PO BOX 2106, Bunbury, WA 6231, AUSTRALIA
ABN 80 099 362 026
Telephone: +61 8 97214044 - Facsimile: +61 8 97214046
E-mail: factory@iinet.net.au

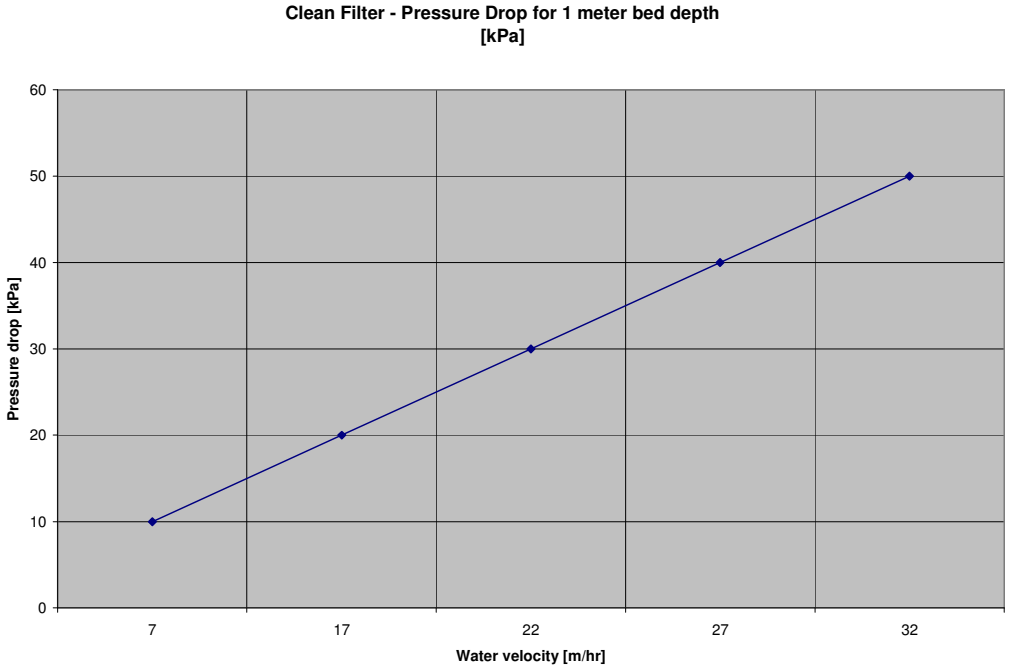
Design Recommendations
for
Water Treatment Plant using DM 65 Filter Media
Flow, Pressure, Water Velocity

The characteristics of DMI 65 filter media are such that the DMI 65 is easy to use and provides flexibility when upgrading old water treatment systems. DMI 65 can be used in existing systems typically by just replacing the ordinary sand or similar materials used for mechanical filtration or for removal of iron and manganese through catalytic oxidation.
The filters using DMI 65 filter media have three modes of operation, the same as ordinary sand filters: Filtration mode, Backwash mode and Rinse mode.
We relate the pressure drop to velocity of the water through the cross sectional area of the filter because its usefulness and simplicity of relating the data to flow rate. The flow rat "*Q*" in **cubic meters per hour** can be calculated by multiplying the velocity '*v*" in **meters per hour** by the filter area "*A*" in **square meters**.

Q = v x A

Water temperature during test for the data in the charts was **24º C**.

1) Filtration mode
Pressure drop for initial clean filter depends on the depth of the filter media bed and water velocity. The chart below shows the pressure drop for 1 meter bed depth. For other bed depth the pressure drop can be considered linearly dependent on bed depth. Thus, to find out the pressure drop for 0.6 m bed depth we multiply the value for pressure drop found in the chart by 0.6.

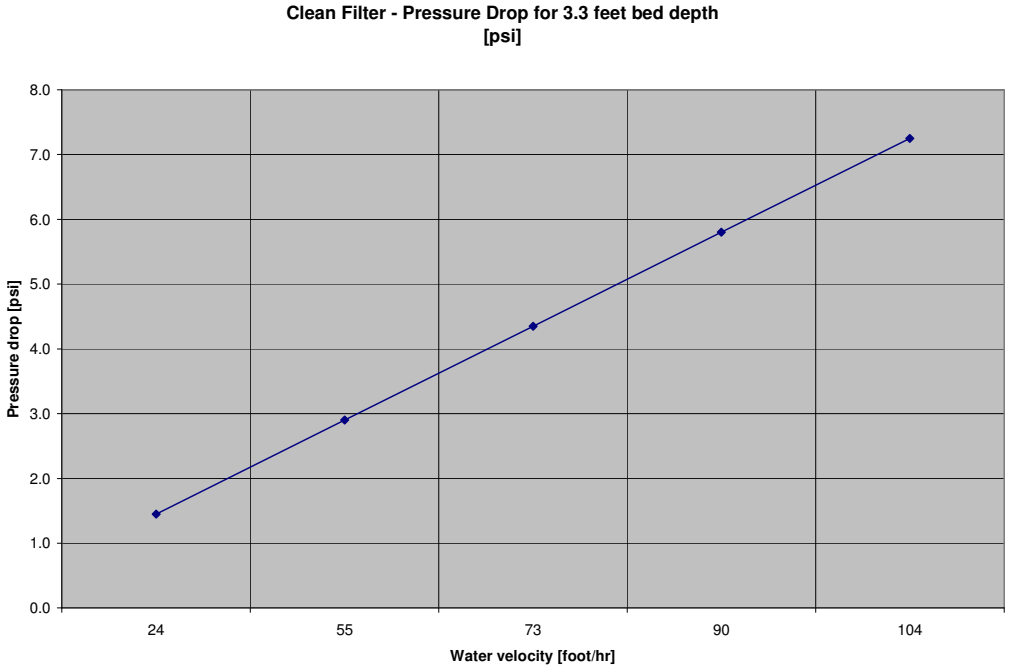


Filter media depth needed increases with the decrease in the amount of residual iron and manganese allowed in the filtered water. Maximum bed depth could be just over 1 meter and relates also to the flow capacity of the system and effective height of available filters.

Quantum
Filtration Medium

PO BOX 2106, Bunbury, WA 6231, AUSTRALIA
ABN 80 099 362 026
Telephone: +61 8 97214044 - Facsimile: +61 8 97214046
E-mail: factory@iinet.net.au

Water velocity through the filter should be selected in accordance with the usage of the filtered water, size of water treatment plant, water quality and other factors.



For large drinking water treatment plants the depth of the bed should be selected towards the maximum and the water velocity around 5 m/hr, in any case not more than 10 m/hr. This maximizes performance in removing iron and manganese, reduces the frequency of backwashing, reduces power consumption because average pressure drop is lower, and could provide redundancy in case one of the filters is out of order and higher flow rate has to be put through the remaining filters.
The upper limit of velocity, up to 30 m/hr should be used for small bed depth and larger allowed amount of residual iron and manganese in the filtered water.

2) Backwash mode
Total pressure drop through the filter before backwashing is recommended to be maximum 100 kPa. The granules of DMI 65 filter media are porous. The larger the pressure drop, the larger compaction forces are applied to the filter media. The interaction between filter media particles during alternated compaction under normal service and expansion of the bed during backwashing leads in time to deterioration of granules. Backwashing the filter when the pressure drop has increased by 50 kPa from the initial clean filter pressure drop is a good reference. Higher or lower values could be set depending on the application and how long the filter media has to last before changing it. Note that the filter media would not loose significantly the effectiveness in removing the iron and manganese but the pressure drop through clean filter bed will increase.
Water velocity for backwashing the filter is limited to 80 m/hr. This is the same as recommended for ordinary sand filtration. Although it is possible to use not filtered water for backwashing in general this is not a good idea unless the water is relatively clean and the system is set up with a rinse operating mode in addition to filtration and backwashing. At low backwashing velocity longer backwashing time is needed. In general backwashing velocity should be twice the filtration velocity.
Backwashing time should be determined by using a site glass on the discharge backwash line or in some other way observe when the backwash water discharged is satisfactorily clean. Backwashing time could vary from a few minutes to 15 minutes.

3) Rinse mode
This mode follows backwashing to remove the contaminant solids that would exit the filter before the filter bed is compacted back and operates normally. This mode is not necessary to be implemented in all water treatment systems.

Quantum
Filtration Medium

PO BOX 2106, Bunbury, WA 6231, AUSTRALIA
ABN 80 099 362 026
Telephone: +61 8 97214044 - Facsimile: +61 8 97214046
E-mail: factory@iinet.net.au

Rinse time should be around 30 seconds for small bed depth and 1 minute or a little more for upper limit of bed depth. Obviously the required time could be found by checking the presence of contamination in the filtered water when starting over normal filtration operation.