



# Design Method for High Efficiency of Flow in Circular Pipes

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$q_r$ : Flow in pipe,

$V_{ef}$ : Circulation efficiency;

$V_{max}$ : Velocity max;

$V_r$ : Velocity in pipe,

$A_{max}$ : Cross sectional area correspond to  $Q_{max}$ ,

$Q_p$ : Flow in full section,

$\theta_{Q_{max}}$ : Water surface angle correspond to  $Q_{max}$

$R_R$ : the resistance rate.

## Reference

1. Achour, B., Bedjaoui A. (2006). Discussion of : explicit solutions for normal depth problem » by Prabhata K. Swamee, Pushpa N. Rathie, IAHR Journal of hydraulic research., 44(5), 715-717.
2. André, F. (1995). *Analyse Numérique pour Ingénieur*, Ecole polytechnique de Montréal, Canada.
3. Barr, D.I.H., Das, M.M. (1986). Direct solution for normal depth using the manning equation. Proc., institution of Civil Engineers., 2(81) 315-333.
4. Camp, T.R. (1946). Design of sewers to facilitate flow, *J. Sewage Works.*, Vol. 18, pp. 3-16.( also Trans. Amer. Soc. Civ. Engrs, 109(1944) 240-243.)
5. Capart, H., Sillen, X., and Zech, Y. 1997. Numerical and experimental water transients in sewer pipes. *J. Hydraul. Res.*, 35(5) 659–670.
6. Carlier, M. (1980). *Hydraulique Générale*, Eyrolles, France.
7. Chow, V.T. (1959). *Open channel hydraulics*. Mc Graw-Hill, New York.
8. Cunge, J. A., Jr., F. M. H., and Verwey, A. 1980. *Practical aspects of computational river hydraulics*, Pitman, London.
9. Ferreri, G. B., Freni, G., & Tomaselli, P. 2010. Ability of Preissmann slot scheme to simulate smooth pressurisation transient in sewers. *Water Science and Technology*, 62(8)1848-1858.
10. Garcia-Navarro, P., Priestley, A., and Alcrudo, F. 1994. Implicit method for water flow modeling in channels and pipes. *J. Hydraul.Res.*, 32(5) 721–742.

11. Giroud, J.P., palmer, B., and Dove, J.E.,(2000). Calculation of flow Velocity in pipes as function of flow rate. *J. Geosynthetics International.*, 7(4-6) 583- 600.
12. Ji, Z. 1998. General hydrodynamic model for sewer/channel network systems. *J. Hydraul. Eng.*, 124(3) 307–315.
13. Manning, R. (1891). On the flow of water in open channels and pipes. *Transactions. Institution of Civil Eng. Ireland., Dublin.*, 20,161-207.
14. Marc, S. and Béchir, S. (2006). *Guide technique de l'assainissement*, Le Montier, Paris, France.
15. McGhee ,T. J. (1991). *Water Supply and Sewerage*, 6<sup>th</sup> edition, McGraw Hill, New York.
16. Prabhata, K., Swamee.(2004). Exact solution for normal depth. *J. Hydr. Research., IAHR.*, 42(5) 541-547.
17. Saatçi, A.(1990).Velocity and depth of flow calculations in partially pipes. *J. Environ. Eng., ASCE.*, 116(6)1202-1208.
18. Swarna, V., Modak, P. (1990). Graphs for Hydraulic Design of Sanitary Sewers. *J. Environ. Eng.,ASCE.*, 116(3)561–574.
19. Trajkovic, B., Ivetic, M., Calomino, F. & D'Ippolito, A. 1999. Investigation of transition from free surface to pressurized flow in a circular pipe *.J. Water Sci. Technol.* 39(9)105-112.
20. Zeghadnia, L., Djemili, L., Houichi, L., and Rezgui, N. (2009). Détermination de la vitesse et la hauteur normale dans une conduite partiellement remplie. *European Journal of Scientific Research.*, 37(4) 561-566.
21. Zeghadnia, L., Djemili, L.and Houichi, L. (2014). Analytical solution for the flow velocity and water surface angle in drainage and sewer networks: case of pipes arranged in series, *Int. J. Hydrology Science and Technology*, 4(1)58–67.
22. Lotfi, Z., Djemili, L., Houichi, L. and Rezgui, N (2014) New equation for the computation of flow velocity in partially filled pipes arranged in parallel', *J. Water Science and Technology.*,. IWA.,70(1)160–166.