

Well Screen with Extending Filter

BACKGROUND

[0001] In a well system, sand control screens are used to filter against passage of particulate from the wellbore into the production string. The wellbore around the screens is often packed with gravel to assist in stabilizing the formation and to pre-filter against particulate before the particulate reaches the screens. A uniform gravel packing can, however, be difficult to achieve due to formation of sand bridges and other complications experienced when pumping the gravel slurry into the region around the screens. Therefore, sometimes expandable screens that expand into contact with the wellbore are used in place of gravel packing. The expandable screens are less problematic to install and can provide similar filtering and formation support as an arrangement of conventional screens and gravel packing.

SUMMARY

[0002] This disclosure describes a well screen with a swell material that expands to extend filters into contact with the wellbore. The well screen can include features such as communication lines and a flow control device to enable control of fluid flow between the wellbore and the interior of the screen assembly.

[0003] Certain aspects encompass a well screen assembly for installation in a subterranean wellbore. The well screen assembly includes a base pipe having a sidewall opening to an interior of the base pipe. A filter assembly is carried on the base pipe and has an internal passage in fluid communication with the opening. The filter assembly is adapted to filter against passage of particulate from the wellbore into the opening. A swell material is carried in the base pipe between the filter assembly and the base pipe. The swell material is adapted to expand under specified conditions and displace the filter assembly radially toward a wall of the wellbore. A flow control device is provided in fluid communication between the internal passage of the filter assembly and the opening in the base pipe and is adapted to restrict communication of fluid with the opening in the base pipe.

[0004] Certain aspects encompass a well screen assembly for installation in a subterranean wellbore. The well screen assembly includes a base pipe having a sidewall opening to an interior of the base pipe. A filter assembly is carried on the base pipe and has an internal passage in fluid communication with the opening. The filter assembly is adapted to filter against passage of particulate from the wellbore into the opening. A swell material is carried in the base pipe between the filter assembly and the base pipe. The swell material is adapted to expand under specified conditions and displace the filter assembly radially toward a wall of the wellbore. A communication line is carried by the base pipe.

[0005] Certain aspects encompass a method. According to the method, in response to the presence of a specified fluid, a plurality of filters on a base pipe are extended from a retracted state to a radially extended state in contact a wall of a wellbore. With the filters, particulate of a specified size and larger is filtered from passage between the wellbore and an interior of the filters while flow of fluid is allowed. Communication of the flow between the interior of the filters and the interior bore of the base pipe is also restricted.

[0006] The details of one or more embodiments are set forth in the accompanying drawings and the description below. Other features, objects, and advantages will be apparent from the description and drawings, and from the claims.

DESCRIPTION OF DRAWINGS

[0007] FIG. 1 is a side view of an example well system incorporating a plurality of well screen assemblies.

[0008] FIG. 2A is a perspective exterior view of the well screen assembly.

[0009] FIGS. 2B and 2C are axial cross sectional views of the well screen assembly of FIG. 2A.

[0010] FIG. 3A is a detail side cross-section view of an end of an example well screen assembly having a flow control device in the form of a dissolvable material.

[0011] FIG. 3B is a detail side cross-section view of an end of an example well screen assembly having a flow control device in the form of a choke insert.

[0012] FIG. 3C is a detail side cross-section view of an end of an example well screen assembly having a flow control device in the form of a valve.

[0013] FIG. 4A is a detail side cross-sectional view of an example check valve.

[0014] FIG. 4B is a detail side cross-sectional view of an example autonomous valve.

[0015] FIG. 4C is a cylindrical projection of an example autonomous valve.

[0016] FIG. 5 is an axial cross-section of an example well screen assembly having a communication line running axially through the well screen assembly.

[0017] Like reference symbols in the various drawings indicate like elements.

DETAILED DESCRIPTION

[0018] Referring first to FIG. 1, an example well system 10 is shown to illustrate an example application of well screen assemblies 24 and 26. The well system 10 includes a subterranean wellbore 12 extending from the terranean surface through one or more subterranean zones of interest 20. The subterranean zones 20 can correspond to all or a portion of a subterranean formation (e.g., hydrocarbon bearing formation) and/or multiple formations. The well bore 12 shown in FIG. 1 is a “horizontal” well bore, and has a substantially vertical section 14 and a substantially horizontal section 18. The concepts herein, however, are applicable to many other configurations of well bores, such as vertical wells, slanted wells, other deviated wells, multi-laterals, and/or other configurations. The wellbore 12 can be cased or partially cased. For example, in FIG. 1, the vertical section 14 includes a casing 16 cemented at an upper portion thereof, and the horizontal section 18 is open hole through the subterranean zone 20.

[0019] A tubing string 22, for example a production and/or injection string, resides in the well bore 12 and extends from the surface. The tubing string 22 can communicate fluids between the subterranean zone 20 and the surface. The screen assemblies 24, 26 are distributed along the tubing string 22 proximate the subterranean zone 20. The screen assemblies 24, 26 are sand control screen assemblies that can filter out particulate materials from well fluids, direct the well fluids to an inner diameter of the tubing string 22, and stabilize the formation 20. As is discussed in more detail below, the screen assemblies 24, 26 are of a type that radially expand into contact with an interior wall of

wellbore 12 and are shown in an operating or a radially expanded configuration. An example screen assembly that can be used as screen assemblies 24, 26 is disclosed in U.S. Patent Publication No. US 2011/0036565, entitled “Control Screen Assembly,” filed Aug. 12 2009, the entirety of which is incorporated herein by reference. Three screen assemblies, one screen assembly 24 and two screen assemblies 26, are shown. In other instances, fewer or more screen assemblies 24, 26 can be used. Also, in other instances, the screen assemblies may be all of one type (e.g., all screen assemblies 24 or all screen assemblies 26) or a mixture.

[0020] FIG. 2A is a side exterior view of a well screen assembly 24. The well screen assembly 24 includes a base pipe 32, end rings 30, 33, an intermediate ring 31, a plurality of filter assemblies 38 arranged around the base pipe 32 and spanning between the end rings 30, 33 and intermediate ring 31, and in certain instances, a control device 34. Well screen assembly 26 is similar in construction to well screen assembly 24, but lacks an intermediate ring 31. Thus, the filter assemblies 38 span only between end rings 30, 33. The base pipe 32 is an elongate tubular structure for fluid communication therethrough, and is configured to couple in-line (e.g., threadingly by box and pin and/or otherwise) with the remainder of the tubing string. The end rings 30, 33 and the intermediate ring 31 (“the rings 30, 31, 33”) are around the exterior of the base pipe 32. In instances that a control device 34 is provided, the control device 34 is embedded between the filter assemblies 38 and the base pipe 32, for example in an end ring 30, 33, and controls communication of fluid between the wellbore 12 and the interior of the base pipe 32 via the filter assemblies 38. The filter assemblies 38 filter against passage of particulate during communication of fluid between an exterior of the well screen assembly 24 and the interior of the base pipe 32.

[0021] FIG. 2B is an axial cross-section through an end ring 30, and FIG. 2C an axial cross-section intermediate the end ring 30 and intermediate ring 31. Swell materials 35 (FIG. 2C) are disposed circumferentially around the base pipe 32 and axially between the rings 30, 31, 33. As described in more detail below, the swell materials 35 expand in contact with an activating fluid. The filter assemblies 38 are positioned on an exterior of the swell material 35. In certain instances, the filter assemblies 38 can be retained in

grooves in the rings 30, 31, 33 in a running configuration and can be allowed to detach from the grooves in an operating configuration. The swell material can be configured to expand and displace the filter assemblies 38 radially when contacted with the actuating fluid, for example, to achieve an operating configuration.

[0022] The filter assemblies 38 may be filtration tubes that extend axially along the base pipe 32 and have a substantially rectangular shape. The filter assemblies 38 each include a housing 41 for filter material 40. The housing 41 can include apertures 39 (FIG. 2A) concentrated near the ends or distributed along its entire length that allow well fluids to enter the filter assemblies 38 and filter out particulate larger than a specified size. The filter material 40 can include filtration openings through which further filter out particulate larger than a (typically, but not necessarily smaller) specified size. In one example, the filter material 40 is a fine mesh. Once in the filter media 38, fluid is directed, through an axial interior passage of the media 38, to one or more of the rings 30, 31, 33. Tubes 37 extend from the interior passage of the media 38. In certain configurations, such as that of FIG. 2B, the tubes 37 extend through the openings 42 in the base pipe 32. In other configurations, such as that of FIGS. 3B, the tubes 37 extend into internal chambers of the control devices 34 without extending through the base pipe 32. The tubes 37 communicate fluids from the filter assemblies 38 into the base pipe 32, as well as guide the filter assemblies 38 when moving between the radially expanded and retracted positions.

[0023] In instances where a control device 34 is provided, it can include one or more chokes, valves and/or other devices for affecting flow rate, pressure or other aspects of the communication of fluids. A ring 30, 31, 33 can have one control device 34 or more than one control device 34, and the control devices 34 can be of the same type or different types. Different rings 30, 31, 33 in the same screen assembly 24, 26 can also have the same or different types of control devices, and some can have no control devices 34. By having different control devices 34 in different screen assemblies 24, 26 and/or different rings 30, 31, 33 of different screen assemblies 24, 26 along the length a tubing string, one can create a desired pressure and/or flow profile, for example, to achieve a specified production and/or injection profile. For instance, some horizontal wells have

issues with the heel-toe effect, where gas or water cones in the heel of the well and causes a difference in fluid influx along the length of the well. The differences in fluid influx can lead to premature gas or water break through, significantly reducing the production from the reservoir. The control devices 34 of differing resistance to flow can be positioned in the string to stimulate inflow at the toe and balance fluid inflow along the length of the well. In another example, different zones of the formation accessed by the well can produce at different rates. The control devices 34 can be placed in the production string to reduce production from high producing zones, and thus stimulate production from low or non-producing zones. Still other circumstances to balance or otherwise control fluid inflow exist.

[0024] The swell material 35 can expand upon contact with an activating fluid and displace the filter assemblies 38 to contact an internal diameter of a wellbore. The activating fluid can include well fluids, such as hydrocarbon liquid, water, and gas, and/or other fluids. Various techniques can be used to contact the swell material 35 with an activating fluid. One technique includes configuring the swell material 35 to expand upon contact with activating fluids already present within the well bore when the screen assembly 24, 26 is installed or with activating fluids produced by the formation after installation. The swell material 35 may include a mechanism for delaying swell to prevent swelling during installation. Examples of a mechanism for delaying swell include an absorption delaying layer, coating, membrane, or composition. Another technique includes circulating activating fluid through the well after the screen assembly 24, 26 is installed in the well. In other embodiments, swell material 35 is capable of expansion upon its location in an environment having a temperature or a pressure that is above a specified threshold in addition to or alternative to an activating fluid.

[0025] Expansion of the swell material 35 can displace the filter assemblies 38 to contact or approximate the formation 20 at the wellbore 12. The thickness of the swell material 35 can be selected based on the diameter of the screen assembly 24, 26 and the diameter of the well bore 12 to maximize contact area of the filter assemblies 38 with the wellbore 12 upon expansion. In some embodiments, part of the swell material 35 expands between the filter assemblies 38 and contacts the formation 20 at the wellbore 12 between the

filter mediums 38 to conform to non-uniform wellbore diameters. The swelled screen assembly 24, 26 can reduce or eliminate annular flow of well fluids, provide multiple flow paths for filtered well fluids, and provide stabilization to the wellbore 12. For example, the swelled screen assembly 24 can support the formation 20 to prevent formation collapse.

[0026] FIG. 3A is a detail side cross-section view of an end of an example well screen assembly 300 that could be used as the well screen assembly 24, 26. The example well screen assembly 300 of FIG. 3A includes a flow control device in the form of a dissolvable material 302 embedded in the filter assemblies 38 and seals against flow between the interior of the base pipe 32 and the surrounding wellbore via the filter assemblies 38. The dissolvable material can be selected to dissolve in response to certain fluids (e.g., the actuating fluid and/or another fluid) and/or when exposed to certain conditions, such as a specified temperature and/or pressure (e.g., high temperatures associated with steam injection). In certain instances, the dissolvable material 302 can be a plasticized acid coating such as polylactic acid (PLA), polylactic-co-glycolic acid (PLGA), or similar. Other examples of dissolvable material exist. The dissolvable materials can be coated, injected, and/or pressed into the filter assemblies before assembly or installation in the well, forming a filled non-porous surface. For example, the dissolvable materials can be embedded into the apertures of the filter assembly housing, the axial interior passage and/or the openings in the filter material. After installation of the screen into the wellbore, the dissolving fluid or fluid that creates the dissolving conditions can be filled into the base tube 32 and/or into the wellbore around the screen to dissolve the dissolvable material 302 and open the screen assembly 300 to flow. The dissolvable materials provide a multitude of functions. For example, the dissolvable material 302 can eliminate the need to treat the mud prior to running screen by completely protecting the filter assemblies from contamination and clogging. In addition, in instances where the dissolvable material 302 is or contains an acid, it can also eliminate the need to pump an acid treatment to degrade the filtercake, because the acid of the dissolvable material can degrade the filtercake. Furthermore, the coating 302 can eliminate the need to run a wash pipe by creating a low pressure barrier/conduit through

the screen, and enabling the screen to be used as a wash pipe prior to dissolving the dissolvable material.

[0027] FIG. 3B is a detail side cross-sectional view of an end of an example well screen assembly 400 that could be used as the well screen assembly 24, 26. The example well screen assembly 400 of FIG. 3B includes a flow control device in the form of a choke insert 56. In FIG. 3B, the illustration details a connector ring 52 and a housing 58, both of which are part of a ring, such as the rings 30, 31, 33 shown in FIG. 2A. One end of connector ring 52 is sealingly coupled to the housing 58 that is circumferentially welded to the base pipe 32. The other end of the connector ring 52 is coupled to the arrangement of filter assemblies 38. The housing 58 internally receives the choke insert 56. As above, the filter assembly 38 resides around a swell material 35. Fluids can enter the filter assembly 38 and pass through the tube 37; however, tube 37 does not pass through the base pipe 32. Rather fluids travel into the housing 58 and through the choke tube 56 before passing into the base pipe 32 via one or more openings 59. The choke tube 56 has a specified diameter that restricts flow and creates a pressure drop. A single choke tube 56 can be provided in the housing 58, or multiple choke tubes 56 can be provided and arranged to provide the pressure drop. The choke tube 56 can be an insert to the housing 58 and retained in the housing 58 by a retainer nut 55 or can be integrally formed in the structure. Configuring the choke tube 56 as an insert facilitates interchanging the choke tube 56 with others of different restrictions. By having different restriction choke tubes 56 in different screen assemblies along the length of a tubing string, one can create a specified pressure and/or flow profile, for example, to achieve a specified production and/or injection profile. Additionally, there need not be one flow control device per screen assembly 400. For example, in certain instances, one or more, but fewer than all of the rings 30, 31, 33 of a screen assembly (screen assembly 400 or the other configurations of screen assembly described below) contain flow control devices and the remaining rings 30, 31, 33 are configured so that fluids from their respective tube 37 flow into a flow path that runs axially along the screen assembly. The flow path is fluidically isolated from the flow bore of base pipe 32, and communicates the fluid to one of the

rings 30, 31, 33 with a flow control device to thereafter be controlled by the flow control device.

[0028] FIG. 3C is a detail side cross-sectional view of an end of another example well screen assembly 500 that could be used as well screen assembly 24, 26. The example well screen assembly 500 of FIG. 3C includes a flow control device in the form of a valve 60. The arrangement of the filter assemblies and tubes, connector ring and housing are similar to that described above, and the valve 60 is positioned between the filter assemblies and the one or more apertures 59. The valve 60 is adapted to selectively change between allowing and sealing against flow between the interior of the base pipe 32 and the wellbore 12 via the filter assemblies 38. In certain instances, the valve 60 can be a check valve, an autonomous valve, a valve controlled to open, close and/or change its restriction to flow in response to a signal (e.g., electrical, hydraulic, optic and/or other signal), or a combination of such valves and others. For example, a check valve can allow for unidirectional flow or a flow with less resistance in one direction and higher resistance in the other. In certain instances, the screen assembly 500 can be provided with a check valve oriented to allow flow from the interior of the base pipe 32 to the well bore 12 via the filter assemblies 38 and to seal against flow from the wellbore 12 via the filter assemblies 38 and to an interior of the base pipe 32 or vice versa. An autonomous valve can respond to fluids of certain properties (viscosity, speed, etc.) to provide less or more restriction. In certain instances, the screen assembly 500 can be provided with an autonomous valve that can change between allowing and restricting against flow between the interior of the base pipe 32 and the wellbore 12 via the filter assemblies 38 in response to a fluid flow characteristic, such as, at least one of fluid flow rate, viscosity or density.

[0029] FIG. 4A shows an example check valve 62 that could be used as valve 60. The example check valve 62 is oriented to allow flow from the filter assemblies into the base pipe 32, but seal against flow from the base pipe 32 toward the filter assemblies. The check valve 62 has a flexible, annular sleeve 61 around the base pipe 32 in the interior of the housing 58. In certain instances, the flexible sleeve 61 is a polymer, such as butyl rubber, VITON fluoroelastomer (a registered trademark of DuPont Performance

Polymers, LLC), and/or other polymers. The end of the sleeve 61 towards the filter assemblies 38 is sealingly affixed to the housing 58 by a sleeve carrier 63, and the end of the sleeve 61 opposite the filter assemblies 38 is free, although it is also a tight fit around the base pipe 32. The plurality of circumferentially spaced apertures 59 are provided in the base pipe 32 adjacent the sleeve 61.

[0030] When pressure in the interior of the base pipe 32 is lower than the pressure in the filter assemblies, fluid flows past the sleeve 61, through the apertures 59, and into the interior of the base pipe 32. The fluid tends to push the free end of the flexible sleeve 61 open and fluid passes between the sleeve 61 and the base pipe 32. When pressure in the interior of the base pipe 32 is higher than the pressure in the screen assemblies, the pressure differential tends to hold the flexible sleeve 61 into sealing engagement with the exterior of the base pipe 32 thus restricting flow, and in certain instances, sealing against flow from the interior of the base pipe 32 toward the screen assemblies. No access into the wellbore is required to actuate the check valve 62 between restricting or sealing against outflow and allowing inflow. Rather, the check valve 62 is responsive to pressure and direction of flow.

[0031] Although described as restricting or sealing against flow from the base pipe 32 toward the screen assemblies, the orientation of sleeve 61 could be reversed and the check valve 62 could alternately be configured to restrict or seal against flow from the screen assemblies toward the base pipe 32. Additionally, although described as a unidirectional flow control device, the check valve 62 can alternatively be configured as a bidirectional flow control device having a lower resistance to flow from the exterior to the interior of the base pipe 32 than from the interior to the exterior of the base pipe 32. For example, additional apertures 59 not between the sleeve 61 and the filter assemblies, and thus not restricted to one-way flow, can be included in the base pipe 32. Finally, although one example of check valve 62 has been shown, there are many other configurations of check valves that could be used as valve 60, including ball-type check valves, spring type check valves, and/or other types of check valves.

[0032] FIGS. 4B and 4C show an example autonomous valve 65 that could be used as valve 60. The autonomous valve 65 autonomously (i.e., without human or other

interaction) changes between allowing and restricting against flow between the interior of the base pipe 32 and the wellbore 12 via the filter assemblies 38 in response to a fluid flow characteristic, such as, at least one of fluid flow rate, viscosity or density. For example, the autonomous valve 65 can become more restrictive of fluid flow as the flow rate increases and less restrictive as the flow rate decreases or vice versa. The autonomous valve 65 can become more restrictive of fluid flow as the viscosity fluid increases and less restrictive of viscosity of the fluid decreases or vice versa. The autonomous valve 65 can become more restrictive of fluid flow as the fluid density increases and less restrictive as the fluid density decreases or vice versa. In certain instances, the autonomous valve 65 can automatically be more restrictive to water than oil or vice versa, more restrictive to gas than oil or vice versa, and/or more restrictive to production flow (i.e., flow from the wellbore 12 into the interior 325 of the base pipe 32) than to injection flow (i.e., flow from the interior 325 of the base pipe 32 into the wellbore 12) or vice versa.

[0033] Several examples of autonomous valves that could be used as the autonomous valve 65 are disclosed in U.S. Patent Publication No.12/700,685, entitled "METHOD AND APPARATUS FOR AUTONOMOUS DOWNHOLE FLUID SELECTION WITH PATHWAY DEPENDENT RESISTANCE SYSTEM", filed February 4, 2010, the entirety of which is incorporated herein by reference. Still other examples exist. For the sake of discussion, FIG. 4C shows a cylindrical projection of one example autonomous valve 70 that can be used as the valve 65 in FIG. 4B. Notably, example autonomous valve 70 includes no moving parts. The cylindrical projection shows a fluid separator 46 with multiple passages 74, 76, 77 each having a different resistance to flow in relation to a characteristic of the fluid flow. Passages 76, 77 include fluid diodes 49 that provide resistance to flow based on the density, viscosity and velocity of the fluid they receive. The multiple passages feed into a fluid amplifier 80 and the flows from the passages act on each other to direct the total flow based on the respective momentum of flow from the passages 74, 76, 77. The amplifier 80 increases the total fluid flow's tendency to flow towards one direction, and thus directs the flow to preferentially enter one or another of multiple passages 84, 86. Flow from the passages 84, 86 combines in a fluid switch 795

together with flow from another passage 797. Flows from the passages 84, 86, 797 again act on each other to direct the total flow based on the respective momentum of flow from the passages 84, 86, 797. The total flow preferentially enters one of two inlets 54, 56 to a fluid diode 52. The inlets 54, 56 of the fluid diode 52 are arranged so that the fluid diode 52 provides more resistance to fluid flowing from inlet 54 to the outlet 58 than to fluid flowing from the other inlet 56 toward the outlet 58. The result is that the resistance to flow through the autonomous valve 70 as a whole depends on the characteristics of the fluid flow, such as its density, viscosity and/or flow rate.

[0034] FIG. 5 shows an axial cross-section of an example well screen assembly 24, 26 having a pair of communication lines 92 running axially through the well screen assembly 24, 26. The communication lines 92 can run between the ends of the well screen assembly 24, 26 or terminate intermediate the ends, for example, at a sensor, controller or other device. In some embodiments, the communications lines 92 are embedded or installed inside a channel 90 through the swell material 35 and the rings 30, 31, 33. Although only two are shown, the channel 90 can hold from one to any number of communication lines 92. The ends of the communication lines 92, after exiting the rings 30, 31 can be affixed to the exterior of the base pipe 32. The communication lines 92 can include hydraulic, electric and/or optical communication lines. Sensors, controllers and/or other components that communicate on the communication lines 92 can also be embedded or installed in the channel 90. The communication lines 92 can be isolated from contact with the fluid in bore of the base pipe 32, as well as from fluids in the well bore. For example, the communication lines 92 can be encapsulated in polymer or other form of encapsulation. The communication lines 92 of one well screen assembly 24, 26 can be connected to an adjacent well screen assembly 24, 26, which is coupled to yet another adjacent well screen assembly 24, 26, and so on, to enable communications over longer distances, for example, between two or more well tools or other equipment in the well bore and/or between the surface and well tools in the well bore. In addition to enabling communication with well tools of the tubing string, the communication lines 92 can be used to signal one or more valves 60 (FIG. 3C) in the control devices to open, close and/or change restriction.

[0035] A number of implementations have been described. Nevertheless, it will be understood that various modifications may be made. Accordingly, other implementations are within the scope of the following claims.

CLAIMS:

1. A well screen assembly for installation in a subterranean wellbore, comprising:
 - a base pipe comprising a sidewall opening to an interior of the base pipe;
 - a filter assembly carried on the base pipe and comprising an internal passage in fluid communication with the opening, the filter assembly adapted to filter against passage of particulate from the wellbore into the opening;
 - a swell material carried in the base pipe between the filter assembly and the base pipe, the swell material adapted to expand under specified conditions and displace the filter assembly radially toward a wall of the wellbore; and
 - a flow control device in fluid communication between the internal passage of the filter assembly and the opening in the base pipe and adapted to restrict communication of fluid with the opening in the base pipe, the flow control device comprising a valve adapted to selectively change between allowing and sealing against communication of fluid with the opening in the base pipe, the valve comprising a check valve comprising a flexible annular sleeve around the base pipe and between the filter assembly and the opening, the flexible sleeve having one end sealingly affixed to a housing of the flow control device and an opposing end free and abutting the base pipe.
2. The well screen assembly of claim 1, where the swell material is adapted to expand in contact with a specified fluid.
3. The well screen assembly of claim 1 or claim 2, where the flow control device further comprises a choke.
4. The well screen assembly of any one of claims 1 to 3, where the check valve is oriented to allow flow from the interior of the base pipe towards the wellbore and to seal against flow from the wellbore towards the interior of the base pipe.

5. The well screen assembly of any one of claims 1 to 4, where the valve comprises an autonomous valve that changes between allowing and restricting communication of fluid with the opening in the base pipe in response to at least one of fluid flow rate, viscosity or density.
6. The well screen assembly of any one of claims 1 to 4, where the valve comprises a valve that is selectively changeable between allowing and sealing communication of fluid with the opening in the base pipe in response to a signal.
7. The well screen assembly of any one of claims 1 to 6, where the flow control device further comprises a dissolvable material embedded in the filter assembly, the dissolvable material adapted to dissolve when exposed to a specified fluid.
8. The well screen assembly of claim 7, where the dissolvable material comprises an acid.
9. The well screen assembly of claim 8, where the acid comprises polylactic acid or polylactic-co-glycolic acid.
10. The well screen assembly of any one of claims 1 to 9, further comprising a hydraulic, electric or optical communication line running axially through a length of the well screen assembly.
11. The well screen assembly of claim 10, where the communication line communicates between the axial ends of the well screen assembly
12. The well screen assembly of claim 10 or 11, where the communication line is encapsulated in polymer.

13. The well screen assembly of any one of claims 10 to 12, where the communication line is fluidically isolated from a bore of the base pipe and well bore fluids.

14. A method comprising:

in response to the presence of a specified fluid, extending a plurality of filters on a base pipe from a retracted state to a radially extended state in contact a wall of a wellbore;

with the filters, filtering against passage of particulate of a specified size and larger between the wellbore and an interior of the filters while allowing flow of fluid; and;

restricting, with a flow control device, communication of the flow between the interior of the filters and a central interior bore of the base pipe, the flow control device comprising a valve adapted to selectively change between allowing and sealing against communication of fluid with the central interior bore of the base pipe, the valve comprising a check valve comprising a flexible annular sleeve around the base pipe and between the plurality of filters and the central interior bore, the flexible sleeve having one end sealingly affixed to a housing of the flow control device and an opposing end free and abutting the base pipe.

15. The method of claim 14, where restricting communication of flow further comprises restricting the flow with a dissolvable material embedded in the filter; and further comprising dissolving the dissolvable material in response to contacting the dissolvable material with a specified fluid.

16. The method of claim 15, where the dissolvable material comprises an acid.

17. The method of any one of claims 14 to 16, where restricting communication of flow further comprises restricting communication of flow, with the flow control device, in a first direction between the interior of the filters and the interior bore of the base pipe and allowing communication of flow in an opposing direction between the interior of the filters and the interior bore of the base pipe.

18. The method of any one of claims 14 to 17, where restricting communication of flow further comprises restricting communication of flow based on the flow rate, viscosity or density of the flowing fluid.

19. The method of any one of claims 14 to 18, further comprising communicating a signal along a length of the base pipe.