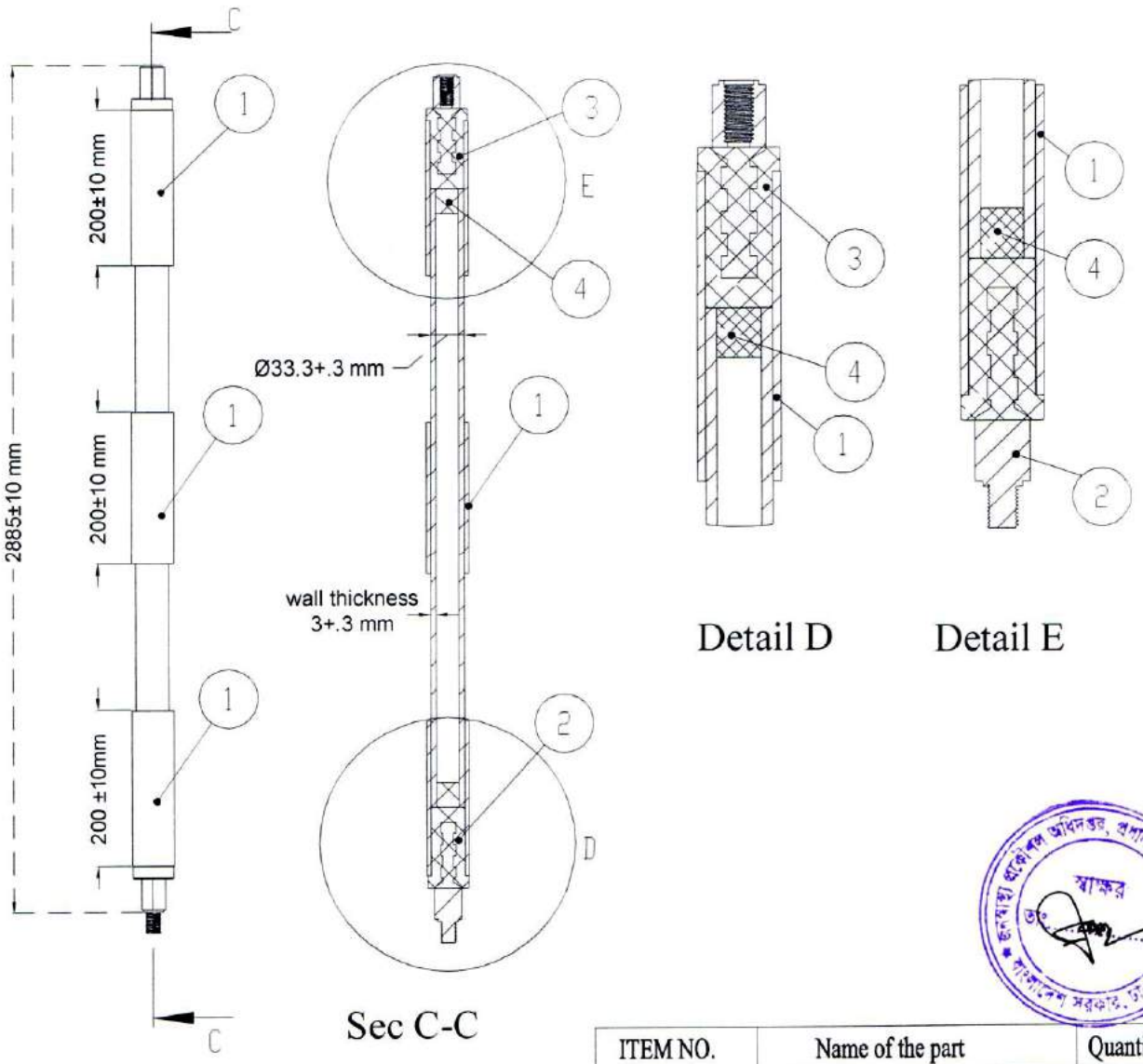
a) Dimension

- Total Length: 30 ±0.3mm
- Diameter : 27±0.3 mm

a) Material: PVC

b) Quantity: as per requirement

4. Pump Rod Assembly



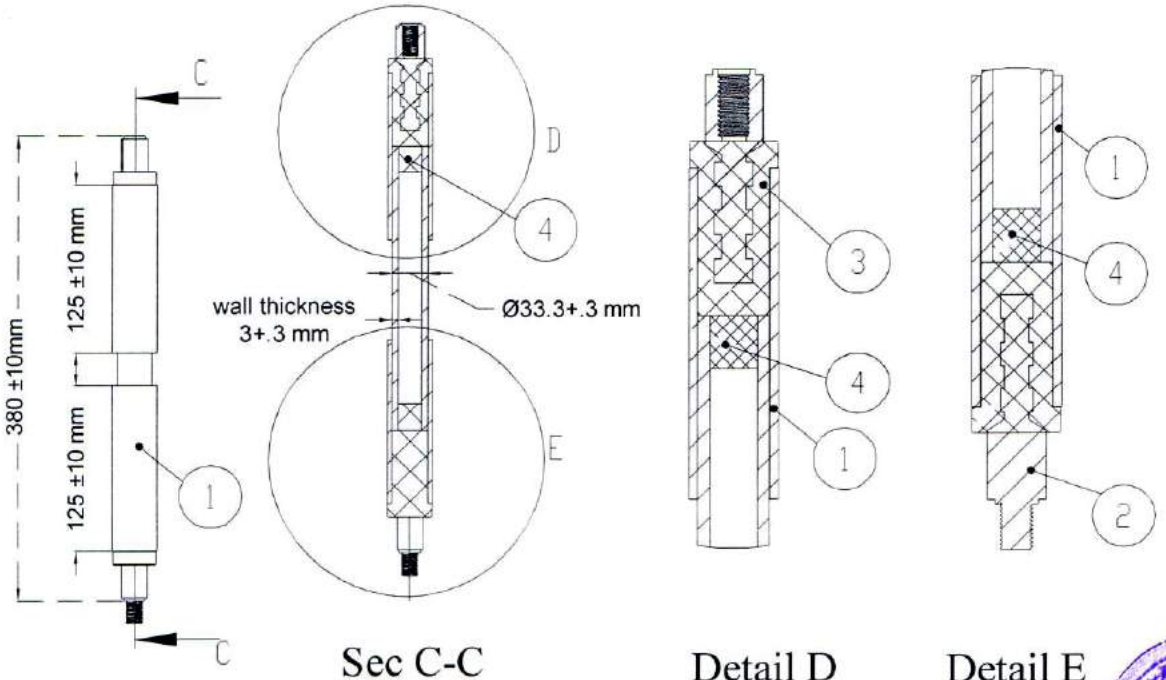
ITEM NO.	Name of the part	Quantity
1	Jacket Pipe	3
2	Molded Male Connector	1
3	Molded Female Connector	1
4	Pumper Cap	2

Tolerence: U.O.S ± 1mm

Design and Specification Manual of Tara Hand Pump	Nazia Tasmin Executive Engineer Design Division, DPHE, Dhaka	Mohammed Hanif Project Director Preferential Rural Water Supply Project, DPHE, Dhaka
Md. Mostafa Project Director Village Water Supply Project, DPHE, Dhaka	Tushar Mohon Shadhu Khan Project Director Arsenic Risk Reduction Project for Water Supply DPHE, Dhaka	A.K.M. Ibrahim Additional Chief Engineer(Planning) DPHE, Dhaka

4. Pump Rod Assembly

Bottom Pump Rod



Sec C-C Detail D Detail E

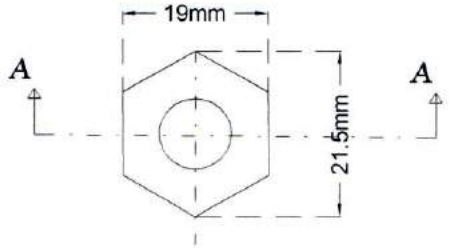
ITEM NO.	Name of the part	Quantity
1	Jacket Pipe	3
2	Molded Male Connector	1
3	Molded Female Connector	1
4	Pumper Cap	2

Tolerence: U.O.S ± 1mm

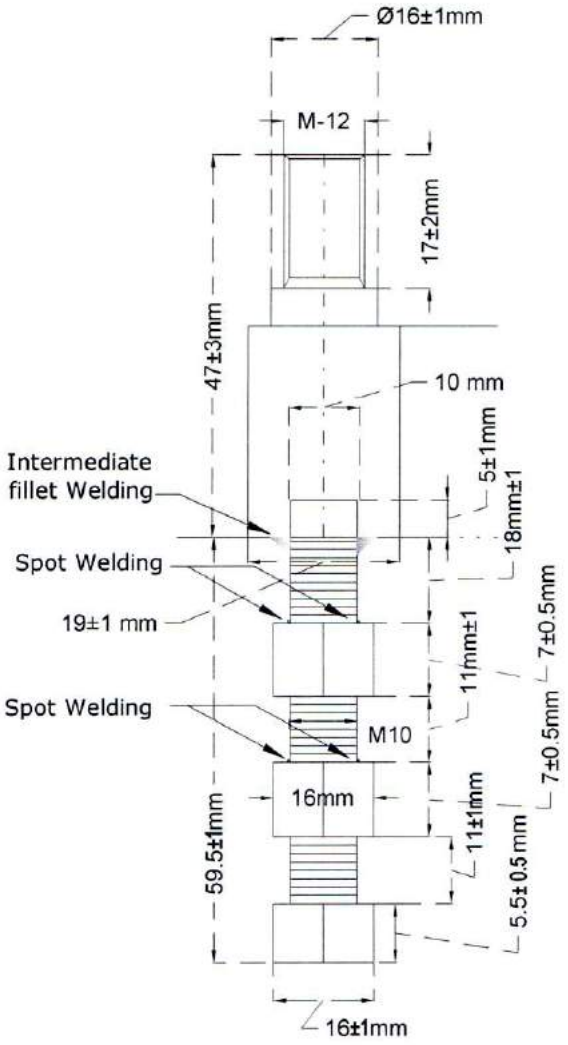
Design and Specification Manual of Tara Hand Pump	Nazia Tasmin 29/7/18 Nazia Tasmin Executive Engineer Design Division, DPHE, Dhaka	29.07.18 Mohammed Hanif Project Director Preferential Rural Water Supply Project, DPHE, Dhaka
29/09/18 Md. Mostafa Project Director Village Water Supply Project, DPHE, Dhaka	29/9/18 Tushar Mohon Shadhu Khan Project Director Arsenic Risk Reduction Project for Water Supply DPHE, Dhaka	29.07.18 A.K.M. Ibrahim Additional Chief Engineer(Planning) DPHE, Dhaka

4. Pump Rod Assembly

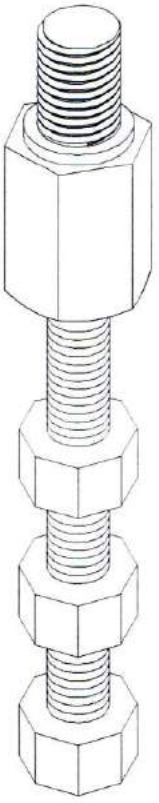
Male Connector



Plan



Sec A-A



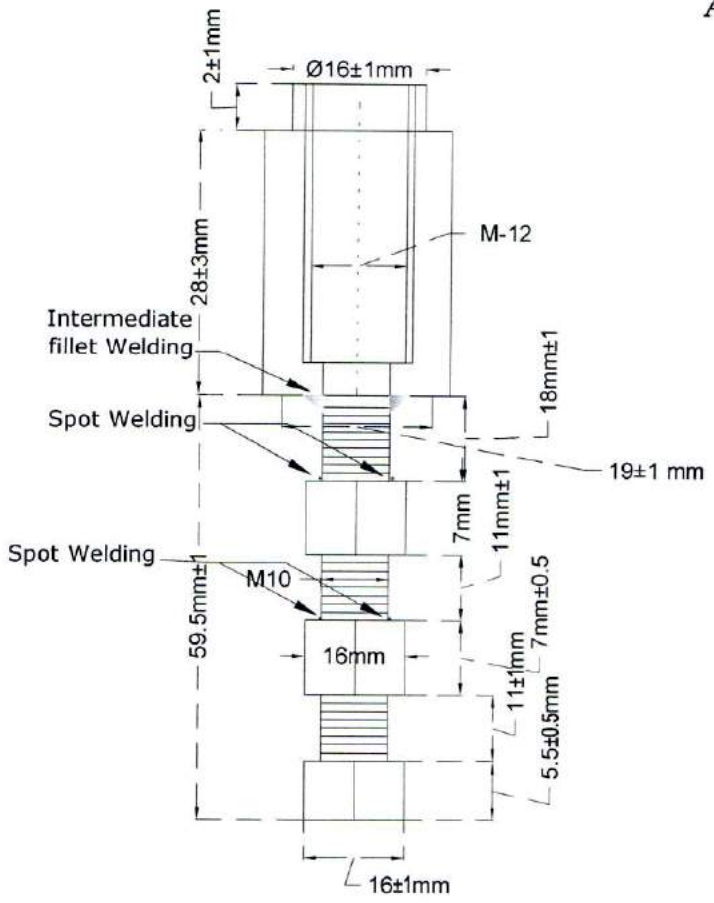
3D View

Tolerence: U.O.S ± 1mm

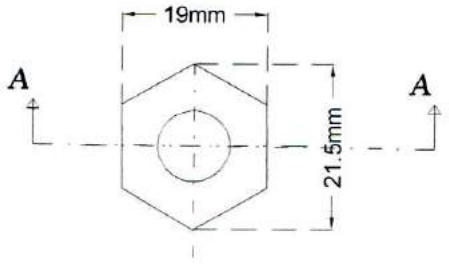
Design and Specification Manual of **Tara Hand Pump**	Nazia Tasmin 29/7/18 Nazia Tasmin Executive Engineer Design Division, DPHE, Dhaka	29.07.18 Mohammed Hanif Project Director Preferential Rural Water Supply Project, DPHE, Dhaka
23/09/18 Md. Mostafa Project Director Village Water Supply Project, DPHE, Dhaka	22/9/18 Tushar Mohon Shadhu Khan Project Director Arsenic Risk Reduction Project for Water Supply DPHE, Dhaka	29.7.18 A.K.M. Ibrahim Additional Chief Engineer(Planning) DPHE, Dhaka

4. Pump Rod Assembly

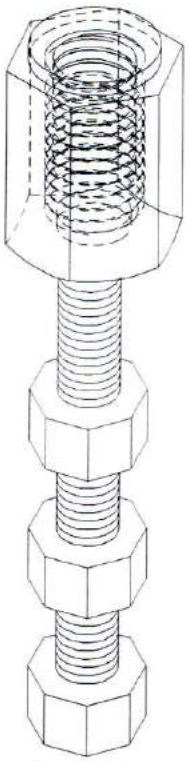
Female Connector



Sec A-A



Plan



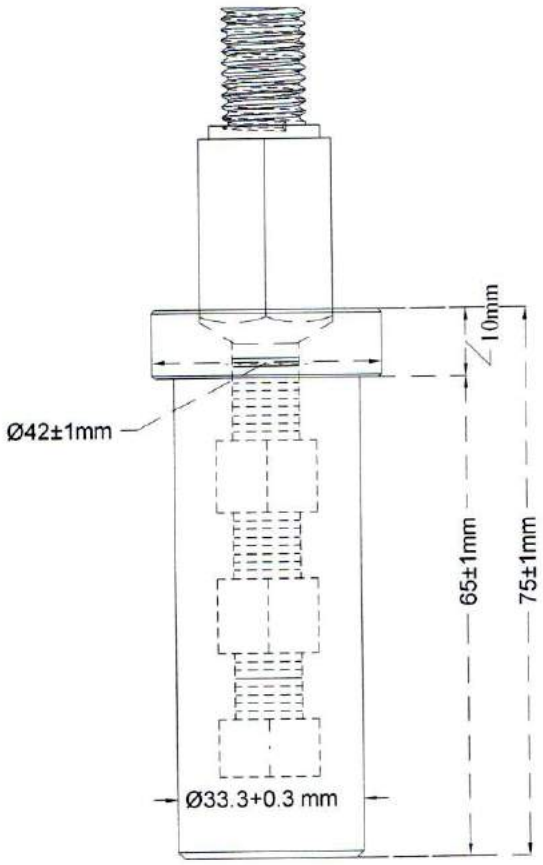
3D View

Tolerence: U.O.S ± 1mm

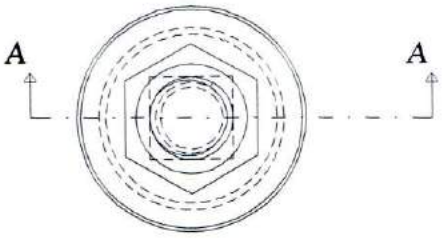
Design and Specification Manual of Tara Hand Pump	Nazia Tasmin 29/7/18 Nazia Tasmin Executive Engineer Design Division, DPHE, Dhaka	29.07.18 Mohammed Hanif Project Director Preferential Rural Water Supply Project, DPHE, Dhaka
29/09/18 Md. Mostafa Project Director Village Water Supply Project, DPHE, Dhaka	29/9/18 Tushar Mohon Shadhu Khan Project Director Arsenic Risk Reduction Project for Water Supply DPHE, Dhaka	29.9.18 A.K.M. Ibrahim Additional Chief Engineer(Planning) DPHE, Dhaka

4. Pump Rod Assembly

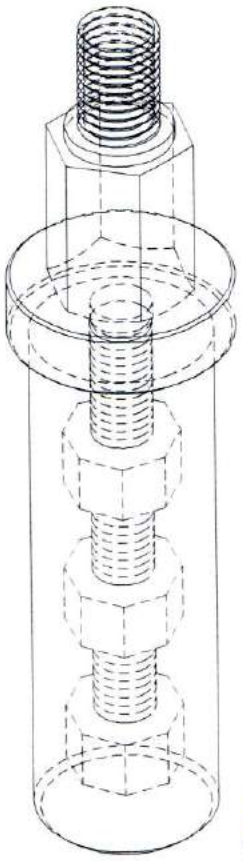
Molded Male Connector



Sec A-A



Plan



3D View

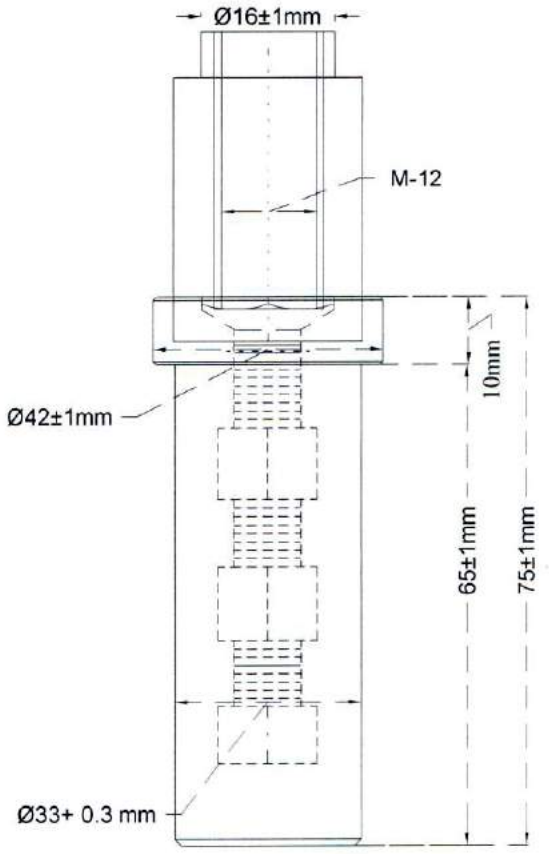
Note: Bonding of PVC mold must be uniform.

Tolerence: U.O.S ± 1mm

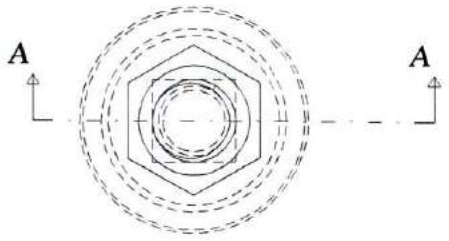
Design and Specification Manual of **Tara Hand Pump**	29/7/18 Nazia Tasmin Executive Engineer Design Division, DPHE, Dhaka	29.07.18 Mohammed Hanif Project Director Preferential Rural Water Supply Project, DPHE, Dhaka
29/09/18 Md. Mostafa Project Director Village Water Supply Project, DPHE, Dhaka	29/9/18 Tushar Mohon Shadhu Khan Project Director Arsenic Risk Reduction Project for Water Supply DPHE, Dhaka	29.9.18 A.K.M. Ibrahim Additional Chief Engineer(Planning) DPHE, Dhaka

4. Pump Rod Assembly

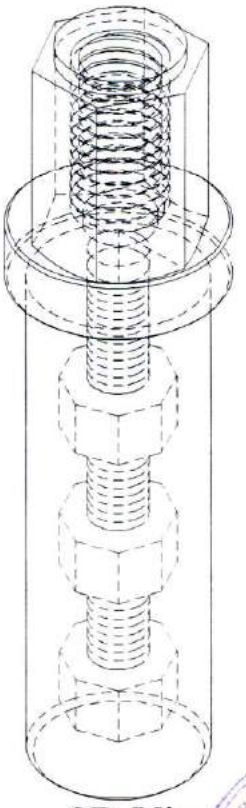
Molded Female Connector



Sec A-A



Plan



3D View

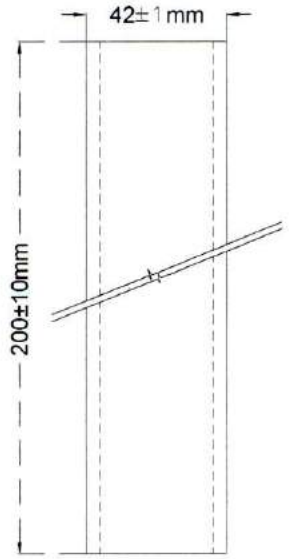
Note: Bonding of PVC mold must be uniform.

Tolerence: U.O.S ± 1mm

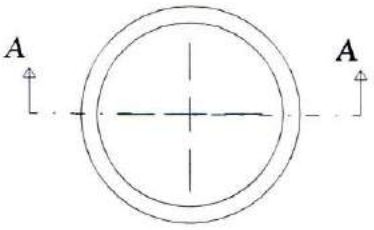
Design and Specification Manual of Tara Hand Pump	Nazia Tasmin Executive Engineer Design Division, DPHE, Dhaka	Mohammed Hanif Project Director Preferential Rural Water Supply Project, DPHE, Dhaka
Md. Mostafa Project Director Village Water Supply Project, DPHE, Dhaka	Tushar Mohon Shadhu Khan Project Director Arsenic Risk Reduction Project for Water Supply DPHE, Dhaka	A.K.M. Ibrahim Additional Chief Engineer(Planning) DPHE, Dhaka

4. Pump Rod Assembly

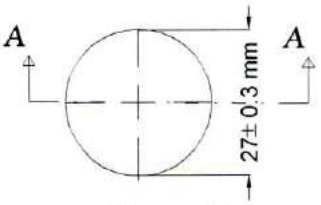
Jacket Pipe and Pumper Cap



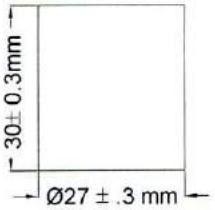
Sec A-A
Jacket pipe



Jacket pipe(Top View)

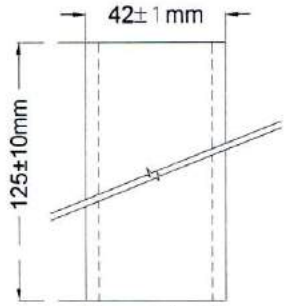


Top View



Sec A-A

Pumper Cap



Sec A-A
Bottom Jacket pipe

Tolerence: U.O.S ± 1mm

Design and Specification Manual of Tara Hand Pump	Nazia Tasmin 29/7/18 Nazia Tasmin Executive Engineer Design Division, DPHE, Dhaka	29.07.18 Mohammed Hanif Project Director Preferential Rural Water Supply Project, DPHE, Dhaka
22/09/16 Md. Mostafa Project Director Village Water Supply Project, DPHE, Dhaka	22/9/18 Tushar Monon Shadhu Khan Project Director Arsenic Risk Reduction Project for Water Supply DPHE, Dhaka	29.7.18 A.K.M. Ibrahim Additional Chief Engineer(Planning) DPHE, Dhaka

5. General Specifications of Piston Assembly

5.1 Piston Shaft

a) Dimension
- Total Length: 162.5±3 mm
- Diameter: ø 12 mm

b) Material: SS

c) Quantity: 1 no.

5.2 Cup Seal Holder

a) Dimension
- Height: 35±1 mm
- Bottom OD: 49±0.5 mm
- Top OD: 39.3±1 mm

b) Material: Nylon

c) Quantity: 2 nos.

5.3 Cup Seal

a) Dimension
- Height:16±0.2 mm
- Top OD: ø55±1 mm
- Bottom OD: ø50±1mm

b) Material: Nitrile Rubber

c) Quantity: 2 nos.

5.4 Washer

a) Dimension
- Top OD: ø22±1 mm
- Bottom ID: ø12.7+1,-0 mm
- Thickness: 2±0.2 mm

b) Material: Stainless Steel (SS)

c) Quantity:1 no.

5.5 Nut

a) Dimension
- Diameter: M-12
- Thickness: 9 mm
- Flat to flat: 19 mm

b) Material: Stainless Steel (SS)

c) Quantity:1 no.

5.6 Grapple Hook

a) Dimension
- Hook Diameter: 6 mm

b) Material: Stainless Steel (SS)

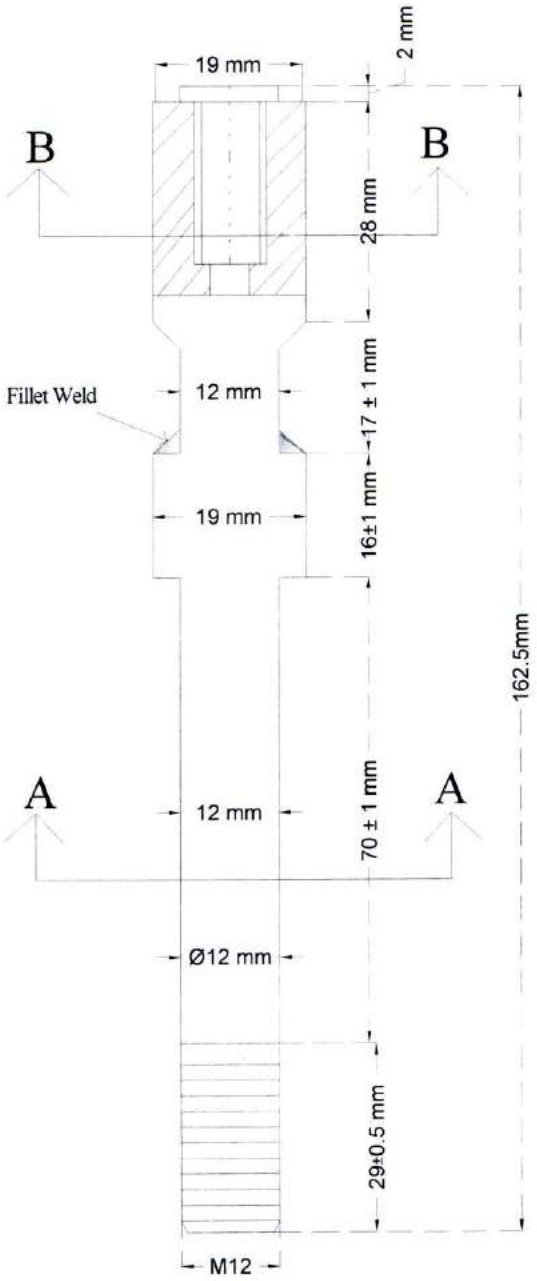
c) Quantity: 1 no.

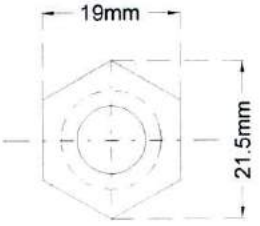
5.7 Wing Check Nut

a) Quantity: 1 no

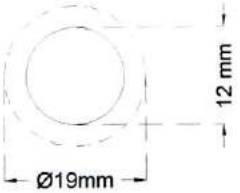
b) Material: Nylon with SS nut

5. Piston Assembly





Section B-B



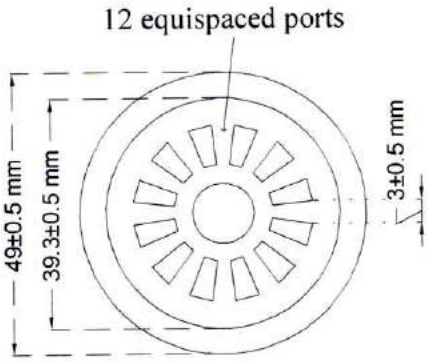
Section A-A

Bottom Connector

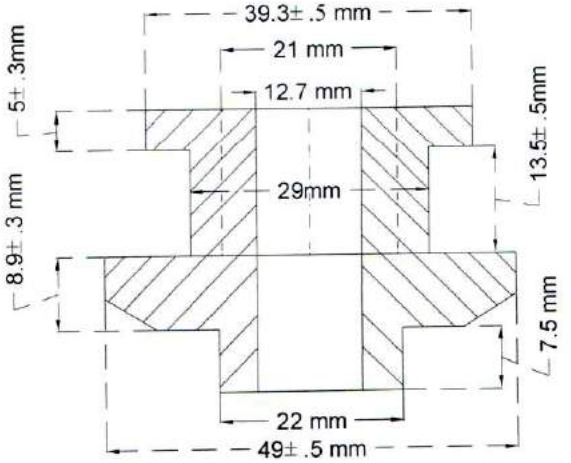
Tolerence: U.O.S ± 1mm

Design and Specification Manual of **Tara Hand Pump** (Extractable)	Nazia Tasmin 29/7/18 Nazia Tasmin Executive Engineer (CC) Design Division, DPHE, Dhaka	23.09.18 Mohammed Hanif Project Director Preferential Rural Water Supply Project, DPHE, Dhaka
23/09/18 Md. Mostofa Project Director Village Water Supply Project, DPHE, Dhaka	29/9/18 Tushar Mohon Shadhu Khan Project Director Arsenic Risk Reduction Project, DPHE, Dhaka	29.9.18 A.K.M. Ibrahim Additional Chief Engineer(Planning) DPHE, Dhaka

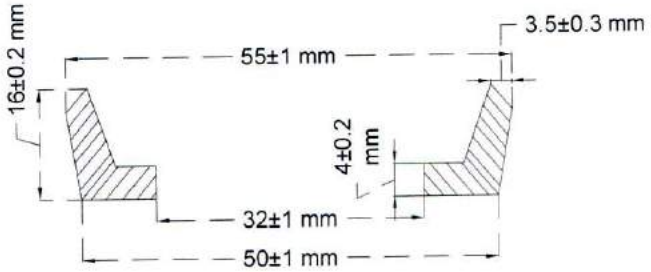
5. Piston Assembly



Cup Seal Holder
(Top View)



Cup Seal Holder



Cup Seal

Tolerence: U.O.S ± 1mm

Design and Specification Manual of **Tara Hand Pump**	Nazia Tasmin 29/7/18 Nazia Tasmin Executive Engineer Design Division, DPHE, Dhaka	29.07.18 Mohammed Hanif Project Director Preferential Rural Water Supply Project, DPHE, Dhaka
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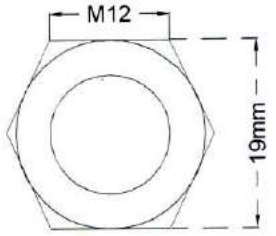
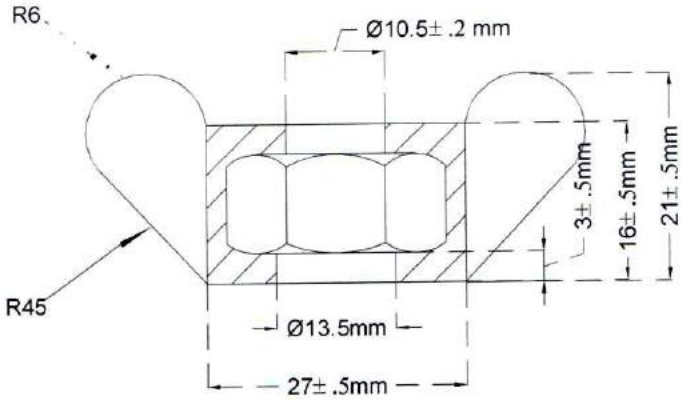
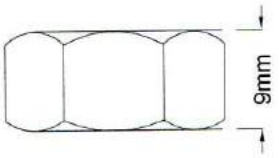
5. Piston Assembly



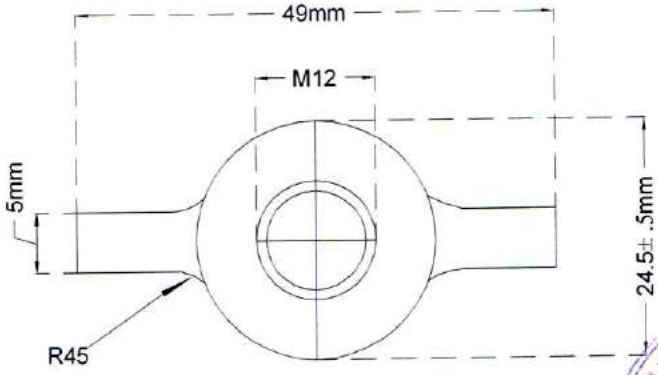
Stainless Steel Nut(top view)



Wing Check Nut(side view)



Stainless Steel Nut(side view)



Wing Check Nut(top view)

Tolerence: U.O.S ± 1mm

Design and Specification Manual of **Tara Hand Pump**	Nazia Tasmin 29/7/18 Nazia Tasmin Executive Engineer Design Division, DPHE, Dhaka	29.07.18 Mohammed Hanif Project Director Preferential Rural Water Supply Project, DPHE, Dhaka
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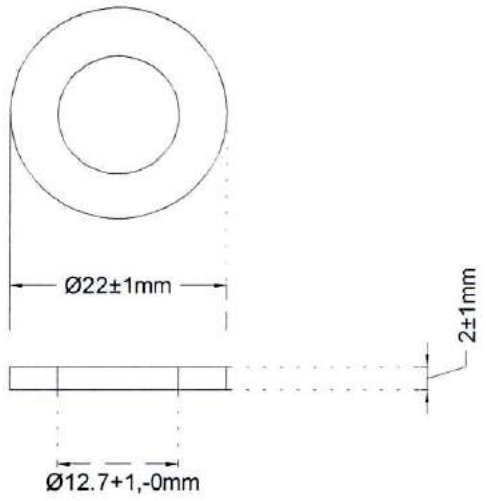
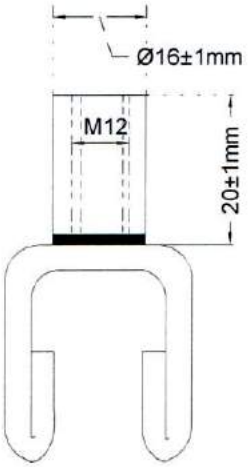
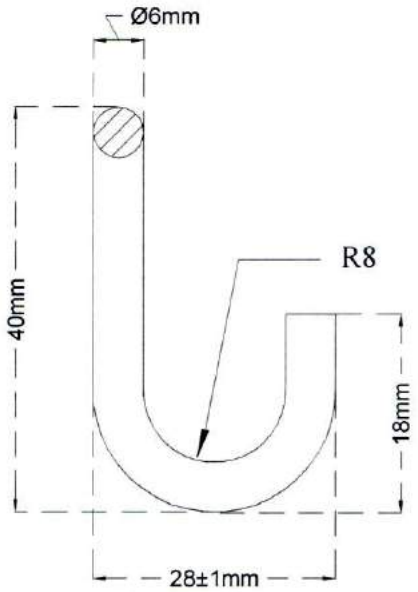
5. Piston Assembly



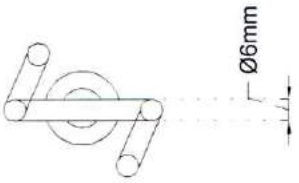
Stainless Steel Washer



Grapple Hook



Grapple Hook
(side view)



Grapple Hook
(top view)

Tolerence: U.O.S ± 1mm

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6. General Specifications of Cylinder Assembly

6.1 SS Pipe

a) Dimension

- Total Length: 600 ± 10mm
- Thickness: 1.2 ± 0.3, -0mm

b) Material: Stainless Steel (SS)

c) Quantity: 1 no

6.2 uPVC Pipe

a) Dimension

- Total Length of Cylinder: 660 ± 10mm
- Class: C

b) Material: uPVC

c) Quantity: 1 no.

6.3 Foot Valve Receiver

a) Total Length: 120 ± 0.5 mm

b) Material : uPVC

c) Quantity: 1 no.

6.4 Bottom Seat

a) Dimension

- Length: 45 ± 1mm
- Top OD: 74±1mm
- Top ID: 61±1mm

b) Material: Nitrile Rubber (Hardness: 75-85 Shore 'A')

c) Quantity: 1 no

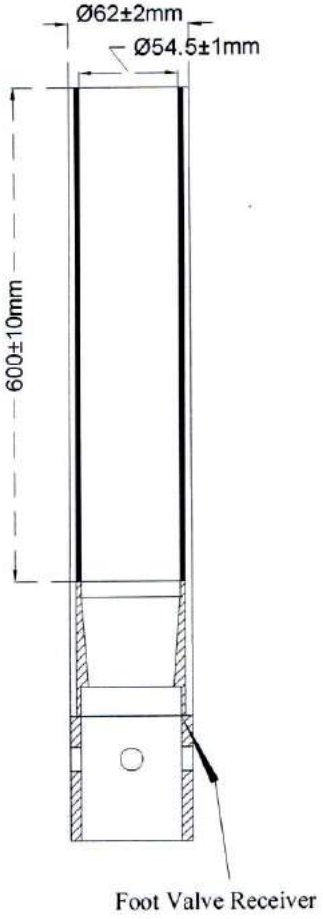
6.5 Cylinder Top Socket

a) Total Length: 250 ± 5 mm

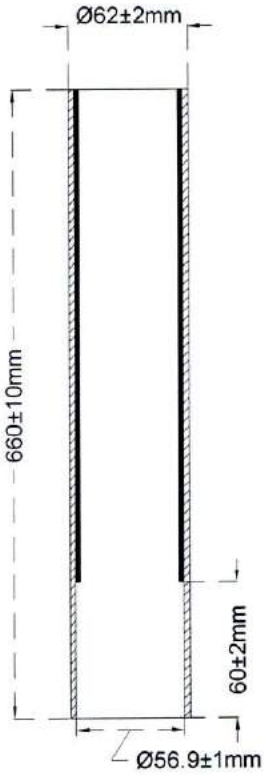
b) Material : uPVC Class 'C' Pipe

c) Quantity: 1 no.

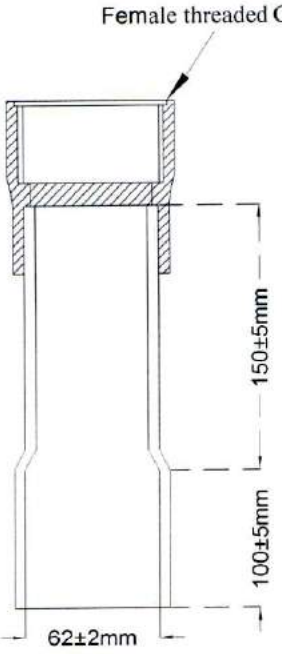
6. Cylinder Assembly



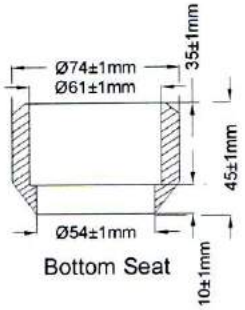
Stainless Steel Cylinder



Cylinder Pipe



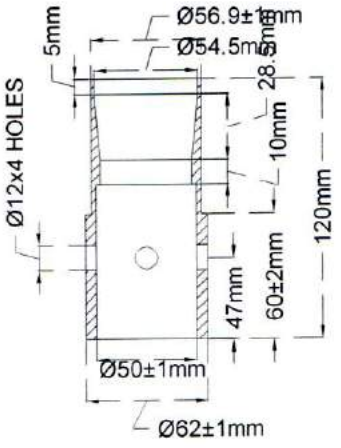
Cylinder Top Socket



Bottom Seat

SS Screw

bottom seat fixing has to be done with 3nos SS screws with size 19mm long



Foot Valve Receiver

Note: Inside seam of SS liner to be smoothed out as much as possible

Tolerence: U.O.S ± 1mm

Design and Specification Manual of **Tara Hand Pump**	Nazia Tasmin 29/7/18 Executive Engineer Design Division, DPHE, Dhaka	29.07.18 Mohammed Hanif Project Director Preferential Rural Water Supply Project, DPHE, Dhaka
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7. General Specifications of Non-Return Foot Valve

7.1 Body

a) Dimension
- Total Length: 45 ± 1mm
- Top OD: Ø52±1 mm
- Top ID : Ø43±0.5mm
- Bottom OD : Ø46± 1mm
- Bottom ID : Ø34±1 mm

b) Material: High Density Polyethylene (HDPE)

c) Quantity: 1 no.

7.2 Guide Rod

a) Dimension
- diameter: Ø10mm
- Total Height: 90 ± 1mm

b) Material: Stainless Steel (SS)

c) Quantity: 1 no.

7.3 Foot Valve Flap

a) Dimension
- OD: Ø50 ± 0.3 mm
- ID : Ø10 ± 0.1 mm

b) Material: Nitrile Rubber (Hardness: 75-85 Shore 'A')

c) Quantity: 1 no.

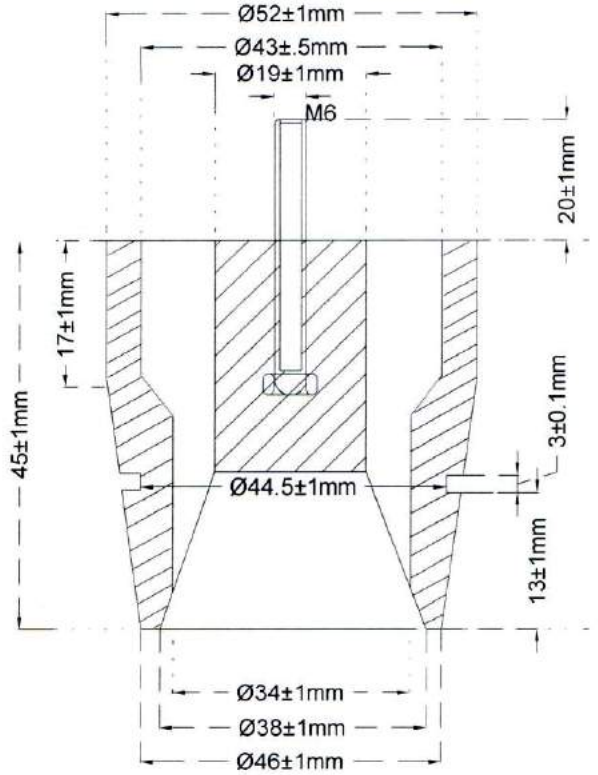
7.4 O-Ring

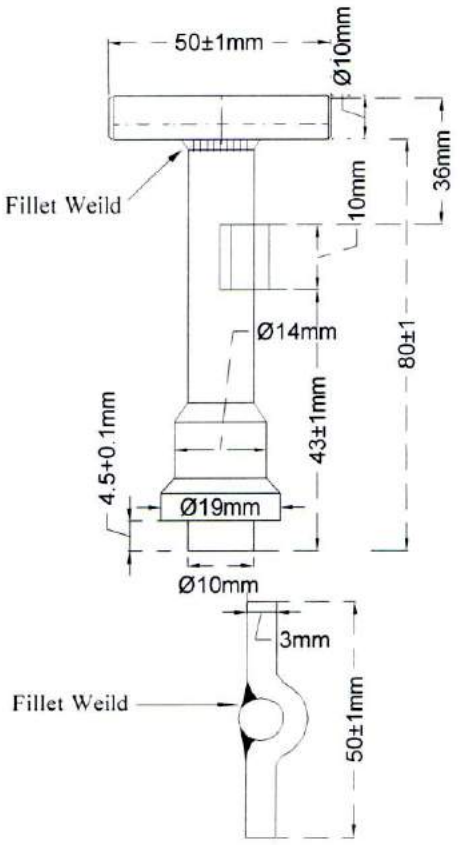
a) Dimension
- ID: Ø43.5 ± 1mm
- Thickness : 2.9 ± 0.1mm

b) Material: Nitrile Rubber (Hardness: 75-85 Shore 'A')

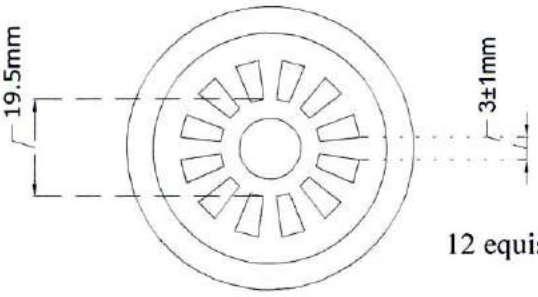
c) Quantity: 1 no.

7. Non-return Foot Valve



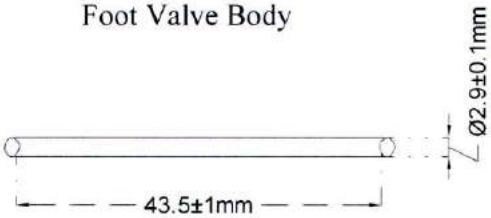


Foot Valve Guide



12 equispaced ports

Foot Valve Body



O- Ring

Foot Valve Flap

Tolerence: U.O.S ± 1mm

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8. General Specifications of Rising Main

8.1 Rising Main Pipe

a) Dimension
- Length: 2885±10mm
- ID : Ø55mm

b) Material: uPVC Class C

c) Quantity: as per requirement

8.2 Threaded Coupler(Male)

a) Dimension
- Length: 82 ± 0.5mm
- OD: Ø 64.5±0.3 mm
- ID : Ø56±0.3 mm

b) Material: uPVC virgin compound
Quantity: as per requirement
(Made in automatic injection machine)

8.3 Threaded Coupler(Female)

a) Dimension
- Length: 79 ± 0.5mm
- OD: Ø 73.5±0.5mm
- ID : Ø68±0.2mm

b) Material: uPVC virgin compound
Quantity: as per requirement
(Made in automatic injection machine)

8.4 Rising Main Centralizer

a) Dimension
- Height : 25± 0.5mm
- Outer Diameter : Ø74 ± 0.5mm
- Inner Diameter: Ø60 ± 0.5mm

b) Material : Nitrile rubber (Hardness: 75-85 Shore 'A')

c) Quantity: as Per Requirement

d) Weight : N/A

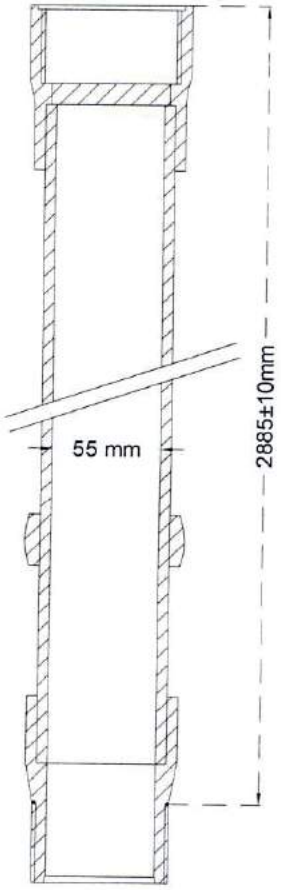
8.5 O-Ring

a) Dimension
- ID: Ø60±0.5mm
- Thickness : 4± 0.5mm

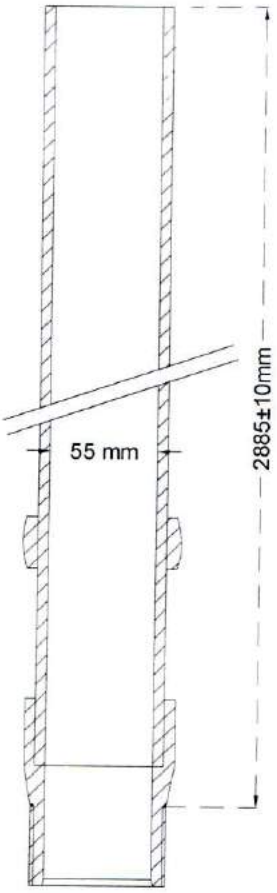
b) Material: Nitrile Rubber (Hardness:65-75 Shore 'A')

c) Quantity: 1 no.

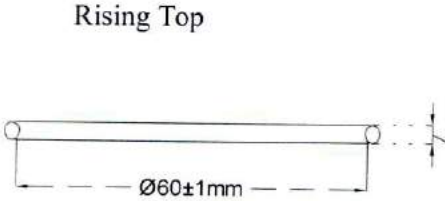
8. RISING MAIN



Rising Main (with coupler)



Rising Top



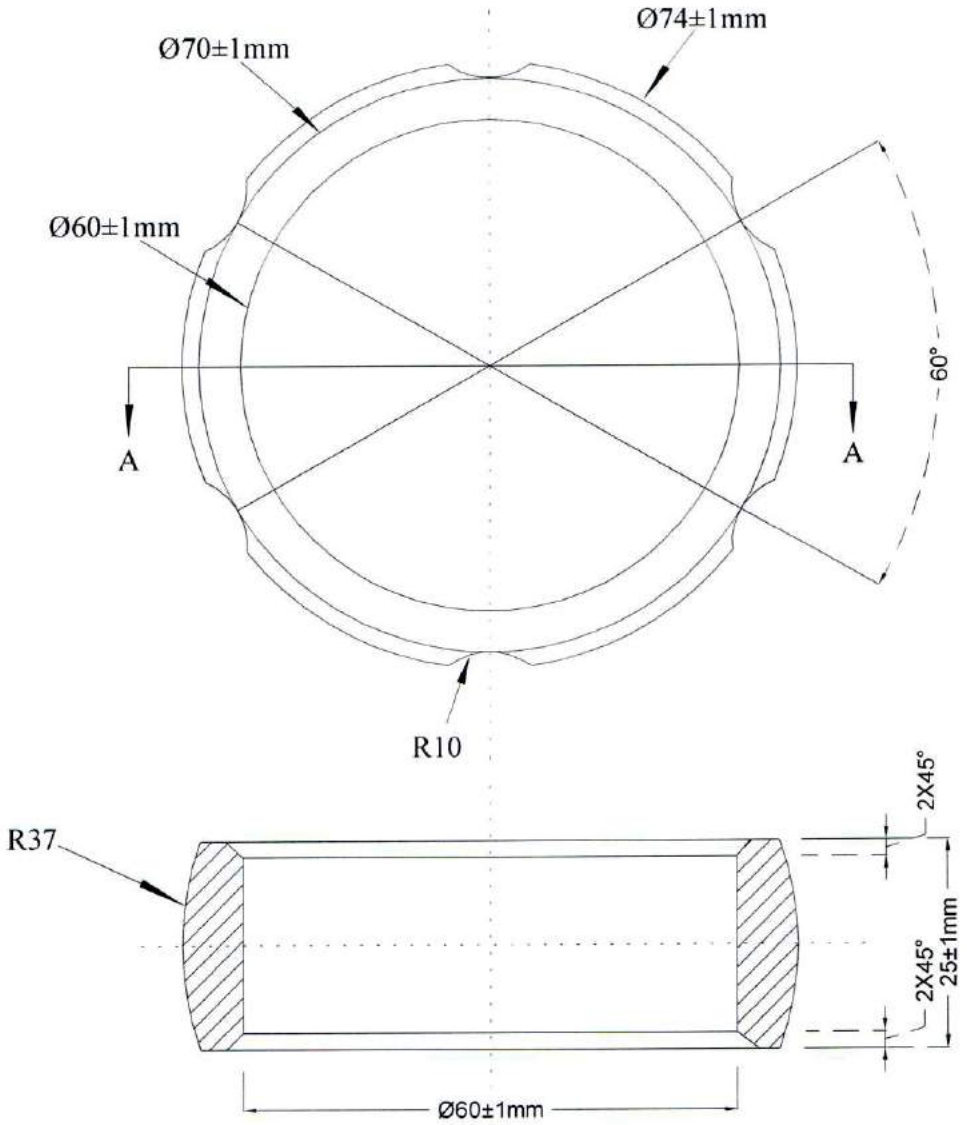
Coupler O- Ring

Tolerence: U.O.S ± 1mm

Note: u-PVC Materials (White Color)

Design and Specification Manual of **Tara Hand Pump** (Extractable)	Nazia Tasmin 29/7/18. **Nazia Tasmin** Executive Engineer (CC) Design Division, DPHE, Dhaka	22.09.18 **Mohammed Hanif** Project Director Preferential Rural Water Supply Project, DPHE, Dhaka
22/09/18 **Md. Mostofa** Project Director Village Water Supply Project, DPHE, Dhaka	22/9/18 **Tushar Mohon Shadhu Khan** Project Director Arsenic Risk Reduction Project, DPHE, Dhaka	25.7.18 **A.K.M. Ibrahim** Additional Chief Engineer(Planning) DPHE, Dhaka

8. RISING MAIN



Section A-A

Rising Main Centralizer

Tolerence: U.O.S ± 1mm

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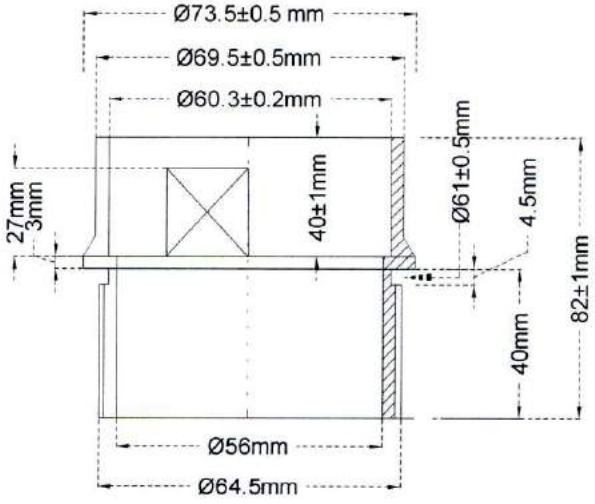
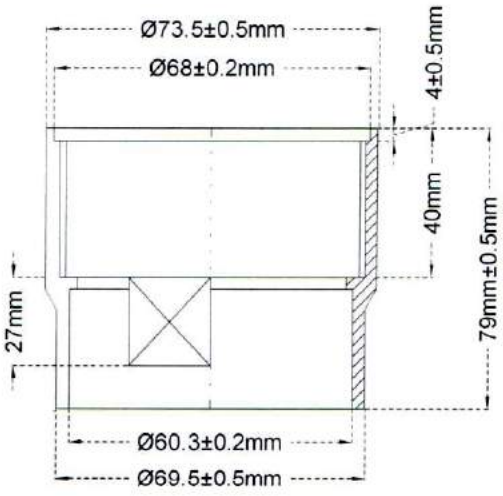
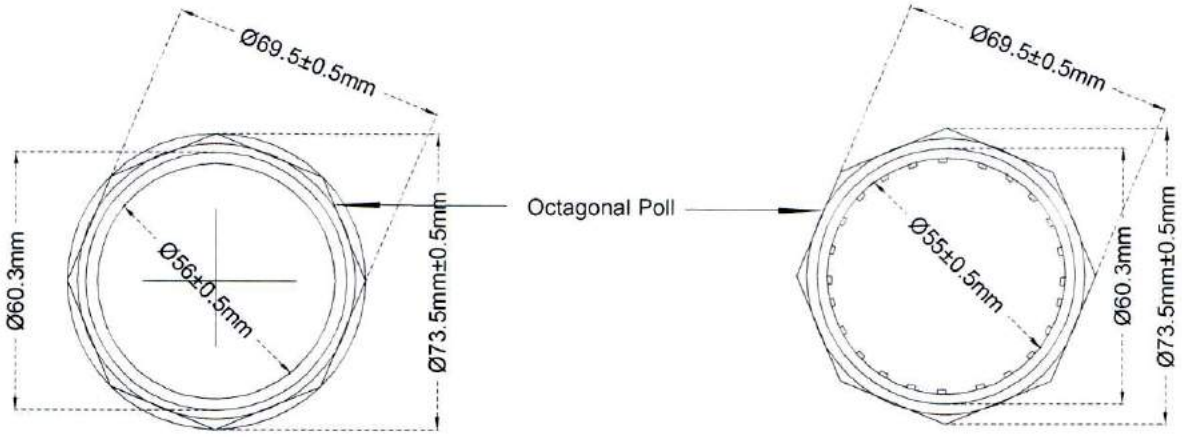
2→10/18 Md. Mostafa Project Director Village Water Supply Project, DPHE, Dhaka	29/7/18 Tushar Mohon Shadhu Khan Project Director Arsenic Risk Reduction Project for Water Supply DPHE, Dhaka	29/7/18 A.K.M. Ibrahim Additional Chief Engineer(Planning) DPHE, Dhaka

8. RISING MAIN







Male threaded
Auto-Coupler

Female threaded
Auto-Coupler

Note: Couplers will be made in automatic Injection Machine with u-PVC virgin materials (white color).

Tolerence: U.O.S ± 1mm

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General Notes

1. Specified markings (DPHE and manufacturer's name/code name) on pump head will be clearly marked with mould on all pump head components (barrel, head cover and handle). Specified markings for project name and date of manufacturing will be printed with indelible ink on SS sticker plate which will be attached to head cover or as specified.
2. Manufacturer's name or significant marking on all PVC, rubber, nylon, CI and HDPE parts of Tara hand pump will be clearly printed with indelible ink (using screen printer or other method).
3. Best quality PP bag, plastic belt and other necessary materials will be used for packing of parts of Tara pump. Manufacturer's name, address and contact number will be printed on PP bag.
4. Much care is needed in joining PVC parts with solvent cement. Pull test should be done after minimum 24 hours of joining pipes and moulds.
5. Pump rods, rising mains and cylinder will be supplied in complete assembled condition.
6. All SS materials will not be affected/ attracted by magnets.
7. Maximum allowed ovality for round items will be 0.5 mm.
8. Tolerances for individual items/ components must be properly and suitably adjusted between and maintained.
9. All sharp edges/ corners to be rounded or smoothed out. Besides, all burs, molding flusher etc. to be cleaned properly.

INSTALLATION GUIDELINES

For installation of the Tara Hand Pump, the following steps should be followed strictly:

1 Cut the housing pipe according to design height of platform and block.
2 Fix the pump stand at the top of the housing pipe and cast the block keeping design depth. Install pump at least three days after casting of block.
3 When the block is ready clean the surrounding of the water point.
4 Check and arrange all parts of the eight items of Tara pump chronologically on the ground.
5 Measure the exact depth of housing. Lay the attached rising main with cylinder and pump rod with piston assembly alongside on ground. Keep the foot valve beside rising main exactly at the place where foot valve would be sited inside the cylinder. Keeping minimum 4″ clear distance from top of the guide rod to bottom of grapple hook calculate the length of rising main to be cut. If housing depth is exactly same as designed, pump rod assembly will be accurate.
6 If for any unavoidable reason, depth of housing is less then desired depth then cut the portion of top pump rod exactly same as the difference of the depth and join again with spare jacket pipe and solvent cement with care. For example, if housing depth is 6″ less than desired depth then cut 6″ portion of top pump rod. Cut at minimum 10″ distance from the bottom of top jacket pipe.
7 Set the foot valve assembly properly and place the foot valve inside the cylinder assembly making sure that it is fixed tightly. Pour water to ensure the foot valve protects water leaking completely. After confirmation of water sealing, insert the cylinder assembly into the housing pipe and hold the upper part of it.
8 Wash the male coupler of one rising main and joint it with the female coupler of cylinder top socket properly and insert into the housing pipe holding the opposite end.
9 Wash each joint with clean water prior to joining with other part and slightly tighten joints with care so that PVC body is not get damaged.
10 Protect the rising main and cylinder from falling inside the well. Join and insert all rising main accordingly until the bottom seat of cylinder assembly reaches the lowest part of housing pipe.
11 Cut the extra portion of top rising main keeping minimum 3″ to 4″ (three to four inches) clear from the top of the flange of pump stand.
12 Set the rubber grommet around the upper part of rising main properly.
13 Set the piston assembly properly and join the female connector of the top of bottom connector to the male connector of bottom pump rod and using range make sure that joint is tightened properly. Wash each joint before joining and insert all the pump rods one by one carefully jointing with one-another and insert inside the rising main.
14 Fix the hanger rod assembly properly using pivot pin and cotter pins.
15 Attach hanger rod assembly with head cover and handle of pump body using hanger pin and fulcrum pin.
16 Fix top joint of pump rod to the thread of hanger rod.
17 Use the cotter pins accordingly.
18 Fix nut-bolts of pump head and bottom flange.
19 Up and down the pump handle slowly and carefully with both hands. After a certain time, water will start coming out from the well. Continue pumping unless and until clean water comes out.
20 Now, it is ready for use.

তারা হ্যান্ড পাম্প স্থাপনের নির্দেশিকা

তারা হ্যান্ড পাম্প স্থাপনের ক্ষেত্রে নিম্নলিখিত ধাপগুলি যথাযথভাবে অনুসরণ করতে হবেঃ

১। প্লাটফর্ম ও ব্লকের ডিজাইন উচ্চতা অনুযায়ী হাউজিং পাইপ কাটুন।
২। পাম্পস্ট্যান্ড হাউজিং পাইপের উপর বসান এবং ডিজাইন অনুযায়ী ব্লক ঢালাই করুন। অন্তত তিনদিন পর পাম্প স্থাপনের কাজ শুরু করুন।
৩। ব্লকসহ ওয়েল পাম্প স্থাপনের জন্য প্রস্তুত হলে নলকূপের আশেপাশের স্থান পরিস্কার করুন।
৪। তারা পাম্পের ৮টি আইটেমের প্রতিটি পার্টস চেক করুন ও পরিস্কার স্থানে পর্যায়ক্রমে সাজিয়ে রাখুন।
৫। হাউজিং এর সঠিক গভীরতা মাপুন। সিলিন্ডারসহ রাইজিং মেইন ও পিস্টন এসেম্বলি সংযুক্ত পাম্পরড মাটিতে পাশাপাশি সাজান। সিলিন্ডারের যে স্থানে ফুটভাল্ভ বসবে সে স্থানে ফুটভাল্ভটিও পাশাপাশি রাখুন। ফুট ভাল্ভের গাইডরডের উপর প্রান্ত হতে পিস্টন এসেম্বলির গ্র্যাপল হুকের মধ্যে ন্যুনতম ৪"গ্যাপ রেখে রাইজিং মেইন ও পাম্পরড সাজিয়ে নিন। এর পরবর্তীতে রাইজিং মেইনের কতটুকু অংশ কাটতে হবে তা হিসেব করে নিন। হাউজিং পাইপের গভীরতা ডিজাইন অনুযায়ী থাকলে পাম্পরডের মাপও মিলে যাবে।
৬। কোন কারণে হাউজিং এর গভীরতা কাঙ্ক্ষিত গভীরতার চেয়ে কম হলে হাউজিং যতটুকু কম ঠিক ততটুকু পাম্পরড কেটে কাটা অংশ দুইটি স্পেয়ার জ্যাকেট পাইপ ও সলভেন্ট সিমেন্ট দিয়ে সঠিকভাবে সংযুক্ত করুন। উদাহরণস্বরূপ, হাউজিং গভীরতা ৬" কম হলে উপরের পাম্পরড হতে ৬" অংশ কেটে সাবধানতার সাথে পুনরায় সংযুক্ত করতে হবে। এক্ষেত্রে পাম্পরডের উপরের জ্যাকেট পাইপের নিচের অংশ থেকে কমপক্ষে ১০" দূরত্ব রেখে কাটতে হবে।
৭। ফুটভাল্ভ এসেম্বলি যথাযথভাবে সেট করুন এবং সিলিন্ডার এসেম্বলির ভেতর উক্ত ফুট ভাল্ভটি ছেড়ে দিন। ফুটভাল্ভ যথাযথভাবে স্থাপিত হয়েছে তা নিশ্চিত হয়ে পানি ভরে সিলিন্ডারটি পানি ধরে রাখে কিনা তা চেক করুন। পানি ফেলে দিয়ে সিলিন্ডার হাউজিং পাইপের ভেতর প্রবেশ করান ও উপরের ফিমেল কাপলারের অংশটি ধরে রাখুন।
৮। এবারে একটি রাইজিং মেইন নিয়ে মেইল কাপলার সংযুক্ত অংশ পরিষ্কার পানিতে ধুয়ে সিলিন্ডার এসেম্বলির টপ সকেটের ফিমেইল কাপলারের সাথে যথাযথভবে সংযুক্ত করুন এবং সংযুক্ত অংশ হাউজিং এর ভেতর প্রবেশ করান।
৯। এভাবে প্রতিটি কাপলার জয়েন্ট পানিতে ধুয়ে পরিষ্কার করে সাবধানতার সাথে যথাযথভাবে সংযুক্ত করুন ও হাউজিং এ প্রবেশ করান।
১০। সিলিন্ডারসহ রাইজিং মেইন যেন হাউজিং এর ভেতর পড়ে না যায় সে ব্যপারে সতর্ক থাকুন। রাইজিং মেইনসমূহ সংযুক্ত করা সম্পন্ন হলে সিলিন্ডারের বটম সিট হাউজিং এ গিয়ে ঠেকবে।
১১। পাম্পস্ট্যান্ডের ফ্লেঞ্জের উপর থেকে ৪" অংশ রেখে রাইজিং মেইনের অতিরিক্ত অংশ কেটে ফেলুন।
১২। রাবার গ্রোমেট রাইজিং মেইনের চারপাশ দিয়ে পাম্পস্ট্যান্ডে প্রবেশ করান।
১৩। পিস্টন এসেম্বলি সঠিকভাবে সন্নিবেশ করুন। বটম কানেক্টরের উপরের অংশের ফিমেইল জয়েন্টের সাথে বটম পাম্পরডের মেইল জয়েন্ট সংযুক্ত করুন। প্রতিটি সংযোগের আগে জয়েন্টগুলি পরিষ্কার পানিতে ধুয়ে নিন ও রেঞ্জ দ্বারা মজবুতভাবে সংযুক্ত করুন এবং একে একে হাউজিং এর ভেতর প্রবেশ করান।
১৪। হ্যাঙ্গার রড ও হ্যাঙ্গার পিভট অংশ পিভট পিন ও কটার পিন দিয়ে যথাযথভাবে সংযুক্ত করুন।
১৫। হ্যাঙ্গার পিন ও ফালক্রাম পিন দ্বারা হ্যাঙ্গার রড এসেম্বলি পাম্পবডির হেডকভার ও হ্যান্ডেলের সাথে সংযুক্ত করুন।
১৬। সবচেয়ে উপরের পাম্পরডের ফিমেইল জয়েন্টের সাথে হ্যাঙ্গার রডের থ্রেড সংযুক্ত করুন।
১৭। কটার পিনসমূহ যথাযথভাবে ব্যবহার করুন।
১৮। হেড কভার ও বটম ফ্লেঞ্জের নাট-বোল্টসমূহ সঠিকভাবে স্থাপন করুন।
১৯। পানি না আসা পর্যন্ত ধীরে ধীরে ও সাবধানতার সাথে হ্যান্ডেল উঠানামা করুন। এক পর্যায়ে পানি বের হয়ে আসবে। পরিষ্কার পানি না আসা পর্যন্ত হ্যান্ডেল চাপতে থাকুন।
২০। উপরের ধাপ সমূহ সম্পন্ন করার মাধ্যমে নলকূপটি ব্যবহারের জন্য প্রস্তুত হয়েছে।