

Ground water treatment using MBF filtration, field results and references

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Moving bed filtration may be applied for ground water treatment. The typical set up consists of aeration (Fe^{2+} converted to Fe^{3+}) followed by MBF. The pfd is indicated in figure 1, including the typical operating window.

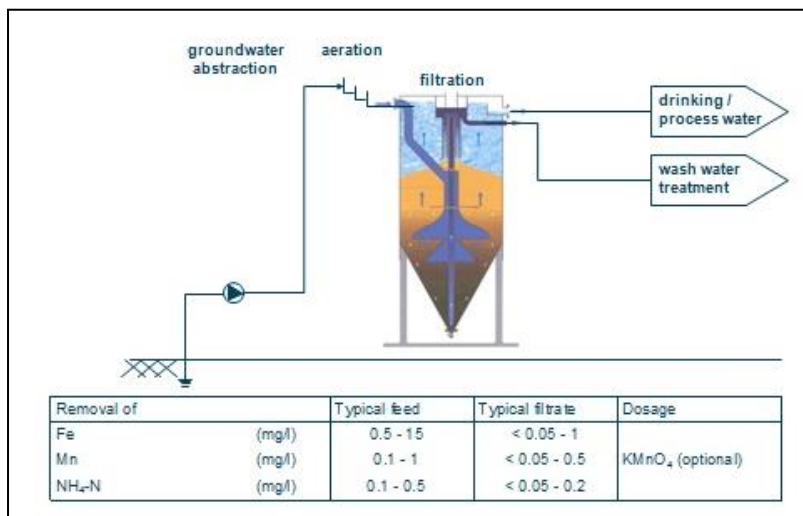


Figure 1 – PFD

Numerous filter plants have been installed for ground water treatment. In figure 2 a plant with a capacity of 120 m³/h is indicated, installed in 2005 at the drinking water plant of Knokke, Belgium.



Figure 2 – MBF at Knokke, Belgium

Performance data have been gathered at various plants. For one of those plants (Vitens, Weerseloseweg, Netherlands) the performance data have been presented below.

Two 5m² MBF filters with 2 m bed height have been applied. The filters were operated at 7 – 10 m/h filtration rate. During the last period coagulant (Wisprofloc P) has been dosed. Wisprofloc P is a pregelatinised cationic starch product.

During the operating stages 4 different configurations have been monitored.

- Run 1 Filter with sand ranging 0.8 to 1.0 mm, 7 m/h
- Run 2 Filter with sand ranging 0.8 to 1.2 mm, 7 m/h
- Run 3 Filter with sand ranging 0.8 to 1.2 mm, 10 m/h
- Run 4 Filter with sand ranging 0.8 to 1.2 mm, 10 m/h, dosing 0.3 mg/l Wisprofloc P

The feed concentrations of groundwater are fairly constant. The average ferric concentration is 1.4 mg/l. The average manganese concentration is 0.13 mg/l. The average pH is 8.15. The water is aerated prior to feeding the MBF.

Fe and Mn removal have been monitored closely and the results are presented in the graphs below, figure 3 (Fe removal) and figure 4 (Mn removal).

Regarding to the ferric removal run 4 gives the best results approximately 95 – 98% removal. In this run a small coagulant dosing was applied and the filtration rate was 10 m/h. Manganese removal is a biological process. As shown in the graph the manganese removal gradually improved after a period of 6 weeks (run 4) to over 90% removal efficiency.

Summarizing both Ferric and manganese removal can be MBF. The removal efficiencies for ferric are 95 – 98% and for manganese 90 – 95%, obtaining very low filtrate concentrations.

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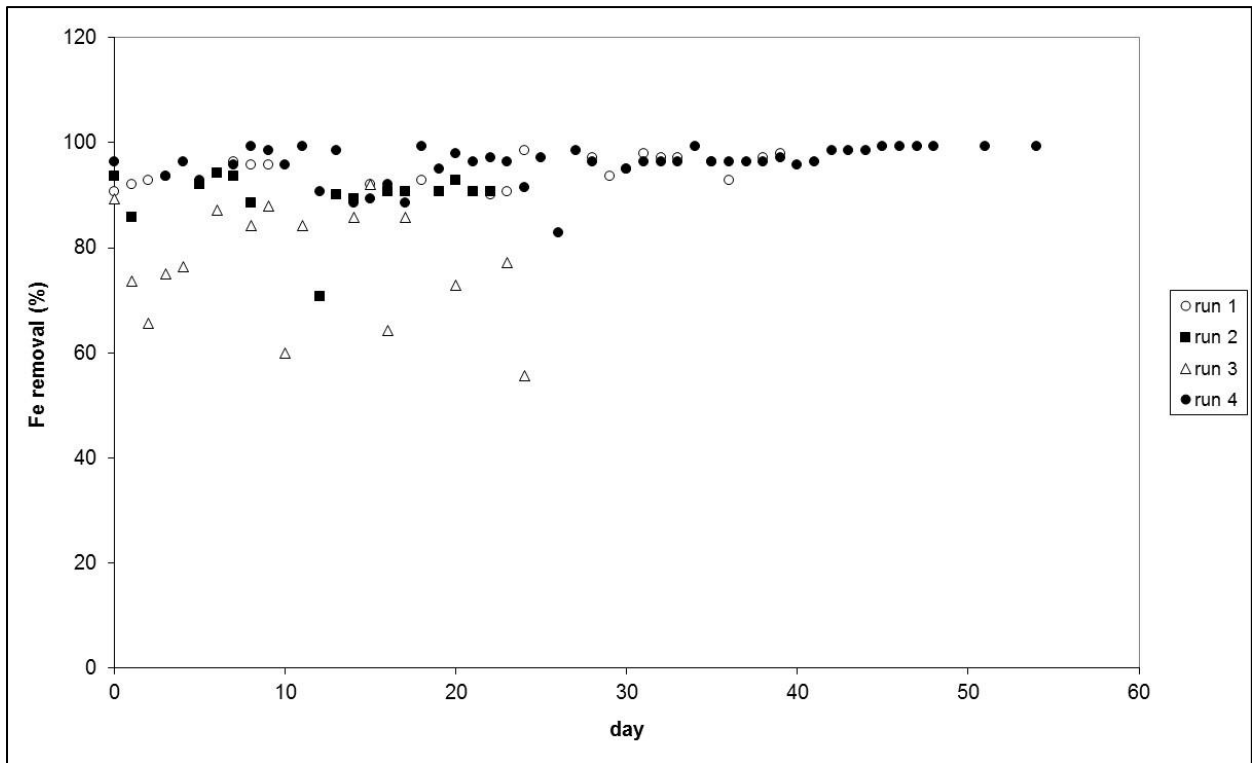


Figure 3 – Fe removal

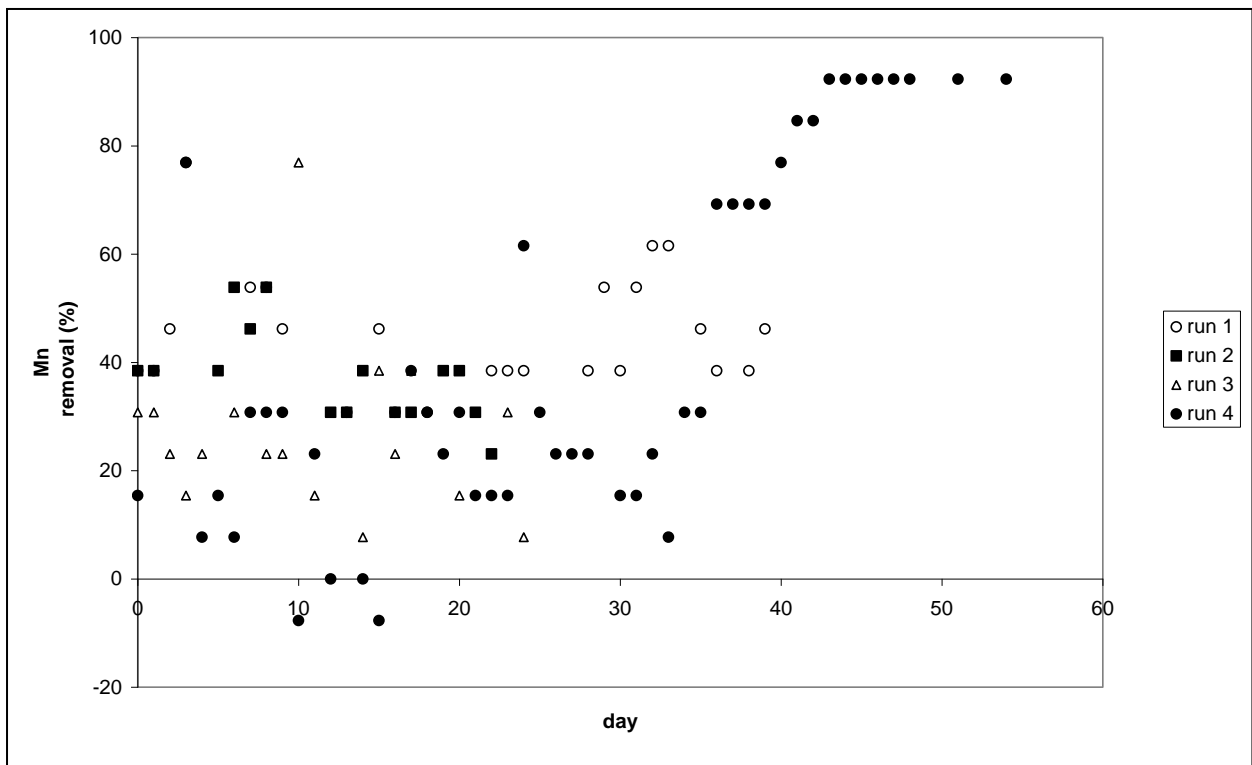


Figure 4 – Mn removal