TAMIL NADU WATER SUPPLY AND DRAINAGE BOARD
31, KAMARAJAR SALAI, CHEPAUK, CHENNAI – 5

ABSTRACT

TWAD BOARD - GUIDELINE FOR SELECTION OF PIPES AND PIPE MATERIALS FOR ADOPTION IN TWAD BOARD WATER SUPPLY AND UNDERGROUND SEWERAGE SCHEMES TO BE IMPLEMENTED BY TWAD BOARD - ORDERS ISSUED - REG.

(RDT & PMC)

B.P.Ms.No.100 **Dated :28.10.2022**

Read :

Board's Resolution No.2.1, Dated 30.09.2022

ORDER:

B.P.Ms.No.23/ TWAD Board (PDC)/ dated.28.02.2011 stipulates to review the Pipe policy after three years. Accordingly, the pipe policy was reviewed and the "Guidelines for selection of pipes and pipe materials for adoption in Water supply and Underground sewerage schemes to be implemented by TWAD Board" was issued vide B.P.Ms.No.26/ TWAD Board (RDT&PMC)/ dated. 05.03.2019, and this guidelines was taken up for review.

In order to carry out detailed review of the existing pipe selection guidelines for any modifications required based on the performance of the pipes, regional level committees comprising of Chief Engineer, Superintending Engineer (WSS), Superintending Engineer (UGSS), Executive Engineers (PF, WSS, UGSS, O&M) and Assistant Executive Engineer, Material testing laboratory of TWAD Board, were formed for submission of reports.

Also, team of Engineers of TWAD Board were formed to visit the states of Telangana, Andhra Pradesh, Kerala, Karnataka and Odisha to collect data for discussions on the Pipe materials used in Water supply and Underground Sewerage schemes in the states.

TWAD Board constituted an Expert Committee for review of pipe selection guidelines vide B.P.Ms.No.35/ TWAD Board (RDT&PMC)/ dated.14.06.2022 comprising Managing Director/ TWAD Board as Chairman, Joint Managing Director/ TWAD Board as Vice-Chairman, Engineering Director/ TWAD Board as Member secretary and Engineering Director/ CMWSSB, Senior Vice-President/ TNUIFSL, Deputy general Manager/ TUFIDCO, Chief Engineer/ DMA, Superintending Engineer/CTP, Representative from Anna University, Dept. of Civil Engineering as members.

The recommendations of the regional level committees and the data on usage of pipes in the states visited were placed before the expert committee meetings held on 17.06.2022, 21.06.2022 and 28.06.2022.

The recommendations of the Expert committee were placed before the State Level Technical Committee (SLTC) of TWAD Board in its meeting held on 29.06.2022 and the recommendations of SLTC was placed before Board in its meeting held on 21.07.2022.

The Board after detailed deliberations vide its Resolution 2.1, dated.21.07.2022 resolved to place the proposal again in Board with the recommendations of SLTC of TWAD Board duly analyzing the PCC slab provision over HDPE pipe, adoption of Cast-in-situ and Pre-cast Machine Holes, performance of RCC Pipes in UGSS in CMWSSB & TWAD Board, cost comparison of pipes, action to be taken for default in quality of supply of pipes & regarding quality control procedures for plastic pipes.

The SLTC in its meeting held on 05.08.2022 discussed the observations of Board and the recommendations of the SLTC were placed before Board on 30.09.2022.

The Board after detailed deliberations vide Resolution No.2.1, dated.30.09.2022 approved the proposed guidelines for selection of pipes and pipe materials for adoption in water supply and underground sewerage schemes to be implemented by TWAD Board. Further, the Board observed that,

a. Selection of pipes for collection system in UGSS in densely populated areas shall be made considering expected high organic load in sewage. In such places economy of the pipe alone shall not play governing role. While preparation of Detailed Project Reports, selection of pipes based on site conditions and requirement among the choices in the proposed pipe selection guidelines shall have to be substantiated by the Chief Engineer who sends proposal for approval.
b. For adoption of O-PVC pipes of dia. up to 400 mm OD in Water supply distribution system, recommendation of SLTC shall be obtained.

The SLTC during the meeting held on 18.10.2022 discussed the above observations of Board and Resolved to recommend for adoption of O-PVC pipe up to 400 mm OD for water supply distribution system as per the existing pipe policy B.P.Ms.No.26/ TWAD Board (RDT&PMC)/ dated.05.03.2019.

Further as specified in the existing pipe selection guidelines Resolved to recommend adoption of O-PVC pipes in line with the guidelines stipulated in B.P.Ms.No.23/TWAD Board (PDC)/ dated.28.02.2011 regarding usage of any new piping material,

Also, SLTC suggested to place the performance study of O-PVC pipes in TWAD Board schemes in the next three years while review of next pipe selection guidelines.

The "Guidelines for selection of pipes and pipe materials for adoption in water supply and underground sewerage schemes to be implemented by TWAD Board" is issued as tabled below incorporating the following in the Board approved guidelines vide Resolution No.2.1, dated.30.09.2022.

a. The recommendation of SLTC on O–PVC pipes

b. The observations of Board made on selection of pipes for collection system in UGSS in densely populated areas.

A. Water Supply Schemes:

Sl. No.	Description	Pipe	
1.	**Headworks connecting main, River and Drainage crossing works:**		
a.	All sizes	Cast Iron socket and spigot (CI S/S) pipe as per latest IS 1536 and Cast Iron double flanged (CI D/F) pipe as per latest IS 7181/ IS 1537	
b.	Up to 600 mm ID	Ductile Iron socket and spigot (DI S/S) pipe and Ductile Iron double flanged (DI D/F) pipe as per latest IS 8329	
c.	Above 600 mm ID	Mild Steel (MS) pipe as per latest IS 3589 **Joints** – Above 600 mm ID – Sleeve Joint Up to 600 mm ID (if provided) – Butt joint The joints to be tested with radiographic examination/ ultrasonic/ liquid penetrant flaw detection / air test as per relevant standards, as required to ensure the quality of joints. Further, appropriate coating shall be made at the joints of the Mild Steel (MS) pipes after the welding work is carried out. **Coatings:** **Above GL** Internal – Cement mortar lining (IS 3589) External – Cement mortar coating (IS 3589)/ Epoxy coating (IS 3589), based on site requirement **Below GL** Internal – Cement mortar lining (IS 3589) External – Cement mortar coating (IS 3589)/ Coal tar wrapping (IS 15337), based on site requirement **Cathodic protection arrangements:** As per site condition, Mild Steel (MS) pipes shall be provided with cathodic protection arrangements to prevent pipe from corrosion.	
2.	**Pumping/ Gravity Mains:**		
a.	Up to 125 mm ID	Galvanized Iron (GI) pipe as per latest IS 1239: Part 1	
b.	Up to 225 mm OD	High Density Poly Ethylene (HDPE) pipe (PE 100) as per latest IS 4984	
c.	Above 200 mm and up to 400 mm ID	Ductile Iron (DI) pipe as per latest IS 8329	Based on cost analysis & site conditions, the selection of pipes should be certified by the Engineer–in–charge.
	Above 225 mm and up to 400 mm OD	Oriented Poly Vinyl Chloride (O-PVC) pipe as per latest IS 16647 (For use in line with the	

Sl. No.	Description	Pipe
		guidelines stipulated in B.P.Ms.No.23/TWADB(PDC)/ dated. 28.02.2011 regarding usage of any new piping material)
d.	Above 400 mm and up to 600 mm ID	Ductile Iron (DI) pipe as per latest IS 8329
		Bar Wrapped Steel Cylinder (BWSC) pipe with welded joints (for working pressure up to 60 m head) as per latest IS 15155. Appropriate inner/ outer cement mortar coating shall be made at the joints of the pipe after the welding work is carried out.
e.	Above 600 mm ID	Mild Steel (MS) pipe as per latest IS 3589 (Joints and coatings as in 1.c.)
	Note: DI pipes are preferable in Urban and heavy traffic areas.	
3.	**Pipe connection works for Sump/ OHT:**	
a.	Up to 125 mm ID	Galvanized Iron (GI) pipe as per latest IS 1239: Part 1
b.	Above 125 mm and up to 1000 mm ID	Ductile Iron (DI) double flanged pipe as per latest IS 8329/ Cast Iron (CI) double flanged pipe as per latest IS 7181/ IS 1537
c.	Above 1000 mm ID	Mild Steel (MS) pipe as per latest IS 3589 (Joints and coatings as in 1.c.)
	Note: Pipe connections shall be provided with suitable supports as required for higher staging height as per site condition.	
4.	**Distribution System:**	
a.	Up to 125 mm ID	Galvanized Iron (GI) pipe as per latest IS 1239:Part 1
b.	Up to 250 mm OD	High Density Poly Ethylene (HDPE) pipe (PE 100) as per latest IS 4984
c.	Up to 400 mm OD	Oriented Poly Vinyl chloride (O-PVC) pipe as per latest IS 16647 (For use in line with the guidelines stipulated in B.P.Ms.No.23/ TWADB (PDC)/ dated.28.02.2011 regarding usage of any new piping material)
d.	Above 250 mm ID	Ductile Iron (DI) pipe as per latest IS 8329
e.	House service connection	Medium Density Poly Ethylene (MDPE) pipe as per latest ISO 4427
5.	**Pumpset erection in Bore Well:**	
a.	All sizes, up to 60m depth	Un-Plasticized Polyvinyl Chloride (U-PVC) pipe/ High Density Poly Ethylene (HDPE) pipe (PE 100) as per latest IS 4984
b.	All sizes, above 60m depth	Galvanized Iron (GI) pipe as per latest IS 1239:Part 1

B. Under Ground Sewerage Schemes:

Sl. No.	Description	Pipe
1.	**House Service Connection (HSC):**	
a.	For domestic use	110 mm OD Un-Plasticized Polyvinyl Chloride (U-PVC) pipe (SN 8 - SDR34) as per latest IS 15328
b.	For commercial use	160 mm OD Un-Plasticized Polyvinyl Chloride (U-PVC) pipe (SN 8 - SDR34) as per latest IS 15328

Sl. No.	Description	Pipe
2.	**Collection System:**	
a.	Up to 300 mm ID and up to 3 m depth	Double Wall Corrugated (DWC) pipe (SN8) as per latest IS 16098: Part 2 and with required bedding
		Un-Plasticized Polyvinyl Chloride (U-PVC) pipe with required stiffness as per latest IS 15328 and with required bedding
b.	Above 300 mm ID and up to 600 mm ID and all depth, in non-corrosive soil areas	Reinforced Cement Concrete (RCC pipe) with Sulphate Resistant Cement (SRC) as per latest IS 458 with inner high alumina cement mortar lining of min. 12 mm thickness and with required bedding
c.	Up to 1500 mm OD & all depth	High Density Poly Ethylene (HDPE) pipe (PE 100) as per latest IS 14333 with required stiffness & bedding
d.	Any dia., and all depth	Cast Iron (CI) pipe as per latest IS 1536 with required bedding
3.	**Machine holes**	
a.	Pre-cast monolithic Reinforced Cement Concrete (RCC) machine hole without top coping, irrespective of depth considering the minimum time for execution and minimum disturbance to the public.	
b.	Pre-cast Reinforced Cement Concrete (RCC) rings of 0.5 m/ 1 m depth with interlocking arrangements & grouted joints without top coping, if it is not possible to erect pre-cast monolithic Reinforced Cement Concrete (RCC) machine holes.	
c.	Cast-in-situ masonry (Rectangular up to 2.50 m depth & Circular above 2.50 m depth)/ cast-in-situ Reinforced Cement Concrete (RCC) machine holes, to be adopted only if above two options are not feasible as per site conditions.	
4.	**Pumping main:**	
a.	Up to 1500 mm OD	High Density Poly Ethylene (HDPE) pipe (PE 100) as per latest IS 14333
b.	Any dia.	Cast Iron (CI) pipe as per latest IS 1536
5.	**Effluent disposal from STPs:**	
a.	**Pumping** – High Density Poly Ethylene **(HDPE)** pipe (PE 100) as per latest IS 14333	
b.	**Gravity** – Reinforced Cement Concrete **(RCC) pipe** with Sulphate Resistant Cement (SRC) as per latest IS 458 with inner high alumina cement mortar lining of min. 12 mm thickness (in non-corrosive soil areas)/ High Density Poly Ethylene **(HDPE)** pipe (PE 100) as per latest IS 14333 as per site condition	

C. General conditions:

1. The selection of pipes shall be made based on site condition/ requirement. If two or more pipes are found suitable, then economy shall be the governing factor and the selection of pipe should be certified by the Engineer-in-charge, for water supply schemes and pumping main in underground sewerage schemes (UGSS).
2. The selection of pipes for collection system in UGSS in densely populated areas shall be made considering expected high organic load in sewage. In such places economy of the pipe alone shall not play governing role. While preparation of Detailed Project Reports, selection of pipes based on site conditions and requirement among the choices in the

proposed pipe selection guidelines shall have to be substantiated by the Chief Engineer who sends proposal for approval.

3. The guidelines may be relaxed for the Deposit works carried out by TWAD Board based on the request of the beneficiary for choice of pipes, provided the operation and maintenance cost shall not increase.
4. The pipes suggested in the above guidelines for adoption in the Schemes may be modified, if necessary, by the Engineer who is competent to accord Technical Sanction under extraordinary circumstances to suit the site conditions that necessitate changes after detailed analysis and justification.
5. Necessary conditions to ensure raw material composition of High Density Poly Ethylene (HDPE) pipe as per required standard to be included in the bid document. The raw material shall be pre compounded at manufacturing stage.
6. In order to ensure the quality of Pipe material, the various Quality test procedures as mentioned in the relevant codes of respective Pipe materials, should be carried out without fail.
    a. As per prevailing sampling procedures in TWAD Board for plastic based pipes, one sample for every 6 km and part length of pipe supplied is tested for acceptance tests (testing procedure as per respective Indian Standard) at TWAD Board material quality testing laboratory, for all schemes implemented by TWAD Board.
    b. In order to improve the quality of pipe testing for plastic based pipes such as HDPE, u-PVC, O-PVC, DWC pipes, every 10^{th} sample collected (as per sampling procedure presently adopted in TWAD Board) shall be tested in Central Institute of Petrochemicals Engineering and Technology (CIPET) instead of TWAD Board material quality testing laboratory, for schemes costing more than Rs.100 crore.
7. Suitable provision to be incorporated in the agreement seeking a declaration from the Manufacturer /Dealer/ Contractor for the supply of pipe as per respective IS codal specifications.
    a. If the percentage of failure in TWAD Board material quality testing laboratory for a particular brand of pipe is more than 3% for a financial year even after re-sampling, then, at the end of each financial year, the list of such brand shall be communicated to Bureau of Indian standard who has issued license for the use of standard mark to the manufacturer for taking necessary corrective action.
    b. Also, at the end of every financial year, circular shall be issued to registered contractors and field Engineers to avoid purchase of pipes from the above said defaulting manufacturers.

All the officials of TWAD Board are instructed to strictly adhere to the above mentioned guidelines without any deviation. The guidelines come into effect from the date of issue of this order.

The pipe selection guidelines shall be reviewed after three years, with the performance study of the O-PVC pipes in TWAD Board schemes.

(BY ORDER OF THE BOARD)

Sd/- V. Dakshinamoorthy, dt.28.10.2022
Managing Director,
TWAD Board, Chennai-5.

To
All the Chief Engineers of TWAD Board.
Copy to
The PC to the Managing Director, TWAD Board Head Office, Chennai-5.
The PC to the Joint Managing Director, TWAD Board Head Office, Chennai-5.
The PC to the Engineering Director, TWAD Board Head Office, Chennai-5.
The PC to the Finance Director, TWAD Board Head Office, Chennai-5.
All the Joint Chief Engineers of TWAD Board Head Office, Chennai-5.
All the Superintending Engineers of TWAD Board.
The Deputy Chief Engineer, SQMS, TWAD Board Head Office, Chennai-5.
The Residential Audit Unit/ Board Cell, TWAD Board Head Office, Chennai-5.
Spare – 10 copies.

/forwarded by order/

28/10/22
Assistant Executive Engineer (RDT&PMC),
TWAD Board, Chennai-5.
28/10/2022