IRRIGATION COMPONENTS AND/OR SYSTEMS

A. Description: The Rain Bird™ IQ™ v3.0 Central Control Software system utilizing software version IQ-CLOUD v3.0.

B. Rain Bird™ IQ™ v3.0 Central Control Software, version IQ-CLOUD v3.0, system specifications include but are not limited to:
   1. The system shall be a cloud based service allowing users to login and control their irrigation system from any internet connected device.
   2. The system shall include the feature IQ-MOBILE allowing quick access to key features in an interface designed for touchscreen devices found in smartphones or tablets.
   3. The system shall be fully programmable, providing the operator with full control of the entire control system.
   4. The system shall be capable of controlling all functions from an internet connected device that could be completed at the physical satellite controller.
   5. The system shall have a Windows® graphical user interface (GUI) that allows programming and a graphical depiction of the satellite controller programming.
   6. The system shall have modular satellite controller capacity and features.
      a. The system shall allow the user to upgrade the system as the system requirements change.
   7. The system shall allow users the ability to add satellites at will.
   8. The system will not be limited on satellite capacity.
   9. The system shall be compatible with the Rain Bird™ ESP-LXME and Rain Bird™ ESP-LXMEF series traditionally-wired controllers with 1 to 48 station capacity.
      a. Shall be able to control 7,200+ satellite stations per site for the ESP-LXME and ESP-LXMEF.
      b. Rain Bird™ ESP-LXME and Rain Bird™ ESP-LXMEF shall be capable of running 5 simultaneous stations.
      c. Each Server Satellite shall be capable of connecting to 149 Client Satellites for a total of 150 Satellites per site.
      d. The maximum number of simultaneous stations per site for the ESP-LXME and ESP-LXMEF shall be 750.
   10. The system shall be compatible with Rain Bird™ ESP-LXD series 2-wire decoder controllers with 1 to 200 station capacity.
       a. Shall be able to control 30,000+ decoders addresses per site ESP-LXD.
       b. Rain Bird™ ESP-LXD shall be capable of running 8 simultaneous stations.
       c. The maximum number of simultaneous stations per site shall be 1,200 for the ESP-LXD.
   11. The system will not be limited on site capacity.
12. The system shall have an adjustable satellite controller capacity allowing the customer to expand the system capacity over time.
13. The system shall allow user log-on passwords to administer access privileges to multiple users of the system.
14. The controller shall have the ability to be programmed and operated in English or Spanish languages.
15. The system shall have user configurable formats for date, time, number, and units formats.
16. The system shall allow virtual site configurations, allowing the user to group satellite controllers into a site to simplify common adjustments.
17. The system shall incorporate a satellite controller Dry-Run™ feature that graphically depicts the following program operation features:
   a. Minute-by-minute program activity
   b. Expected flow rates
   c. Programs/stations operating at any point in time.
   d. The order in which stations irrigate and which stations will be simultaneously run together.
18. The system shall incorporate program adjust values for each satellite controller program.
19. The system shall include a site-level daily or monthly seasonal adjust percentage
   a. Shall adjust the station run times for all satellite controllers in the site.
20. The system shall also offer site-level daily or monthly ET value adjustments as an alternative to seasonal adjustment percentage.
21. The software shall utilize IQNCC Network Communication Cartridges to interface with the system controllers.
22. The cartridge shall be available with GPRS/Cellular, Ethernet, RS-232 external modem port, or IQNet™ Communications Cable.
   a. The controller shall be configured as a Direct, Server, or Client Satellite with the cartridge installed.
23. The Server satellite shall share its Rain Bird™ IQ-CLOUD Server communication link with up to 149 Client satellites and be capable of sharing weather sensors and master valves amongst the 150 satellite controllers.
24. The software shall incorporate a site configuration utility that contacts the satellite controller and shall:
   a. Report the hardware configuration and retrieve the configuration and programming data
   b. Report any learned flow rates the controller may have.
   c. Verify the satellite hardware configuration has not changed each time it contacts the satellite controller.
25. The controller and IQNCC cartridge firmware shall be upgradeable (reflashed) from the Rain Bird™ IQ-CLOUD Server through the internet.
26. The software shall be capable of manually starting a program, test a program, or station on any satellite controller.
27. The software shall be capable of overriding the satellite controller Auto/off dial position and sensor Active/Bypass switch position.

28. Satellite controllers equipped with flow sensors shall provide a learn flow utility to measure the nominal flow rate of each station.
   a. The satellite controllers shall come with Flo-Watch™.
   b. Flow-Watch™ shall provide protection for high and low flow conditions with user defined reactions.
   c. The learn flow rate shall be compared to the actual flow sensor flow rate each time the station operates.
   d. A user defined percentage above and below the learned flow rate shall be used to determine if the flow rate is problematic.
   e. User defined reactions shall be programmable including a diagnose mode where the cause of the problem flow rate is identified and the problem station or water source is shut off.

29. A manual master valve water window shall be provided to automatically open the master valve and account for manual watering flow rates without turning off the flow sensing functions of the satellite controller.
   a. Both normally closed and open master valves shall be supported.

30. All flow sensing features shall be programmable through the software.

31. The system shall offer user definable station-level priorities and a program-level water window.

32. Stations are selected to operate based on their priority with high priority stations operating first.

33. The station operation shall be paused and resumed at the start of the next water window if a program cannot complete the run time of all stations in the water window.

34. The system shall provide user definable number of simultaneous station to operate per program and for the whole satellite controller.
   a. The combination of these features shall be used to automatically shorten the overall operating time of the satellite controller programs.

35. All satellite controller features listed shall be programmable through the software.

36. The system shall include software Rain Bird™ Feature Packs to expand the features of the system.
   a. Feature Pack features shall be enabled for all sites and satellites in the IQ software.

37. The feature packs shall include:
   a. Advanced communications
   b. Advanced programming
   c. Advanced ET
   d. Advanced flow sensing.

38. The Rain Bird™ Advanced Communication Feature Pack IQACOMFP specifications include but are not limited to:
   a. Shall provide automatic communication and email reports.
IQ Cloud Specification Attachment B

b. The Rain Bird™ Advanced Communication Feature Pack IQACOMFP shall function with any NCC cartridge.
c. Automated satellites synchronize and retrieve logs and Weather Source retrieve weather data communications.
d. Shall send automated e-mail reports indicating alarm/warnings and satellite station run time reports up to 250 e-mail addresses.

39. The Rain Bird™ Advanced Programming Feature Pack IQAPGMFP specifications include but are not limited to:
   a. Shall provide satellite controller PIN-code lock-out and 2-way programming.
b. Shall help prevent unauthorized personnel from making programming changes at satellites the PIN-Code protection.
c. Each satellite shall have a maximum of 5 assigned PIN-codes.
d. The satellite PIN-Code Protection shall be a 4-digit PIN-Code.
e. Lockout options shall include full or partial lockout.
f. All PIN-codes shall be programmed through the software.
g. Changes made at the satellite shall be able to be viewed and accepted in the software.
h. The Copy/Move Satellite Utility shall allow the user to copy or move a satellite to another site.
i. The user shall be able to view a list of site personnel who have accessed each satellite with date and time access information.
j. Shall allow the user to accept or reject programming changes made at the satellites to each IQ™ v2.0 satellite from the central computer.

40. The Rain Bird™ Advanced ET Feature Pack IQAETFP specifications include but are not limited to:
   a. Shall provide automatic program adjustment based management allowed depletion scheduling.
b. ET/rain weather sources shall include CIMIS Internet, Global Weather Service, and Rain Bird™ WSPROLT and Rain Bird™ WSPRO2 Weather Stations.
c. Shall allow Automated MAD (Management Allowed Depletion) irrigation scheduling adjustments.
d. The software shall use irrigation association terminology and formulas.
e. Shall have four ET checkbooks per satellite controller.
f. Shall have the functionality to export to Microsoft Excel® for customized reports.

41. The Rain Bird™ Advanced Flow Sensing Feature Pack IQAFSENFP specifications include but are not limited to:
   a. Shall provide minute-by-minute flow logs in a graph comparing actual flow and projected flow.
b. Shall retrieve minute-by-minute flow logs from flow sensor equipped Rain Bird™ ESP-LXMEF and Rain Bird™ ESP-LXD satellite controllers.
c. Station flow rates shall be learned by the Learn Flow Utility.
d. Shall compare real-time flow rates to learned flow rates.
IQ Cloud Specification Attachment B

e. Shall automatically diagnose problem flows to determine whether they are caused by a break in a main line or lateral line.

f. Shall produce Flow Logs vs. Projected Flow Graphical Report identifying which programs and stations are running at any point in time.

g. Shall automatically close the master valve or station valve to isolate the problem.

h. Actual flow totals shall be added to the satellite station run time report, included in the automated email reports.

i. Shall be able to monitor and automatically react to a breakage in the pipe by using the Flow Sensing Feature Pack, the Flow Smart Module and a flow sensor.

42. The system shall include a context-sensitive help system.

43. The system shall allow the user to create custom computer programming to meet specific needs.

44. The IQ-CLOUD system’s recommended requirements shall be:
   a. Operating System: Browser based or Microsoft Remote Desktop (RDP).
   b. Compatibility tested: OSX, Windows 7, 8, 8.1, 10, Chrome Browser, Edge Browser and Internet Explorer.

45. The IQ v3.0 Central Control System™ shall be as manufactured by Rain Bird® Corporation.

C. Rain Bird® IQ™ v3.0 Central Control Hardware system specifications include but are not limited to:

1. The hardware shall utilize IQNCC Network Communication Cartridges to interface between the system controllers and the Rain Bird® IQ-CLOUD Server.

2. The cartridge shall be designed to install Rain Bird® ESP-LXME, Rain Bird® ESP-LXMEF and Rain Bird® ESP-LXD Series controller faceplate.
   a. No tools shall be required for the communication cartridge installation.
   b. The communication cartridge shall receive power through a ribbon cable connection to the controller front panel.

3. The communication cartridge shall be configured and monitored through a dedicated dial position on the controller front panel.
   a. In this dial position the communication cartridge shall be in control of the controller display and user interface softkeys.

4. The user interface shall include a setup wizard to guide the user through the required configuration settings.

5. The communication cartridge shall be user configurable as a Direct, Server, or Client satellite controller.

6. The communication cartridge shall incorporate three communication ports to communicate with the Rain Bird® IQ-CLOUD Server as well as communicate with other communication cartridge equipped controllers via high-speed data cable and/or radio communication.
7. The communication cartridge shall incorporate status lights (LEDs) showing the real-time status of the cartridge communication ports.

8. The controller shall be configured as a Direct, Server, or Client Satellite with the cartridge installed.

9. Single controller sites shall use an IQ NCC cartridge configured as a Direct satellite.
   a. A Direct satellite shall have a Rain Bird™ IQ-CLOUD Server communication connection but no network connections to other satellites in the system.
   b. Communication cartridges configured as a Direct satellite shall communicate directly with the Rain Bird™ IQ-CLOUD Server via the primary (IQ) communication port.
   c. Configuring the communication cartridge as a Direct satellite shall disable the IQNet™ high-speed data cable (CM) and radio (Radio) communication ports.

10. Multi-controller sites shall be able to use one IQ NCC cartridge configured as a Server satellite and the other NCC cartridges configured as Client satellites.

11. The Server satellite has a Rain Bird™ IQ-CLOUD Server communication connection and shares this communication connection with the Client satellites though high-speed data cable or radios.

12. The communication connection between Server and Client satellites shall be called the IQNet™.
   a. The IQNet™ communication shall be either radio or two wire path from the server to the various clients the server communicates too.
   b. The IQNet™ communication shall have the capability to mix-and-match between radio and hardwire clients.

   a. IQFSCMLXME Flow Smart Connection Module for the ESP-LXME Controller.
   b. IQCMLXDE Connection Module for the ESP-LXD Controller.


15. Satellites on a common IQNet™ can share weather sensors and master valves.

16. Communication cartridges configured as a Server satellite shall communicate directly with the Rain Bird™ IQ-CLOUD Server via the primary (IQ) communication port.
   a. Configuring the communication cartridge as a Server satellite shall enable the IQNet™ high-speed data cable (CM) and radio (Radio) communication ports for communication with Client satellite controllers.
   b. A single Server satellite shall be capable of networking up to 150 Client satellites across the IQNet™ network.

17. Communication cartridges configured as a Client satellite shall communicate via the IQNet™ network with a Server satellite.
IQ Cloud Specification Attachment B

a. The Client satellite shall not have direct communication with the Rain Bird™ IQ-CLOUD Server but shall instead use the Server satellite connection.
b. Client satellite primary (IQ) communication port shall be disabled.
c. Configuring the communication cartridge as a Client satellite shall enable the IQNet™ high-speed data cable (CM) and radio (Radio) communication ports for communication with a Server satellite controller.

18. Satellite controllers on a single IQNet™ network can share up to 8 master valves and 32 weather sensors.

19. Master valves and weather sensors shall be shared across ESP-LXME traditionally-wired and ESP-LXD 2-wire controllers.

20. The cartridge shall be available with GPRS/Cellular, Ethernet, RS-232 external modem port, or IQNet™ Communications Cable.
a. Communication cartridges with GPRS/Cellular and Ethernet shall utilize static IP addresses for communication with the Rain Bird™ IQ-CLOUD Server.

21. IQ NCC cartridges shall be initially configured through a setup wizard provided in the ESP-LX Series Controller IQ Settings dial position.

22. Communication setting parameters shall be configured through the IQ software or the IQ Configuration Software designed for netbook/laptop use on the job site.

23. The Rain Bird™ IQ FSCM-LXME Flow Smart Connection Module shall provide IQNet™ high-speed data cable connections for the ESP-LXME and ESP-LXMEF controllers.
a. Shall include a Flow Smart Module and Base Module functions.
b. Shall replace the standard ESP-LXME or ESP-LXMEF Base Module.

24. The Rain Bird™ IQ CM-LXD Connection Module shall provide IQNet™ high-speed data cable connections for the ESP-LXD controller.
a. Shall be installed in ESP-LXD 0 (zero) module slot.

25. The Rain Bird™ IQ SS-Radio Radio Modem shall provide IQNet™ wireless radio communication between Server and Client satellite controllers.
a. Shall include a power supply and an external antenna.
b. Programming software and cable shall be provided separately.

26. The Rain Bird™ IQ NCC-GP GPRS/Cellular Cartridge shall include an embedded GPRS/Cellular Data Modem with an antenna connector.
a. Shall include an internal antenna for plastic controller enclosures.
b. An optional external antenna shall be available for metal case controller enclosures.
c. Shall require GPRS/Cellular data service plan with static IP address from cellular service provider.
d. Used for Direct or Server satellite applications requiring wireless GPRS/Cellular communication with the Rain Bird™ IQ-CLOUD Server.
27. The Rain Bird™ IQ NCC-EN Ethernet Cartridge shall include an embedded Ethernet Network Modem with RJ-45 port.
   a. Shall include a RJ-45e patch cable.
   b. Shall require a LAN network static IP address.
   c. Shall be used for Direct or Server satellite applications requiring Ethernet LAN network communication with the Rain Bird™ IQ-CLOUD Server.

   a. Shall include an external modem cable (IQ Direct Cable provided with IQ Software Package)
   b. Shall be used for Client Satellite applications requiring IQNet™ high-speed data cable or radio communication with the Server Satellite.
   c. Shall be used for Direct or Server satellite applications requiring external modem (radio or other 3rd-party device) communication with the Rain Bird™ IQ-CLOUD Server.

29. Server and Client satellite controllers shall utilize a Connection Module to connect to the IQNet™ via high-speed data cable.
   a. The Connection Module shall be controlled by the cartridge CM port.
   b. Connection Modules shall provide quick connect terminals for connection to the 2 communication conductors as well as ground.

30. Server and Client satellite controllers shall utilize a Frequency Hopping Spread Spectrum Digital Radio for wireless communication on the IQNet™.
   a. The radio shall be controlled by the cartridge Radio port.
   b. A connector cable to interconnect the cartridge and radio shall be supplied with the cartridge.

31. The Rain Bird™ IQ-CLOUD Server shall be capable of upgrading (reflashing) the communication cartridge firmware through the IQ communication port.
   a. New features shall be implemented into the cartridge without the need to replace the existing communication cartridges.

32. The communication cartridge shall keep a log of all controller and IQNet™ activity for upload to the Rain Bird™ IQ-CLOUD Server.

33. The IQ v3.0 Central Control System™ shall be as manufactured by Rain Bird™ Corporation.

D. Rain Bird™ IQ™ v3.0 Central Control flow sensing system specifications include but are not limited to:
   1. The Rain Bird™ flow sensing system shall be configurable to the following systems:
      a. Rain Bird™ IQ™ v3.0 Central Control Software Systems
      b. Rain Bird™ LXME
      c. Rain Bird™ LXMEF
      d. Rain Bird™ LXD
2. Rain Bird™ flow sensing system shall include Flo-Watch™.
   a. Flo-Watch™ shall constantly monitors for low flow and excess flow conditions caused by broken lines or heads.
   b. Flo-Watch™ shall automatically quarantine and shut down the problem area(s) and continue to irrigate non affected areas.

3. The flow sensing system flow sensors shall provide a learn flow utility to measure the nominal flow rate of each station.
   a. The controller has the ability to automatically learn station flow rates.
   b. The learn flow rate shall be compared to the actual flow sensor flow rate each time the station operates.
   c. A user defined percentage above and below the learned flow rate shall be used to determine if the flow rate is problematic. The software shall allow the user to increase or decrease the length of time of a flow event before the controller reacts.
   d. User defined reactions shall be programmable including a diagnose mode where the cause of the problem flow rate is identified and the problem station or water source is shut off.
   e. The automatic collection of flow rates shall prevent the user from manually entering data from drawings or physically visiting each valve to collect flow data and manually entering the data collected into a controller.

4. Rain Bird™ flow sensing system shall incorporate FloManager®.
   a. The FloManager® shall provide real-time flow, power, and station management.
   b. The FloManager® shall manage the number of stations operating at any point in time based on water source capacity, station flow rate, station module assignment, number of valves per station, station priorities, and user defined simultaneous stations per program and for the controller.
   c. The FloManager® shall determine the optimal station irrigating sequence.
   d. The system shall run at its fullest capacity until all programs are complete.
   e. The controller shall automatically select and run multiple valves at the same time within hydraulic parameters allowing for shorter water windows.
   f. Flow rates may be manually measured and entered into the controller to utilize FloManager® functionality.

5. The flow sensing system shall be compatible with the Rain Bird™ ESP-LXME and Rain Bird™ ESP-LXMEF series traditionally-wired controllers with 1 to 48 station capacity.
   a. Pulse transmitter and decoders shall not be required with traditionally-wired controllers.

6. The flow sensing system shall be compatible with Rain Bird™ ESP-LXD series 2-wire decoder controllers with 1 to 200 station capacity.
   a. Rain Bird™ Two-Wire Decoder Sensor SD210TURF shall be required on two-wire decoder systems.
7. The flow sensors system models include but are not limited to:
   a. Rain Bird™ FS100B Flow Sensor
   b. Rain Bird™ FS150B Flow Sensor
   c. Rain Bird™ FS200B Flow Sensor
   d. Rain Bird™ FS050P Flow Sensor
   e. Rain Bird™ FS075P Flow Sensor
   f. Rain Bird™ FS100P Flow Sensor
   g. Rain Bird™ FS150P Flow Sensor
   h. Rain Bird™ FS200P Flow Sensor
   i. Rain Bird™ FS300P Flow Sensor
   j. Rain Bird™ FS400P Flow Sensor
   k. Rain Bird™ FS350B Flow Sensor
   l. Rain Bird™ FS350SS Flow Sensor

8. The Rain Bird™ FS100B Flow Sensor or Rain Bird™ FS150B Flow Sensor specifications include but are not limited to:
   a. The flow sensor shall be an in line type with a nonmagnetic, spinning impeller (paddle wheel) as the only moving part.
   b. The paddle wheel shall be a six-bladed impeller design.
   c. The flow sensor shall be designed for outdoor or underground applications.
   d. The electronics housing shall be glass-filled PPS.
   e. The impeller shall be glass-filled nylon or Tefzel® with a UHMWPE or Tefzel sleeve bearing.
   f. The shaft material shall be tungsten carbide.
   g. The electronics housing shall have two, ethylene propylene O-Rings and shall be easily removed from the meter body.
   h. The sensor electronics shall be potted in an epoxy compound designed for prolonged immersion.
   i. Electrical connections shall be 2 single conductor 18 AWG leads 48 inches (1.2 meters) long.
   j. Insulation shall be direct burial “UF” type colored red for the positive lead and black for the negative lead.
   k. The sensor shall be capable of operating in line pressures up to 400 psi (27.5 bars).
   l. The sensor shall be capable of operating in liquid temperatures up to 220° F (105°C).
   m. The sensor shall be capable of operating in flows of ½ foot (0.15 meters) per second to 15 feet (4.5 meters) per second with linearity of ±1% and repeatability of ±1%.
   n. The meter body shall be cast 85-5-5-5 bronze, in 1” (25 mm) and 1½” (40 mm), female iron pipe thread sizes.
   o. The FS100B Flow Sensor and FS150B Flow Sensor shall be as manufactured by Rain Bird™ Corporation.

9. The Rain Bird™ FS200B Flow Sensor specifications include but are not limited to:
   a. The flow sensor shall be an insertion type with a nonmagnetic, spinning impeller (paddle wheel) as the only moving part.
   b. The paddle wheel shall be a six-bladed impeller design.
c. The flow sensor shall be designed for outdoor or underground applications.

d. The sensor sleeve shall be bronze, with the sensor housing being PPS.

e. The sensor shall be mounted in a 2” malleable bronze tee.

f. The sensor shall be a nonmagnetic, spinning impeller (paddle wheel) as the only moving part.

g. The impeller shall be glass-filled nylon with a UHMWPE sleeve bearing.

h. The shaft material shall be tungsten carbide.

i. The sensor electronics will be potted in an epoxy compound designed for prolonged immersion.

j. Electrical connections shall be 2 single conductor 18 AWG leads 48 inches long, U.L Style type PTLC wire.

k. The sensor shall operate in line pressures up to 200 psi.

l. The sensor shall operate in liquid temperatures up to 100° F.

m. The sensor shall be capable of operating in flows of ½ foot per second to 30 feet per second with accuracy of ± 1% of full scale and repeatability of ± 0.3%.

n. The FS200B Flow Sensor shall be as manufactured by Rain Bird™ Corporation.

10. The Rain Bird™ FS050P, Rain Bird™ FS075P and Rain Bird™ FS100P Flow Sensor specifications include but are not limited to:

a. The flow sensor shall be an in line type with a nonmagnetic, spinning impeller (paddle wheel) as the only moving part.

b. The paddle wheel shall be a six-bladed impeller design.

c. The flow sensor shall be designed for outdoor or underground applications.

d. The impeller shall be made of 300SST with a UHMWPE sleeve bearing.

e. The shaft material shall be tungsten carbide.

f. The electronics housing shall be made of PPS.

g. The electronics housing shall have two EPDM O-Rings and shall be easily removed from the meter body.

h. The sensor electronics will be potted in an epoxy compound designed for prolonged immersion with 2-conductor, 18AWG solid copper wire leads extending from the top of the sensor.

i. The sensor shall operate inline pressures up to 150 psi at liquid temperatures up to 73° F, or up to 75 PSIG at liquid temperatures up to 110° F.

j. The sensor shall operate in flows of 2 foot per second to 20 feet per second with linearity of ± 3% and repeatability of ± 1.5%.

k. The flow sensor shall generate a frequency which is proportional to flow rate.

l. The meter body shall be fabricated from Schedule 40 PVC Tees, Type 1, white, available in ½”, ¾”, and 1” solvent weld socket end connections.
m. The FS050P, FS075P and FS100P Flow Sensor shall be as manufactured by Rain Bird™ Corporation.

11. The Rain Bird™ FS150P, Rain Bird™ FS200P, Rain Bird™ FS300P and Rain Bird™ FS400P Flow Sensor specifications include but are not limited to:
   a. The flow sensor shall be an in-line type with a nonmagnetic, spinning impeller (paddle wheel) as the only moving part.
   b. The paddle wheel shall be a six-bladed impeller design.
   c. The flow sensor shall be designed for outdoor or underground applications.
   d. The electronics housing shall be glass-filled PPS.
   e. The impeller shall be glass-filled nylon or Tefzel with a UHMWPE or Tefzel sleeve bearing.
   f. The shaft material shall be tungsten carbide.
   g. The electronics housing shall have two, ethylene propylene O-Rings and shall be easily removed from the meter body.
   h. The sensor electronics will be potted in an epoxy compound designed for prolongs immersion.
   i. Electrical connections shall be 2 single conductor 18 AWG leads 48 inches (1.2 meters) long.
   j. Insulation shall be direct burial “UF” type colored red for the positive lead and black for the negative lead.
   k. The sensor shall be capable of operating in line pressure up to 100 psi (6.9 bars).
   l. The sensor shall be capable of operating in liquid temperatures up to 140° F (60° C).
   m. The sensor shall be capable operating in flows of 1/2 foot (0.15 meters) per second to 30 feet (9.2 meters) per second with linearity of ±1% and repeatability of ±1%.
   n. The meter body shall be fabricated from Schedule 80 PVC Tees, available in 1 1/2”, 2”, 3”, and 4” (25mm, 40mm, 50mm, 75mm, and 110mm) with socket end connections.
   o. The FS150P, FS200P, FS300P and FS400P Flow Sensor shall be as manufactured by Rain Bird™ Corporation.

12. The Rain Bird™ FS350B and Rain Bird™ FS350SS Flow Sensor specifications include but are not limited to:
   a. The flow sensor shall be an insertion type with a nonmagnetic, spinning impeller (paddle wheel) as the only moving part.
   b. The paddle wheel shall be a six-bladed impeller design.
   c. The flow sensor shall be designed for outdoor or underground applications.
   d. The sensor sleeve will be brass (or 316 stainless steel) with the sensor housing being PPS.
   e. The impeller shall be glass filled nylon or Tefzel with a UHMWPE or Tefzel sleeve.
   f. The shaft material shall be tungsten carbide.
The sensor will be supplied with a 2” (50mm) NPT adapter for installation into any commercially available weld-on fitting or pipe saddle.

The adapter shall have two, ethylene propylene O-Rings.

The sensor electronics will be potted in an epoxy compound designed for prolonged immersion.

Electrical connections shall be 2 single conductor 18AWG leads 48 inches (1.2 meters) long.

Insulation shall be direct burial “UF” type colored red for the positive lead and black for the negative lead.

Insertion of the sensor into any pipe size shall be 1 1/2” (40mm) from the inside wall to the end of the sensor housing.

The sensor shall be capable of operating in line pressures up to 400 psi (27.5 bars).

The sensor shall be capable of operating in liquid temperatures up to 220° F (105°C).

The sensor shall be capable of operating in flows of 1/2 foot (0.15 meters) per second to 30 feet (9.2 meters) per second.

The FS350B and FS350SS Flow Sensor shall be as manufactured by Rain Bird™ Corporation.