

Claims

1. A method of producing a feed screen, comprising hot-roll calendaring a woven fiber screen to a final height of ~~600 μ m~~ 350 μ m or less and flattening or removing tangent points ~~along~~ on an outer surface of the feed screen, wherein said feed screen is reversibly expandable and compressible and, wherein said feed screen increases cross flow velocity when used in a feed channel and thereby promotes a high turbulence near the membrane surface as compared to a feed screen without flattening and removal of tangent points.
2. ~~— The method of Claim 1, wherein the final height is of 350 μ m or less.~~
3. A feed spacer comprising a woven fiber screen having a height of ~~600 μ m~~ 350 μ m or less and flattened or removed tangent points ~~along~~ on an outer surface of the feed screen and wherein said feed spacer is configured to expand to maintain contact with a surface of a filtration membrane during operation when used in a feed channel, said feed spacer being reversibly expandable and compressible wherein said feed screen increases cross flow velocity in the feed channel and thereby promotes a high turbulence near the membrane surface as compared to a feed screen without flattening and removal of tangent points.
- 4.3. ~~The feed spacer~~ spiral-wound filter element of claim 32, wherein the ~~woven fiber screen~~ has a height of 350 μ m or less.
5. ~~— The feed spacer of Claim 3, wherein~~ filter membrane layers are in planar contact with the woven fiber screen is compressible calendared outer surfaces of the feed spacer.
- 6.4. A spiral-wound filter element comprising a feed spacer of claim 32.

~~7.5.~~ The spiral-wound filter element of claim ~~64~~, further comprising: a permeate screen having a height of 300 μm or less; ~~and~~

~~a filtration membrane.~~

~~8.6.~~ The spiral-wound filter element of claim ~~75~~, wherein the feed spacer is imprinted into the filtration membrane.

~~9.7.~~ The spiral-wound filter element of claim ~~86~~, wherein at least one surface of the feed spacer is imprinted up to 65 μm into the filtration membrane.

~~10.~~ ~~The spiral-wound filter element of Claim 7, wherein the feed spacer is configured to expand to maintain contact with a surface of the filtration membrane during operation.~~

~~11.8.~~ The spiral-wound element of claim ~~75~~, further comprising a housing, wherein an annular space between the filtration membrane and the housing is blocked.

~~12.9.~~ The spiral-wound filter element of claim ~~75~~, wherein the filtration membrane is a microfiltration membrane or an ultrafiltration membrane.

~~13.10.~~ The spiral-wound filter element of claim 5, wherein said permeate screen compresses less than 130 μm in height under compression of about 50 pounds per square inch (psi).

11. A tangential flow filtration (TFF) system comprising at least one filter element of claim ~~6.4~~.