



Quantum Filtration Medium

Leschenault Drive
North Shore
Bunbury
WA
6230

Attention: Clive Hawkes

Follows is a short report on the trial using DMI 65 vs. conventional silica sand at George Municipal water works. Please note that the DMI 65 filter had new nozzles fitted to allow for the finer sand. All filters are Degremont design. George water is highly coloured containing Humic and Fulvic acids – the raw water colour is approx. 800 PtCo colour units. This type of water is believed to be one of the most difficult to filter.

The plant has been running since the beginning of January 07 and we continue to have excellent results.

Report on DMI 65 trials at George Municipality:

1. Iron Removal

It appears that iron removal is very effective regardless of the pH. The highest residual iron found was 0.01 mg/l. (SANS 241 requires less than 0.20)

2. Manganese Removal

Manganese removal is also very efficient. The highest remaining manganese found was 0.06 mg/l (SANS 241 requires less than 0.10) which occurred after problems with the flocculation process and at a high pH. Further investigation is needed to determine optimum pH for manganese removal.

3. Aluminium Removal

Aluminium tests were only done once on 13 December and we found 0.03 mg/l. (SANS 241 requires less than 0.30). It seems that we are getting an additional benefit of aluminium removal even at the higher pH.

4. Turbidity

After the first 48 hours of operation the highest turbidity recorded was 0.06 NTU. (SANS 241 require less than 1.0) It has been noted that during the flocculation problems, the quality of the water after filtration through the DMI 65 remained very good while the filters with normal sand were back-washed repeatedly.



5. Chlorine

Free Chlorine levels remain lower than in the silica sand filters. We suspect that some of the chlorine is used to regenerate the DMI-65.

6. pH

The initial pH in the DMI filter was lower than through the normal sand. It seems that the pH levels have stabilized and are comparable at this stage.

7. Colour.

According to our laboratory tests the highest colour was 4 mg/l PtCo (SANS 241 requires less than 20) but most of the time the colour was lower than the colour of the distilled water bought from a pharmacy in George.

8. General:

We suggest that the pH of the water before filtration must be kept between 7.5 and 8.0 to determine optimum manganese removal although we have seen very good results regardless of the variation in pH from 6.8 to 9.5.

We suggest that free chlorine before filtration must be lowered to 1.5 mg/l as we can smell or taste chlorine after filtration through the DMI 65 sand

9. Filtration Rate and Filter-runs:

The short filter-runs over the first days were because of the fines in the sand. After proper backwashing the filter-runs increase to 24 hours which compare well to the other filters.

Due to a faulty flow control system (we suspect the operation of the ball-valve), we were unable to establish and compare the flow-rate. The Plant Manager has arranged to change the flow control system.

10. Back Washing:

It seems that the air-blow is sufficient for proper backwashing without any changes. We used all 3 pumps (the third pump was installed on Friday) to get a proper water back-wash rate and to remove the fines successfully. The original prescribed backwashed procedure for Degremont filters has been modified by operational personnel to increase the effectiveness of back-washing. We suspect that the deliveries of the pumps have reduced over the years and recommend that the remaining two pumps be checked and/or refurbished as it has a big influence on proper back-washing and the performance of the filters.

11. Loss of Filter media:

We have not noticed any loss of media through the nozzles. We propose that the cover-plates of the inspection-hole be removed next week to do a proper inspection in the under-drain chamber.

After replacement of a modified nozzle with a stainless steel bolt, we have not seen any loss of media during the backwash process. Care should be taken to ensure that media is not lost during backwashing and we will write a proper procedure after the pumps have been checked and/or refurbished.

12. Nozzles:

We have replaced all the nozzles with new nozzles as instructed. We found some modified (shortened) nozzles installed by the original contractors. We have succeeded to install 1258 of the 1260 nozzles properly and replaced one nozzle with a manufactured stainless steel bolt. We have installed one modified nozzle, which has no influence on the loss of media during backwashing. We recommend that all the nozzles of the remaining filters be replaced with new nozzles and that stainless steel bolts be used to block holes where it is impossible to install new nozzles correctly.

13. Asbestos Cover plate in under drain chamber:

We found that the cover plate between the under drain and backwash chamber was in a bad condition and may be the main contributor to the loss of filter media experienced on the filter. We replaced this plate with a stainless steel plate designed by SSI. We recommend that all cover-plates be replaced in the remaining five filters with stainless steel plates.

We feel that the trial up to date has proved that the water after filtration through the DMI 65 sand is within the requirements of a Class 1 SANS 241:2005 drinking water.

Yours faithfully

Water Technology Cape (Pty) Ltd

Clive Wright
Managing Director