CLAIMS

1. A media bed filter comprising:

a reservoir having a raw liquid inlet and a filtered liquid outlet (120); stratified filtering media of varying size with a plurality of densities of granular material, wherein the media bed filter includes an upper layer of micromedia (128) with an underlying granular material (110) of increasing density with particle size so as to facilitate an air backwash of the micromedia without de-stratifying said media, and without requiring reclassification of the stratified media;

a backwash air distributor for injecting air up through the filtering media and a backwash liquid inlet (152); a backwash drain (154) and air valve;

wherein the raw liquid inlet comprises at least one raw liquid distribution nozzle (250) adapted to direct raw liquid inlet flow with a baffle (251) over a substantial portion of a surface of the filtering media, wherein the backwash liquid inlet (152) is controllably connectable to the raw liquid distribution nozzle (250) to flush accumulations on the surface of the filtering media without dispersion of the micromedia to remove said accumulations through the backwash drain (154).

2. The filter as defined in claim 1, wherein the micromedia (128) comprises sand granules.

3. The filter as defined in claim 1, wherein the micromedia (128) comprises glass granules.

4. The filter as defined in claim 1, wherein the micromedia (128) comprises polymer granules.

5. The filter as defined in any one of claims 1 to 4, further comprising a backwash air flow controller adjustable to set an air backwash flow rate effective to wash said micromedia (128) without de-stratifying said media.

6. The filter as defined in claim 5, wherein the micromedia (128) having a density at least 1 g/mL less than a density of the underlying granular material.

7. The filter as defined in claim 6, wherein a bottom layer of the stratified media comprises a granular material (114) of diameter within the range of 2.5 to 6 mm, an intermediate layer of

granular material (112) of diameter within the range of 0.5 to 2 mm, and a top layer of micro-media (128) having an effective diameter of 0.1 mm to 0.4 mm, preferably 0.1 to 0.2 mm.

8. The filter as defined in claim 7, wherein a density of the intermediate layer (112) is about 4 g/mL and a density of the top layer is less than 3 g/mL, preferably of a sand material having a density of about 2.7 g/mL or of a glass material having a density of about 2.5 g/mL or of a plastic material having a density of about 1.6 g/mL.

9. The filter as defined in claim 6, 7 or 8, wherein the bottom layer (114) comprises garnet granules.

10. The filter as defined in any one of claims 1 to 9, wherein the backwash air distributor comprises a conduit (152') surrounding a screen (116) of the filtered liquid outlet (120).

11. The filter as defined in any one of claims 1 to 10, further comprising a controlled backwash air supply.

12. The filter as defined in claim 11, further comprising a controller for automatically controlling valves to perform an air backwash cycle on the micromedia (128) that causes mixing of the micromedia (128) with dispersion of the micromedia (128) into a volume of wash water above the micromedia being limited to within a lower part so that an upper part of the wash water contains no micromedia during air backwash.

13. A media bed filter comprising:

a reservoir having a raw liquid inlet and a filtered liquid outlet (120); filtering media including micromedia (128);

wherein the media bed filter further comprises:

a raw liquid distribution nozzle (250) adapted to direct raw liquid inlet flow with a baffle (251) over a substantial portion of a surface of the filtering media including an upper layer of micromedia (128) with an underlying granular material (110) of increasing density and increasing coarseness; a backwash drain (154); a backwash liquid inlet (152);

wherein the backwash liquid inlet (152) is controllably connectable to the raw liquid distribution nozzle (250) to flush accumulations on the surface of the filtering media without dispersion of the micromedia to remove said accumulations through the backwash drain.