RAIN BIRD LANDSCAPE DRIP IRRIGATION PRODUCTS SPECIFICATIONS

PART 1 - GENERAL

1.01 SCOPE

A. This section specification information is for Rain Bird low volume dripline irrigation products including Control Zone Kits, XFS and XFD Dripline and compatible fittings, and Low Volume Emission Devices.

B. Provide labor, materials, supplies, equipment, tools, and transportation, and perform all operations in connection with and reasonably incidental to the complete installation of the drip irrigation system, and guarantee/warranty as shown on the drawings, the installation details, and as specified herein.

1.02 RELATED WORK

A. Division 00 – Procurement and Contracting Requirements

B. Division 01 – General Requirements

C. Division 22 – Plumbing

D. Division 26 – Electrical

E. Division 31 – Earthwork

F. Division 32 – Exterior Improvements

G. Division 33 - Utilities

1.03 SUBMITTALS

A. Deliver four (4) copies of submittals to Owner’s Representative within ten (10) working days from date of Notice to Proceed. Furnish information in 3-ring binder with table of contents and index sheet. Index sections for different components and label with specification section number and name of component. Furnish submittals for components on material list. Indicate which items are being supplied on catalog cut sheets when multiple items are shown on one sheet. Owner’s Representative. Incomplete submittals will be returned without review.

B. Materials List: Include dripline and low-volume irrigation components, control zone components, shop drawings and other components shown on drawings and installation details or described herein. Quantities of materials need not be included.

C. Manufacturers' Data: Submit manufacturers' catalog cuts, specifications, and operating instructions for equipment shown on materials list.

D. Shop Drawings: Submit shop drawings called for in installation details. Show products required for proper installation, their relative locations, and critical dimensions. Note modifications to installation details as part of shop drawing documentation.

1.04 FLUSHING AND TESTING

A. Schedule testing with Owner’s Representative a minimum of three (3) days in advance of testing.

B. Provide clean, clear water, pumps, labor, fittings, and equipment necessary to conduct line flushing and testing procedures.

C. Recommended Dripline and Emitter Lateral Flushing Procedures.

1. Flush the system every two weeks for the first six (6) weeks and check the water that is flushed out for cleanliness. Establish a regular system flushing schedule for the future based on results from the initial six-week flushing schedule.

2. Flush the system completely after any repairs are made and monitor system operation closely under regular system flushing schedule.

3. Check the pressure at the supply and flush headers on a regular basis and compare with the pressure readings taken after installation.

D. Recommended Dripline and Emitter Lateral Leakage Testing Procedures.

1. Subject installed dripline tubing and emitter lateral piping to water pressure equal to specified operating pressure for ten (10) minutes. Test with control zone components and dripline flush valve components installed.

2. Partially backfill buried pipe and tubing to prevent movement under pressure. Expose couplings, fittings, and valve components.

3. Visually inspect valve assemblies and fittings for leakage and replace defective pipe, fitting, joint, valve, or appurtenance. Repeat test until test segment is free from leaks. Cement or caulking to seal leaks is prohibited.

E. Recommended Dripline and Emitter Lateral Operational Testing Procedures.

1. Activate each dripline and emitter lateral control zone valve in sequence from controller. Provide either one additional person with radio or use handheld remote to activate remote control valves from controller. Manually activating remote control valve using manual bleed mechanism at remote control valve is not an acceptable method of activation. Owner's Representative will visually observe operation, water application patterns, and leakage.

2. Replace or adjust defective valve, fitting, dripline segment, emitter lateral segment, or appurtenance to correct operational and coverage uniformity deficiencies.

3. Repeat test(s) until each dripline or emitter lateral test segment passes testing procedures. Repeat tests, replace components, and correct deficiencies at no additional cost to Owner and/or Owner's Representative.

1.05 CONSTRUCTION REVIEW

A. The purpose of on-site reviews by Owner's Representative is to periodically observe work in progress, Contractor's interpretation of construction documents, and to address questions with regard to installation.

B. Schedule reviews for dripline layout and system testing with Owner's Representative as indicated on drawings or as required by these specifications.

C. Impromptu reviews may occur at any time during project.

D. A review will occur at completion of irrigation system installation and Project Record Drawing submittal.

1.06 GUARANTEE/WARRANTY AND REPLACEMENT

A. The purpose of guarantee/warranty is to ensure that Owner receives irrigation materials of prime quality, installed and maintained in thorough and careful manner.

B. Contractor is responsible for providing guarantee/warranty of irrigation materials, equipment, and workmanship against defects for period of one (1) year from formal written acceptance by Owner's Representative. Fill and repair depressions. Restore landscape, utilities, structures and site features damaged by settlement of irrigation trenches or excavations. Repair damage to premises caused by defective items. Make repairs within seven (7) days of notification from Owner's Representative.

C. Replace damaged items with new and identical materials, using methods specified in contract documents or applicable codes. Make replacements at no additional cost to contract price.

D. Guarantee/warranty applies to originally installed materials and equipment, and replacements made during guarantee/warranty period.

PART 2 – MATERIALS

2.01 QUALITY

A. Provide and install specified equipment and materials, delivered new to the site in unopened containers and confirmed to be without flaws or defects.

2.02 LATERAL PIPE AND FITTINGS

A. Use rigid, unplasticized polyvinyl chloride (PVC) 1120, 1220 National Sanitation Foundation (NSF) approved pipe, extruded from material meeting requirements of Cell Classification 12454-A or 12454-B, ASTM Standard D1784, with integral belled end suitable for solvent welding.

B. Use Class 160, SDR-26, rated at 160 PSI (11 bar), conforming to dimensions and tolerances established by ASTM Standard D2241. Use PVC pipe rated at higher pressures than Class 160 in cases where small nominal diameters are not manufactured in Class 160.

(or)

Use Class 200, SDR-21, rated at 200 PSI (13,8 bar), conforming to dimensions and tolerances established by ASTM Standard D2241. Use PVC pipe rated at higher pressures than Class 200 in the cases where small nominal diameters are not manufactured in Class 200.

(or)

Use Schedule 40 conforming to dimensions and tolerances established by ASTM Standard D1785; UV radiation resistant.

C. Use Schedule 40, Type 1, PVC solvent weld fittings conforming to ASTM Standards D2466 and D1784 for PVC pipe. Use primer approved by pipe manufacturer. Solvent cement to conform to ASTM Standard D2564, of type approved by pipe manufacturer.

D. Use PVC Schedule 80 nipples and PVC Schedule 40 or 80 threaded fittings for threaded pipe connections as specified on the drawings and details.

E. Threaded joint sealant: Use non-hardening, nontoxic pipe thread sealant formulated for use on threaded connections and approved by pipe fitting or valve manufacturer.

2.03 DRIP IRRIGATION COMPONENTS

A. Rain Bird Control Zone Kits

1. General Information

a. Provide control zone kits manufactured by Rain Bird as indicated on construction drawings.

b. Control zone kit assemblies for dripline irrigation zones must include control valve, filtration, and pressure regulation components sized to meet the hydraulic demands and flow requirements of the zones that they service.

2. Rain Bird Low Flow Control Zone Kit for dripline zones with flows from 0.2 to 5.0 GPM (0.8 to 18.9 lpm), including low flow valve (LFV) and pressure regulating filter (PRF).

a. Available model numbers:
   1) XCZ-075-PRF [3/4” (19 mm) Low Flow valve and 3/4” (19 mm) PR filter]
   2) XCZ-LF-100-PRF [1” (25 mm) Low Flow valve and 3/4” (19 mm) PR filter]
   3) XACZ-075-PRF [3/4” (19 mm) Low Flow Anti-siphon valve and 3/4” (19 mm) PR filter]

b. Low Flow Valve (LFV) component specifications include:
   1) Valve body and bonnet constructed of high impact, weather-resistant plastic, stainless steel and other chemical/UV resistant materials
   2) Diaphragm with a double-knife seal, constructed of durable Buna-N rubber with a clog-resistant metering orifice
   3) Energy-efficient, low-power encapsulated solenoid with captured plunger and 90 mesh (200 micron) solenoid filter
   4) External bleed for manual system flushing during start-up, internal bleed for manual zone activation during maintenance operations
   5) Inlet pressure rating: 20 to 120 PSI (1,4 to 8,3 bar)
   6) Female threaded inlet and outlet connections
   7) Anti-siphon valve configuration includes listed features and incorporates atmospheric vacuum breaker with I.A.P.M.O and A.S.S.E. listing approval

c. Pressure Regulating Filter (PRF) combines filtration and pressure regulation in one integrated unit for protection of downstream components of drip irrigation system. PRF component specifications include:

1) Compact “Y” filter body and cap configuration constructed of glass-filled, UV-resistant polypropylene, with 120 PSI (8,3 bar) operating pressure rating. Maximum dimensions of filter body; Height: 4 1/2" (11,4 cm), Length: 5 1/2" (14 cm), Width: 2" (5,1 cm)
2) Standard 200 mesh (75 micron) filter screen constructed of durable polyester fabric attached to propylene frame. Screen is serviceable for cleaning purposes by unscrewing cap from filter body and removing filter element.
3) Normally-open pressure regulating device with preset outlet pressure of approximately 30 PSI (2,1 bar). Pressure regulating device allows full flow with minimal pressure loss unless inlet pressure is greater than preset level. As inlet pressure increases above preset level, internal spring compresses to reduce downstream pressure.
4) Male threaded 3/4” (19 mm) inlet and outlet connections.

(or)

3. Rain Bird Medium Flow Control Zone Kit for dripline zones with flows from 3.0 to 15.0 GPM (11.4 to 56.8 lpm), including Rain Bird DV or ASVF valve and pressure regulating filter (PRF).

a. Available model numbers:
1) XCZ-100-PRF [1” (25 mm) DV valve and 1” (25 mm) PR filter]
2) XACZ-100-PRF [1” (25 mm) Anti-siphon Valve and 1” (25 mm) PR Filter]

b. DV Valve component specifications include:
1) Valve body and bonnet constructed of high impact, weather-resistant plastic, stainless steel and other chemical/UV resistant materials
2) Diaphragm with a double-knife seal, constructed of durable Buna-N rubber with a clog-resistant metering orifice
3) Energy-efficient, low-power encapsulated solenoid with captured plunger and 90 mesh (200 micron) solenoid filter
4) External bleed for manual system flushing during start-up, internal bleed for manual zone activation during maintenance operations
5) Inlet pressure rating: 20 to 120 PSI (1.4 to 8.3 bar)
6) Female threaded inlet and outlet connections
7) Anti-siphon valve configuration includes listed features and incorporates atmospheric vacuum breaker with I.A.P.M.O and A.S.S.E. listing approval

c. Pressure Regulating Filter (PRF) combines filtration and pressure regulation in one integrated unit for protection of downstream components of drip irrigation system. PRF component specifications include:

1) Compact “Y” filter body and cap configuration constructed of glass-filled, UV-resistant polypropylene, with 120 PSI (8,3 bar) operating pressure rating. Maximum dimensions of filter body; Height: 4 1/2" (11,4 cm), Length: 5 1/2" (14 cm), Width: 2" (5,1 cm)
2) Standard 200 mesh (75 micron) filter screen constructed of durable polyester fabric attached to propylene frame. Screen is serviceable for cleaning purposes by unscrewing cap from filter body and removing filter element.
3) Normally-open pressure regulating device with preset outlet pressure of approximately 40 PSI (2,8 bar). Pressure regulating device allows full flow with minimal pressure loss unless inlet pressure is greater than preset level. As inlet pressure increases above preset level, internal spring compresses to reduce downstream pressure.
4) Male threaded 1” (25 mm) inlet and outlet connections.

(or)

4. Rain Bird Medium Flow Commercial Control Zone Kit for dripline zones with flows from 3.0 to 20.0 GPM (11.4 to 75.7 lpm), including PVC ball valve, Rain Bird PESB valve, and Rain Bird pressure regulating quick-check basket filter.

a. Available model numbers:
1) XCZ-100-B-COM [1” (25 mm) PVC ball valve, 1” (25 mm) Rain Bird PESB valve, and 1” (25 mm) PRB-QKCHK pressure regulating basket filter]

b. PESB valve assembly component specifications include:
1) 1” (25 mm) PVC full-port ball valve with female threaded inlet and outlet connections
2) PESB valve body and bonnet constructed of durable glass-filled nylon, stainless steel and other chemical/UV resistant materials
3) Diaphragm constructed of a durable Buna-N rubber material reinforced with nylon
4) One-piece solenoid with captured plunger and 90 mesh (200 micron) solenoid filter
5) External bleed for manual system flushing during start-up, internal bleed for manual zone activation during maintenance operations
6) Inlet pressure rating: 20 to 200 PSI (1,4 to 13,8 bar)
7) Female threaded inlet and outlet connections

c. Pressure Regulating Quick Check Basket Filter combines filtration and pressure regulation in one integrated unit for protection of downstream components of drip irrigation system. Pressure regulating basket filter component specifications include:

1) Basket style body and jar-top cap constructed of heavy-duty glass-filled, UV-resistant polypropylene, with 150 PSI (10,3 bar) operating pressure rating. Maximum dimensions of filter body; Height: 6 1/2" (16,5 cm), Length: 6 1/2" (16,5 cm), Width: 3 1/2" (8,9 cm)
2) Indicator incorporated into filter cap that changes color from green to red during operation when the filter element requires cleaning.
3) Standard 200 mesh (75 micron) filter screen constructed of stainless steel attached to propylene frame. Screen is serviceable for cleaning purposes by unscrewing cap from filter body and removing filter element.
4) Normally-open in-line pressure regulating device, constructed of durable, UV resistant non-corrosive material able to accommodate an inlet pressure rating of not less than 150 PSI (10,3 bar), with preset outlet pressure of approximately 40 PSI (2,8 bar). Pressure regulating device allows full flow with minimal pressure loss unless inlet pressure is greater than preset level. As inlet pressure increases above preset level, internal spring compresses to reduce downstream pressure.
5) Male threaded 1" (25 mm) inlet and outlet connections.

(or)

5. Rain Bird High Flow Commercial Control Zone Kit for dripline zones with flows from 15.0 to 40.0 GPM (56,8 to 151,4 lpm), including Rain Bird PESB valve and two parallel Rain Bird pressure regulating quick-check basket filters.

a. Available model numbers:
1) XCZ-150-COM [1 1/2" (38 mm) Rain Bird PESB valve, and two 1" (25 mm) PRB-QKCHK pressure regulating basket filters]

b. PESB valve assembly component specifications include:
1) PESB valve body and bonnet constructed of durable glass-filled nylon, stainless steel and other chemical/UV resistant materials
2) Diaphragm constructed of a durable Buna-N rubber material reinforced with nylon
3) One-piece solenoid with captured plunger and 90 mesh (200 micron) solenoid filter
4) External bleed for manual system flushing during start-up, internal bleed for manual zone activation during maintenance operations
5) Inlet pressure rating: 20 to 200 PSI (1,4 to 13,8 bar)
6) Female threaded inlet and outlet connections

c. Pressure Regulating Quick Check Basket Filter combines filtration and pressure regulation in one integrated unit for protection of downstream components of drip irrigation system. Pressure regulating basket filter component specifications include:

1) Basket style body and jar-top cap constructed of heavy-duty glass-filled, UV-resistant polypropylene, with 150 PSI (10,3 bar) operating pressure rating. Maximum dimensions of filter body; Height: 6 1/2" (16,5 cm), Length: 6 1/2" (16,5 cm), Width: 3 1/2" (8,9 cm)
2) Indicator incorporated into filter cap that changes color from green to red during operation when the filter element requires cleaning.
3) Standard 200 mesh (75 micron) filter screen constructed of stainless steel attached to propylene frame. Screen is serviceable for cleaning purposes by unscrewing cap from filter body and removing filter element.
4) Normally-open in-line pressure regulating device, constructed of durable, UV resistant non-corrosive material able to accommodate an inlet pressure rating of not less than 150 PSI (10,3 bar), with preset outlet pressure of approximately 40 PSI (2,8 bar). Pressure regulating device allows full flow with minimal pressure loss unless inlet pressure is greater than preset level. As inlet pressure increases above preset level, internal spring compresses to reduce downstream pressure.
5) Male threaded 1” (25 mm) inlet and outlet connections

B. Rain Bird XF Series Dripline Components

1. General Information

a. Provide flexible dual-layered pressure-compensating inline XF Series Dripline manufactured by Rain Bird, with emitter spacing and dripline row spacing as indicated on construction drawings.

b. Provide insert or compression fittings manufactured by Rain Bird that are compatible with inline emitter tubing as indicated on construction drawings.

2. Rain Bird XFD On-Surface Dripline with pressure-compensating inline emitters.

a. Available Rain Bird XFD On-Surface Dripline model numbers for POTABLE water systems; brown colored dripline tubing with emitter flow rates and spacing as shown:
1) Rain Bird XFD-06-12; 0.6 GPH (2,3 lph) emitters spaced 12” (30,5 cm) on-center
2) Rain Bird XFD-06-18; 0.6 GPH (2,3 lph) emitters spaced 18” (45,7 cm) on-center
3) Rain Bird XFD-06-24; 0.6 GPH (2,3 lph) emitters spaced 24” (61 cm) on-center
4) Rain Bird XFD-09-12; 0.9 GPH (3,4 lph) emitters spaced 12” (30,5 cm) on-center
5) Rain Bird XFD-09-18; 0.9 GPH (3,4 lph) emitters spaced 18” (45,7 cm) on-center

6) Rain Bird XFD-09-24; 0.9 GPH (3,4 lph) emitters spaced 24" (61 cm) on-center

b. Available Rain Bird XFDP On-Surface Dripline model numbers for NON-POTABLE water systems; purple colored dripline tubing with emitter flow rates and spacing as shown:
   1) Rain Bird XFDP-06-12; 0.6 GPH (2,3 lph) emitters spaced 12" (30,5 cm) on-center
   2) Rain Bird XFDP-06-18; 0.6 GPH (2,3 lph) emitters spaced 18" (45,7 cm) on-center
   3) Rain Bird XFDP-06-24; 0.6 GPH (2,3 lph) emitters spaced 24" (61 cm) on-center
   4) Rain Bird XFDP-09-12; 0.9 GPH (3,4 lph) emitters spaced 12" (30,5 cm) on-center
   5) Rain Bird XFDP-09-18; 0.9 GPH (3,4 lph) emitters spaced 18" (45,7 cm) on-center
   6) Rain Bird XFDP-09-24; 0.9 GPH (3,4 lph) emitters spaced 24" (61 cm) on-center

c. Dripline tubing material specifications and features include:
   1) XFD tubing; brown in color, conforming to an outside diameter (O.D.) of 0.634 inches (16 mm) and an inside diameter (I.D.) of 0.536 inches (13,6 mm) and wall thickness of 0.049 inches (1,2 mm)
   2) XFDP tubing; purple in color, conforming to an outside diameter (O.D.) of 0.634 inches (16 mm) and an inside diameter (I.D.) of 0.536 inches (13,6 mm) and wall thickness of 0.049 inches (1,2 mm)
   3) Factory installed, pressure-compensating, inline emitters welded to the inner circumference of the polyethylene tubing at spacing specified by model number
   4) Inline emitters designed to pressure-compensate by lengthening the emitter's turbulent flow path (Rain Bird patent pending)
   5) Consistent flow rate from each installed inline emitter when emitter inlet pressure is supplied between recommended operating range of 8.5 to 60 PSI (0,7 to 4,1 bar)
   6) Required filtration for XF Series dripline tubing and emitters is 120 mesh (125 micron)

3. Rain Bird XFS Sub-Surface Dripline with Copper Shield™ Technology and pressure-compensating inline emitters.

   a. Available Rain Bird XFS Sub-Surface Dripline model numbers for POTABLE water systems; copper colored dripline tubing with emitter flow rates and spacing as shown:
      1) Rain Bird XFS-06-12; 0.6 GPH (2,3 lph) emitters spaced 12" (30,5 cm) on-center

2) Rain Bird XFS-06-18; 0.6 GPH (2,3 lph) emitters spaced 18” (45,7 cm) on-center
3) Rain Bird XFS-06-24; 0.6 GPH (2,3 lph) emitters spaced 24” (61 cm) on-center
4) Rain Bird XFS-09-12; 0.9 GPH (3,4 lph) emitters spaced 12” (30,5 cm) on-center
5) Rain Bird XFS-09-18; 0.9 GPH (3,4 lph) emitters spaced 18” (45,7 cm) on-center
6) Rain Bird XFS-09-24; 0.9 GPH (3,4 lph) emitters spaced 24” (61 cm) on-center

b. Available Rain Bird XFSP Sub-Surface Dripline model numbers for NON-POTABLE water systems; purple colored dripline tubing with emitter flow rates and spacing as shown:
1) Rain Bird XFSP-06-12; 0.6 GPH (2,3 lph) emitters spaced 12” (30,5 cm) on-center
2) Rain Bird XFSP-06-18; 0.6 GPH (2,3 lph) emitters spaced 18” (45,7 cm) on-center
3) Rain Bird XFSP-06-24; 0.6 GPH (2,3 lph) emitters spaced 24” (61 cm) on-center
4) Rain Bird XFSP-09-12; 0.9 GPH (3,4 lph) emitters spaced 12” (30,5 cm) on-center
5) Rain Bird XFSP-09-18; 0.9 GPH (3,4 lph) emitters spaced 18” (45,7 cm) on-center
6) Rain Bird XFSP-09-24; 0.9 GPH (3,4 lph) emitters spaced 24” (61 cm) on-center

c. Dripline tubing material specifications and features include:
1) XFS tubing; copper in color, conforming to an outside diameter (O.D.) of 0.634 inches (16 mm) and an inside diameter (I.D.) of 0.536 inches (13,6 mm) and wall thickness of 0.049 inches (1,2 mm)
2) XFSP tubing; purple in color, conforming to an outside diameter (O.D.) of 0.634 inches (16 mm) and an inside diameter (I.D.) of 0.536 inches (13,6 mm) and wall thickness of 0.049 inches (1,2 mm)
3) Factory installed, pressure-compensating, inline emitters welded to the inner circumference of the polyethylene tubing at spacing specified by model number
4) Inline XFS Sub-Surface Dripline emitters include Rain Bird’s exclusive Copper Shield™ Technology (patent pending), which protects the emitter from root intrusion without requiring EPA-approved handling procedures or supplementary equipment for chemical treatment of water as recommended by some manufacturer’s of inline drip equipment.
5) Inline emitters designed to pressure-compensate by lengthening the emitter’s turbulent flow path (Rain Bird patent pending)

6) Consistent flow rate from each installed inline emitter when emitter inlet pressure is supplied between recommended operating range of 8.5 to 60 PSI (0,7 to 4,1 bar)
7) Required filtration for XF Series dripline tubing and emitters is 120 mesh (125 micron)

4. Rain Bird XF Series Blank Dripline Tubing

a. Available model numbers for POTABLE water systems:
1) Rain Bird XFD blank tubing, brown in color.

b. Available model numbers for NON-POTABLE water systems:
1) Rain Bird XFDP blank tubing, purple in color.

5. Rain Bird Easy Fit Dripline Tubing Compression Fittings

a. Available model numbers, designed for compatibility with Rain Bird XF Series Dripline Tubing:
1) Tee: MDCFTEE
2) Coupling: MDCFCOUP
3) Elbow: MDCFEL
4) Adapters:
a) 1/2” (13 mm) Male pipe thread adapter: MDCF50MPT
b) 3/4” (19 mm) Male pipe thread adapter: MDCF75MPT
c) 1/2” (13 mm) Female pipe thread adapter: MDCF50FPT
d) 3/4” (19 mm) Female pipe thread adapter: MDCF75FPT
e) 3/4” (19 mm) Female hose thread adapter: MDCF75FHT
5) Flush Cap end closure for POTABLE system: MDCFCAP
6) Flush Cap end closure for NON-POTABLE system: MDCFPCAP

b. Easy Fit compression fitting specifications and features include:
1) Easy Fit directional fittings and flush cap fittings constructed from molded UV-resistant ABS material with Buna-N rubber seal for long-term, leak free connections
2) Easy Fit adapters constructed from UV-resistant ABS materials for use exclusively with Easy Fit Compression Fittings
3) Easy Fit Compression Fittings are intended for use with polyethylene tubing from .630" to .710" (16 mm-18 mm) OD to provide a leak-free compression fit
4) Maximum pressure loss for the Easy Fit adapters estimated to be 0.1 PSI (0,007 bar) per adapter
5) Operating pressure range for Easy Fit compression fittings and adapters is 0 to 60 PSI (0 to 4,1 bar)

(or)

6. Rain Bird XF Series Dripline Tubing Insert Fittings

    a. Available model numbers, designed for compatibility with Rain Bird XF Series Dripline Tubing:
        1) Tee: XFD-TEE insert tee (17 x17 x 17 mm)
        2) Coupling: XFD-COUP insert coupling (17 x 17 mm)
        3) Elbow: XFD-ELBOW insert elbow (17 x 17 mm)
        4) Cross: XFD-CROSS insert cross (17 x 17 x 17 x 17 mm)
        5) Insert Adapters:
            a) 1/2" (13 mm) Male pipe thread adapter: XFD-MA-050 [17 mm x 1/2" (13 mm) MPT]
            b) 3/4" (19 mm) Male pipe thread adapter: XFD-MA-075 [17 mm x 3/4" (19 mm)MPT]
            c) 3/4" (19 mm) Female pipe thread adapter: XFD-FA-075 [17 mm x 3/4" (19 mm)FPT]
            d) 1/2" (13 mm) Tee male pipe thread adapter: XFD-TMA-050 [17 mm x 1/2" (13 mm)MPT x 17 mm]
            e) 3/4" (19mm) Tee female pipe thread adapter: XFD-TFA-075 [17 mm x 3/4" (19 mm)FPT x 17 mm]

    b. XF Series insert fitting specifications and features include:
        1) Constructed from black acetyl plastic for long-term, leak free connections
        2) Intended for use with polyethylene tubing with ID of 0.536" (13,6 mm), including Rain Bird XF Dripline and XF Series Blank Tubing
        3) Operating pressure range is 0 to 50 PSI (0 to 3,5 bar)

7. Rain Bird Air Relief Valves.

    a. Available model numbers, designed for compatibility with Rain Bird XF Series Dripline Tubing:
        1) ARValve Kit; includes 3/4" (19 mm) air/relief valve, Easy Fit compression tee, and Easy Fit flush cap.
        2) ARV12 Air Relief Valve ; includes 1/2" (13 mm) air relief valve.

C. Rain Bird Point Source Irrigation Emission Devices

1. General Information

    a. Provide low-volume point-source emission devices, manufactured by Rain Bird, to efficiently deliver irrigation water at the plant rootzone as indicated on construction drawings.

2. Rain Bird Single-outlet Xeri-Bug™ Emitters

    a. Available model numbers with self-piercing barb inlet:
        1) XB-05PC (Blue); 0.5 GPH (1,89 lph)

2) XB-10PC (Black); 1.0 GPH (3,79 lph)
3) XB-20PC (Red); 2.0 GPH (7,57 lph)

b. Available model numbers with 10-32 threaded inlet:
1) XB-05PC-1032 (Blue); 0.5 GPH (1,89 lph)
2) XB-10PC-1032 (Black); 1.0 GPH (3,79 lph)
3) XB-20PC-1032 (Red); 2.0 GPH (7,57 lph)

c. Available model numbers with 1/2" (13 mm) threaded inlet:
1) XBT-10 (Black); 1.0 GPH (3,79 lph)
2) XBT-20 (Red); 2.0 GPH (7,57 lph)

d. Single-outlet Xeri-Bug Emitter specifications and features include:
1) Available with three inlet options:
a) Self-piercing barb inlet; Emitters with self-piercing barb inlet permit one-step insertion into 1/2" (13 mm) or 3/4" (19 mm) drip tubing when installed with Rain Bird Xeriman tool.
b) 10-32 threaded inlet; Emitters with 10-32 threaded inlet allow threaded connection into PolyFlex Riser, 1032 Thread Adapter, or 1800 Xeri-Bubbler Adapter
c) 1/2" (13 mm) threaded inlet; Emitters with 1/2" (13 mm) threaded inlet allow threaded connection into 1/2" (13 mm) PVC male adapter.
2) External surfaces constructed from UV resistant acetyl materials
3) Self-flushing to minimize clogging
4) Color-coded to identify flow rate;
a) Blue emitter indicates a flow rate of 0.5 GPH (1,89 lph)
b) Black emitter indicates a flow rate of 1.0 GPH (3,79 lph)
c) Red emitter indicates a flow rate of 2.0 GPH (7,57 lph)
5) Pressure-compensating over the pressure range of 15 to 50 PSI (1,0 to 3,5 bar) with consistent flow rate of [0.5 GPH (1,89 lph)] or [1.0 GPH (3,79 lph)] or [2.0 GPH (7,57 lph)] over this pressure range

3. Rain Bird Single-outlet Pressure-Compensating Modules

a. Available model numbers with self-piercing inlet barb:
1) PC-05: light brown, 5 GPH (18,95 lph)
2) PC-07: violet, 7 GPH (26,53 lph)
3) PC-10: green, 10 GPH (37,90 lph)
4) PC-12: dark brown, 12 GPH (45,48 lph)
5) PC-18: white, 18 GPH (68,22 lph)
6) PC-24: orange, 24 GPH (90,96 lph)

b. Available model numbers with 10-32 threaded inlet:
1) PC-05 10-32: light brown, 5 GPH (18,95 lph)
2) PC-07 10-32: violet, 7 GPH (26,53 lph)

3) PC-10 10-32: green, 10 GPH (37,90 lph)

c. Pressure-Compensating Module specifications and features include:
1) Available with two inlet options:
a) Self-piercing barb inlet; Emitters with self-piercing barb inlet permit one-step insertion into 1/2" (13 mm) or 3/4" (19 mm) drip tubing when installed with Rain Bird Xeriman tool.
b) 10-32 threaded inlet; Emitters with 10-32 threaded inlet allow threaded connection into PolyFlex Riser, 1032 Thread Adapter, or 1800 Xeri-Bubbler Adapter
2) External surfaces constructed from UV resistant acetyl materials
3) Color-coded to identify flow rate;
a) Tan outlet indicates a flow rate of 5 GPH (18,93 lph)
b) Violet outlet indicates a flow rate of 7 GPH (26,50 lph)
c) Green outlet indicates a flow rate of 10 GPH (37,85 lph)
d) Dark brown outlet indicates a flow rate of 12 GPH (45,42 lph)
e) White outlet indicates a flow rate of 18 GPH (68,13 lph)
f) Orange outlet indicates a flow rate of 24 GPH (90,84 lph)
4) Pressure-compensating over the pressure range of 10 to 50 PSI (0.7 to 3,5 bar) with consistent flow rate of [5 GPH (18,93 lph)] or [7 GPH 26,50 lph)] or [10 GPH (37,85 lph)] or [12 GPH (45,42 lph)] or [18 GPH (68,13 lph)] or [24 GPH (90,84 lph)] over this pressure range.

d. Rain Bird PC Diffuser Cap specifications and features include:
1) Available with two color options:
a) PC Diffuser (Black); This Diffuser Cap is to be used for Pressure-Compensating Module zones serviced by a potable water source.
b) PC DIFF-PPL (Purple); This Diffuser Cap is to be used for Pressure-Compensating Module zones serviced by a non-potable water source.
2) Constructed from UV-resistant polyethylene material
3) Capable of snapping onto Rain Bird Pressure-Compensating Modules to create a bubbler effect and prevent wash out

4. Rain Bird Multi-outlet Xeri-Bug Emission Devices

a. Available model numbers with barb inlet:
1) XB-05-6: Blue, 0.5 GPH (1,89 lph/outlet)
2) XB-10-6:Black, 1.0 GPH (3,79 lph/outlet)
3) XB-20-6:Red, 2.0 GPH (7,57 lph/outlet)

b. Available model numbers with 1/2" (13 mm) female threaded inlet:
1) XBT-05-6: Blue, 0.5 GPH (1,89 lph/outlet)
2) XBT-10-6:Black, 1.0 GPH (3,79 lph/outlet)
3) XBT-20-6:Red, 2.0 GPH (7,57 lph/outlet)

c. Multi-outlet Xeri-Bug specifications and features include:
   1) Available with two inlet options:
      a) Barb inlet; Emitters with barb inlet permit insertion into 1/2" (13 mm) or 3/4" (19 mm) drip tubing
      b) 1/2" (13 mm) threaded inlet; Emitters with 1/2" (13 mm) threaded inlet allow threaded connection into 1/2" (13 mm) PVC male adapter.
   2) Six outlet ports, barbed to retain 1/4" (6,4mm) distribution tubing
   3) External surfaces constructed from UV resistant acetyl materials
   4) Self-flushing to minimize clogging
   5) Color-coded to identify flow rate;
      a) Blue emitter indicates a flow rate of 0.5 GPH (1,89 lph) per outlet
      b) Black emitter indicates a flow rate of 1.0 GPH (3,79 lph) per outlet
      c) Red emitter indicates a flow rate of 2.0 GPH (7,57 lph) per outlet
   6) Pressure-compensating over the pressure range of 15 to 50 PSI (1,0 to 3,5 bar) with consistent flow rate of [0.5 GPH (1,89 lph)] or [1.0 GPH (3,79 lph)] or [2.0 GPH (7,57 lph)] GPH over this pressure range

5. Rain Bird 6-outlet Manifold Emission Device

   a. Available model number:
      1) EMT-6XERI

   b. 6-outlet Manifold specifications and features include:
      1) 1/2" (13 mm) female threaded inlet
      2) Six free-flowing outlet ports, barbed to retain 1/4" (6,4 mm) distribution tubing and sealed by manufacturer with durable plastic caps removable with pliers during installation
      3) Recommended operating pressure range between 15 to 50 PSI (1,0 to 3,5 bar)

6. Rain Bird Multi-Outlet Xeri-Bird™ 8 Emission Device

   a. Available model numbers:
      1) XBD-80: Xeri-Bird™ 8 unit (includes seven removable port plugs) with filter
      2) XBD-81: Xeri-Bird™ 8 unit with eight 1 GPH (3,79 lph) Xeri-Bug (XB-10-PC) emitters factory installed and filter

   b. Xeri-Bird™ 8 specifications and features include:
      1) 1/2" (13 mm) threaded device inlet with union base nut to allow removal of the Xeri-Bird 8 body from riser for easy installation and maintenance

2) Eight independent ports, each capable of accepting a Rain Bird Xeri-Bug™ emitter or Rain Bird PC Module for independent flows from 0.5 to 24 GPH (1,89 to 90,96 lph), or a self-piercing barb connector (SPB-025) for unrestricted flow
3) Eight barbed outlet ports mounted on bottom of device capable of securely retaining 1/4" (6,4 mm) distribution tubing
4) 200 mesh (75 micron) filter, easily serviceable from top of unit.
5) Capable of being used with retrofit pressure regulator (PRS-050-30) when pressure regulation is required at unit

D. Rain Bird Low Volume Broadcast Irrigation Emission Devices

1. General Information

a. Provide low-volume broadcast emission devices, manufactured by Rain Bird, to efficiently deliver irrigation water in a short-radius wetting pattern to planting areas as indicated on construction drawings.

2. Rain Bird Xeri-Bubbler™

a. Available model numbers with 1/4" (6,4 mm)barb inlet:
1) SXB-180-025; half-circle, 5 streams
2) SXB-360-025; full-circle, 8 streams
3) UXB-360-025; full-circle, umbrella

b. Available model numbers with 10-32 thread inlet:
1) SXB-180-1032; half-circle, 5 streams
2) SXB-360-1032; full-circle, 8 streams
3) UXB-360-1032; full-circle, umbrella

c. Available model numbers with 5" (12,7 cm) spike inlet:
1) SXB-180-SPYK; half-circle, 5 streams
2) SXB-360-SPYK; full-circle, 8 streams
3) UXB-360-SPYK; full-circle, umbrella

d. Xeri-Bubbler™ specifications and features include:
1) Three inlet connection options:
a) 10-32 self-tapping thread
b) 1/4" (6,4 mm) barb
c) 5" (12,7 cm) spike
2) Three flow pattern options:
a) Half-circle with 5 streams
b) Full-circle with 8 streams
c) Full-circle umbrella pattern
3) Flow and radius adjustment capability by turning outer cap
4) SXB series features flow range of 0 to 13 GPH (0 to 49,2 lph)

5) UXB series features flow range of 0 to 35 GPH (0 to 132,5 lph)
6) Operating pressure range between 15 to 30 PSI (1,0 to 2,1 bar)

3. Rain Bird Xeri-Pop™ Micro-Spray

a. Available model numbers:
1) XP-400X; 4-inch (101,6 mm) pop-up
2) XP-600X; 6-inch (152,4 mm) pop-up
3) XP-1200X; 12-inch (304,8 mm) pop-up

b. Xeri-Pop™ Micro-Spray specifications and features include:
1) 1/4" (6,4 mm) barb inlet located in base of unit for connection to 1/4" (6,4 mm) distribution tubing
2) Three pop-up height options:
a) 4-inch (10,16 cm) pop-up
b) 6-inch (15,24 cm) pop-up
c) 12-inch (30,5 cm) pop-up
3) Compatible with the following Rain Bird nozzles:
a) Multi-port Series nozzles
b) 5-series MPR plastic nozzles
c) 5-series plastic bubbler nozzle (use in conjunction with Rain Bird PCS-series pressure compensating screen)
d) 8-series MPR plastic nozzles
4) External body construction using UV-resistant ABS material
5) Self-flushing, pressure-activated wiper seal
6) Operating pressure range between 20 to 50 PSI (1,4 to 3,5 bar). Optimum performance achieved with 40 PSI (2,8 bar) pressure regulator.

4. Rain Bird Xeri-Sprays™

a. Available model numbers:
1) XS-90; Quarter-circle, spray pattern
2) XS-180; Half-circle, spray pattern
3) XS-360; Full-circle, stream spray pattern
4) 360 ADJ Mister

b. Xeri-Spray™ specifications and features include:
1) 10-32 self-tapping threaded inlet
2) Four flow pattern options:
a) Quarter-circle spray pattern
b) Half-circle spray pattern
c) Full-circle spray pattern
d) Full-circle mister
3) Operating pressure range between 10 to 30 PSI (0,75 to 2,1 bar)
4) Adjustable flow and radius with integral ball valve

a) Flow adjustability between 0 to 31 GPH (0 to 117,3 lph)
b) Radius adjustability for full-circle sprays between 0 to 13.4 feet (0 to 4,1 m)
c) Radius adjustability for part-circle sprays between 0 to 10.6 feet (0 to 3,2 m)

E. Rain Bird Drip Irrigation Accessories

1. 1/4" (6,4 mm) Barb Transfer Fittings

a. Available model numbers:
1) XBF1CONN:1/4" (6,4 mm) Barb Connector
2) XBF2EL: 1/4" (6,4 mm) Barb x Barb Elbow
3) XBFTEE: 1/4" (6,4 mm) Barb x Barb Tee

b. 1/4" (6,4 mm) Barb Transfer Fittings specifications and features include:
1) Three fitting configurations:
a) Connector
b) Elbow
c) Tee
2) Designed for connections of Rain Bird XQ 1/4" (6,4 mm) distribution tubing with an ID of 0.17" (4,3 mm)
3) Barbed on one end to permit easy insertion into any 1/2" (13 mm) or 3/4" (19 mm) polyethylene tubing using a Rain Bird Xeriman® tool (XM-TOOL)
4) Constructed from UV resistant acetyl.
5) Operating pressure range between 0 to 50 PSI (0 to 3.5 bar)

2. Rain Bird Diffuser Bug Cap

a. Available model numbers:
1) DBC-025 (Black); for potable water source
2) DBC-025-PPL (Purple); for non-potable water source

b. Diffuser Bug Cap specifications and features include:
1) Barb inlet designed to fit into 1/4" (6,4 mm) distribution tubing with ID of 0.16" (4 mm)
2) Flanged shield designed to diffuse water to minimize soil erosion at emission point
3) Constructed from polyethylene material
4) Operating pressure range between be 0 to 50 PSI (0 to 3,5 bar)

PART 3 – EXECUTION

3.01 INSPECTIONS AND REVIEWS

A. Pre-construction Site Inspection

1. Verify construction site conditions and note irregularities affecting work of this section. Report irregularities in writing to Owner's Representative prior to beginning work. Commencement of work implies acceptance of existing site conditions.

B. Utility Locates ("Call Before You Dig")

1. Arrange and coordinate Utility Locates with local authorities prior to construction.

2. Repair underground utilities that are damaged during construction. Make repairs at no additional cost to contract price.

3.02 DRIPLINE LAYOUT OF WORK

A. Stake out dripline irrigation system. Items staked include manifold/header pipe and tubing, sleeves, control zone assemblies, flush valves, air relief valves, and check valves.

B. Dripline Irrigation System Layout Review: Dripline irrigation system layout review will occur after staking has been completed. Notify Owner's Representative one week in advance of review. Modifications will be identified by Owner's Representative at this review.

3.03 DRIPLINE EXCAVATION, TRENCHING, AND BACKFILL

A. Excavate and install pipes at minimum cover indicated in drawings or specifications. Excavate trenches at appropriate width for connections and fittings.

B. Minimum cover for dripline components (distance from top of pipe to finish grade):

1. Buried PVC manifold and supply header pipe to dripline grid layouts: 12" (30,5 cm) to top of pipe.

2. Buried dripline lateral pipe downstream PVC manifold and supply header pipe: 4" (10 cm) to top of pipe

3. On-grade dripline lateral pipe downstream PVC manifold and supply header pipe: Secure to finish grade with approved tubing stakes. Install and test prior to installation of landscape fabric and mulch.

C. Backfill only after buried lines have been reviewed, tested, and approved.

D. Excavated material is generally satisfactory for backfill. Use backfill free from rubbish, vegetable matter, frozen materials**,** and stones larger than 2” (50 mm) in maximum diameter. Remove material not suitable for backfill. Use backfill free of sharp objects next to pipe.

E. Dress backfilled areas to original grade. Incorporate excess backfill into existing site grades. Dispose of excess backfill off site.

F. Contact Owner’s Representative for trench depth adjustments where utilities conflict with irrigation trenching and pipe work.

3.04 ASSEMBLING PIPE AND FITTINGS

A. General:

1. Keep pipe free from dirt and debris. Cut pipe ends square, debur and clean as recommended by pipe manufacturer.

2. Keep ends of assembled pipe capped. Remove caps only when necessary to continue assembly.

B. PVC Pipe and Fittings:

1. Use only strap-type friction wrenches for threaded plastic pipe.

2. PVC Solvent Weld Pipe and Fittings:

a. Use appropriate primer and solvent cement. Join pipe in manner recommended by pipe and fitting manufacturers and in accordance with accepted industry practices.

b. Cure for thirty (30) minutes before handling and twenty-four (24) hours before pressurizing or installing with vibratory plow.

c. Snake pipe from side to side within trench.

3. PVC Threaded Connections:

a. Use only factory-formed threads. Field-cut threads are not permitted.

b. Apply thread sealant in manner recommended by component, pipe and sealant manufacturers and in accordance with accepted industry practices.

C. Dripline Tubing and Fittings:

1. Use only Rain Bird XF-Series Insert Fittings or Rain Bird Easy Fit Compression Fittings for Rain Bird XF-Series dripline tubing connections or transitions as recommended by the Manufacturer's representative for the specific site and system conditions.

2. Dripline Insert Fittings:

a. Install dripline tubing and fittings in manner recommended by manufacturer and in accordance with accepted industry practices.

3. Dripline Compression Fittings:

a. Install dripline tubing and fittings in manner recommended by manufacturer and in accordance with accepted industry practices.

3.05 INSTALLATION OF DRIPLINE IRRIGATION COMPONENTS

A. Control Zone Kit Assembly:

1. Flush mainline pipe before installing Control Zone Kit assembly.

2. Locate where shown on drawings. Connect control wires to remote control valve wires using specified wire connectors and waterproof sealant. Provide connectors and sealant per manufacturer's recommendations.

3. Install a maximum of four (4) Low Flow or Medium Flow Control Zone Kits per standard rectangular valve box. Install a maximum of one (1) Medium Flow Commercial Control Zone Kits per standard rectangular valve box. Install a maximum of one High Flow Commercial Control Zone Kits per jumbo rectangular valve box.

a. Locate valve boxes at least 12" (30,5 cm) from, and align with, nearby walls or edges of paved areas.

b. Group Control Zone Kit assemblies together where practical. Align grouped valve boxes in uniform patterns. Allow at least 12" (30,5 cm) between valve boxes.

c. Brand controller letter and station numbers on valve box lid in 2" (50 mm) high letters.

B. Lateral Piping and Dripline Tubing:

1. Install lateral piping and dripline tubing at locations and in grid patterns as indicated on drawings and installation details, and in strict accordance with manufacturer recommendations.

2. Thoroughly flush PVC lateral piping, supply headers, and dripline tubing immediately upon installation.

C. Air Relief Valve Kit Assembly: Install at all high points in dripline tubing grid as shown and directed on drawings and installation details.

D. Flush Point Assembly: Install in flush header or at ends of each dripline zone segment as shown and directed on drawings and installation details. Install at least 12-inches from and align with adjacent walls or edges of paved areas.

3.06 PROJECT RECORD (AS-BUILT) DRAWINGS

A. Document field changes from original design and construction documents. Maintain on-site and separate from original construction documents, one complete set of documents labeled “Project Field Documents”. Keep documents current. Do not permanently cover work until accurate “as-built” information is recorded.

B. Record pipe network alterations on a daily basis. Record work that is installed differently than shown on construction documents. Record accurate reference dimensions, measured from at least two permanent reference points, of each control zone kit assembly, each dripline zone boundary, each air relief valve assembly, each flush point assembly, and other dripline irrigation components enclosed within valve box.

C. Obtain from Owner’s Representative one set of reproducible Mylar drawings or CAD files prior to construction completion. Duplicate information contained on “Project Field Documents” maintained on-site using technical drafting pen or AutoCAD. Label each sheet "Record Drawing".

D. Provide “Record Drawings” to Owner’s Representative. Completion of Record Drawings is required prior to final construction review at completion of irrigation system installation.

3.07 WINTERIZATION AND SPRING START-UP

A. Winterize irrigation system in fall following completion, or partial completion, of irrigation system construction. Start-up irrigation system in spring following completion, or partial completion, of irrigation system construction. Repair any damage caused in improper winterization at no additional cost to Owner. Coordinate winterization and start-up with landscape maintenance personnel.

3.08 MAINTENANCE

A. Maintain irrigation system for duration of 30 calendar days from formal written acceptance by Owner’s Representative. Make periodic examinations and adjustments to irrigation system components in order to achieve the most efficient and uniform application of water.

B. Following completion of Contractor's maintenance period, Owner will be responsible for maintaining system in working order during remainder of guarantee/warranty period, for performing necessary minor maintenance, for protecting against vandalism, and for preventing damage after landscape maintenance operation.

3.09 CLEANUP

A. Remove from site machinery, tools, excess materials, and rubbish upon completion of work.

END OF SECTION 32 84 13