

Comparative Statement of Various Pipes for Gravity Sewers

	EVALUATION CRITERIA	GLAZED STONEWARE PIPES (IS:651-1980)	RCC PIPES (IS:458-1988)	UPVC PIPES	DI PIPES (IS:8329-2000)	HDPE PIPES (IS:14333 -2000)
1.	Available Length	0.6m	2 to 2.5m	6 or 12m	6 m	6 or 12m
2.	Diameters Available	100 to 300mm for higher diameters it is not economical.	150 to 2000mm	Available up to 630mm	Up to 1000mm	Available up to 630mm
3.	Type of Joint	S&S joint with caulking yarn soaked in cement slurry or tarred gasket. Joint is covered with cement mortar.	Available in both collar and S&S joints.	Solvent Cement joint and Rubber Ring joint	Tyton joint with rubber gasket	Butt fusion welding process.
4.	Weight	Light	Heavy	Light	Heavy but lighter than R.C.C. pipes.	Light
5.	Handling	Easy due to shorter length and light weight	Difficult due to heavy weight	Easy due to light weight	Difficult due to heavy weight in larger dia	Easy due to light weight
6.	Roughness Coefficient of Pipe	0.012	0.011	0.011	0.011	0.011
7.	Corrosion resistance	Not affected by hydrogen sulphide gas.	Subject to H ₂ S corrosion due to acids,	Highly corrosion resistant	Protective layers are required to	Highly corrosion resistant

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		Highly corrosion resistant	highly septic sewage and by highly acidic or high Sulphate soils and where velocities are not sufficient to prevent septic conditions. To prevent corrosion Sulphate resistant cement concrete to be used for pipe manufacture.		protect corrosion	
8.	Life	More than 50 years	30 years	Life is more than 50 years due to highly corrosion resistant.	More than 50 years	Life is more than 50 years due to highly corrosion resistant.
9.	Class of Pipes Available	Grade A & AA (Non pressure pipes)	NP1, NP2, NP3, NP4 (Non pressure pipes)	6Kg/Sq.cm, 8Kg/Sq.cm, 10Kg/Sq.cm, 12Kg/Sq.cm	K-7 to K-12 K-7= 12 - 32kg/sqcm. K-9= 25 - 50kg/sqcm Depending Upon the dia of pipe.	PN 2.5, PN4, PN6, PN10 (2.5Kg/Sq, 4Kg/Sq, 6Kg/Sq and 10Kg/Sq)
10.	Requirements of Special Equipments	Not required	Not required	Not required	Not required	Welding equipment required for jointing

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11.	Stacking the Pipe Materials	Can be stacked anywhere. Care should be taken while loading, unloading and stacking.	Can be stacked anywhere. Care should be taken while loading, unloading and stacking.	To avoid exposure to sunlight, it is stacked in covered area. This also requires a special type of stacking to avoid buckling and damage of pipe ends Care should be taken while loading, unloading and stocking.	Can be stacked anywhere. Care should be taken while loading, unloading and stocking.	Same as uPVC
12.	Cost of supplying, laying and jointing of meter length	200 mm: Rs. 272 250 mm: Rs: 377 300 mm: Rs: 517 (DSR 07 + 10% Price contingency)	(NP3 Pipe) 350mm: Rs. 1134 400mm: Rs. 1234 500mm: Rs. 1568 600mm: Rs. 2102 NP2 Pipe 200 mm: Rs 248 300 mm: Rs 441 400 mm: Rs 578 500 mm: Rs 855 600 mm: Rs 1095 (UP JN)	6 kg/cm ² 200mm: Rs. 604 (UPJN+20% for laying & Price Contngency) 315mm: Rs. 1448 (MP ADB Project+20% Price contingency)	(25 - 50 kg/cm ²) K9 Pipe 200mm: Rs:2442 300mm: Rs:4505 400mm: Rs:5520 500mm: Rs:9418 600mm: Rs:12283 (UPJN Supply rate+20% for laying & price contingency)	PE 100, PN- 6 200mm: Rs. 640 315mm:Rs. 1585 400mm: Rs. 2595 500mm: Rs. 4695 630mm: Rs. 7434 (MP ADB Project+20% Price contingency)

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13.	Remarks on Cost	Comparatively Cheaper	NP2 is Cheapest among all materials	Costlier than RCC pipe but cheaper than HDPE pipes.	Costlier than other pipes but cheaper than HDPE pipes.	Smaller diameter pipes are cheaper and higher diameter pipes are costlier.
14.	Requirement in Refilling the Trench	No stone or rock to be filled while refilling.	No stones or rocks to be filled while refilling.	Sand bedding is required to avoid the deflection of pipe due to burden of earth. No stones or rocks to be filled while refilling.	No stones or rocks to be filled while refilling.	Concrete arch bedding is required to avoid the deflection of pipe due to burden of earth.
15.	Infiltration	If joints are weak/poor, chance of infiltration is high due to more number of joints.	Infiltration is less if rubber joints are used but joints should be proper if collar joints are used.	Infiltration is very less	Infiltration is very less	Infiltration is very less
16.	Workability	Light weight for easy handling.	For larger diameter due to heavy weight handling to be done with care	Light weight for easy handling.	Good	Light weight for easy handling.
17.	Effect of Radiation	Not affected	Not affected	Affected by UV rays if stored for a long duration in	Not affected	Affected by UV rays if stored for a long duration in open fields

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				open fields hence it should be kept covered.		hence it should be kept covered.
18.	Jointing Skill Requirements	Requires quality supervision	Jointing is easy in S&S pipes with rubber ring joints.	Jointing is easy in S&S pipes using solvents.	Jointing is easy in S&S pipes with rubber ring joints.	Jointing is expensive and jointing results in beeding which causes obstruction for solids in sewage
19.	Protection to the Pipe	Depending upon the loading conditions, pipes should be protected with either sand or Cement Concrete bedding	Depending upon the loading conditions, pipes should be protected with either sand or Cement Concrete bedding	Pipe should be protected against deflection due to super imposed loads. Pipe embedded portion should be well compacted.	Not required	Pipe should be protected against deflection due to super imposed loads. Pipe embedded portion should be well compacted.
20.	Maintenance	Almost nil if joints are properly made.	Almost nil if proper velocity is maintained.	Pipe may get damaged due to rodding	Minimum	Pipe may get damaged due to rodding
21.	Previous Experience/ Performance	In use for long period and performance is satisfactory	In use for long period and performance is Good	Not common for street sewers but now picking up use to connect houses to sewer	It is durable pipe. Performance is yet to be proven	Recent use started in India. It is durable