

**NETAFIM USA**



**NETAFIM USA  
LANDSCAPE & TURF  
PRODUCTS**

**PRODUCT PERFORMANCE SPECIFICATIONS  
SEPTEMBER 2016**

# PRODUCT PERFORMANCE SPECIFICATIONS

<b>1.0 DRIPLINES</b>	
Techline® HCVXR.....	Page 3
Techline® CV .....	Page 4
Techline® DL .....	Page 5
Techline® RW .....	Page 6
Techline® EZ .....	Page 7
<b>2.0 TECHFILTER®</b> .....	Page 8
<b>3.0 17MM FITTINGS</b>	
17MM Standard Fittings .....	Page 9
17MM Specialty Fittings .....	Page 10
<b>4.0 12MM FITTINGS</b>	
12MM Standard Fittings .....	Page 12
12MM Specialty Fittings .....	Page 12
<b>5.0 LOW VOLUME CONTROL ZONE KITS</b>	
LVCZ Kit – Low Flow 0.25 to 4.4 GPM .....	Page 14
LVCZ Kit – High Flow 4.5 to 17.6 GPM .....	Page 15
LVCZ Kit – 1.5” High Flow 11 to 35 GPM .....	Page 17
<b>6.0 REGULATING</b>	
Pressure Regulator – High Flow .....	Page 19
Pressure Regulator – In-line Low Flow .....	Page 19
<b>7.0 POINT SOURCE COMPONENTS</b>	
Self-Piercing Emitters .....	Page 20
Techflow Emitters .....	Page 20
BD and WP Emitters .....	Page 21
Polyethylene Tubing .....	Page 22
Micro-Tubing .....	Page 22
<b>8.0 FILTERS</b>	
Manual Disc Filters .....	Page 23
2” Compact LP Disc-Kleen Filters .....	Page 23
2” LP Disc-Kleen Filters .....	Page 24
3” LP Disc-Kleen Filters .....	Page 25
Apollo Disc-Kleen Filters .....	Page 26
<b>9.0 VALVES</b>	
Series 80 Nylon Control Valves .....	Page 27
¾” Electric Control Valve for Landscape .....	Page 27
1” Electric Control Valve for Landscape .....	Page 28
1 ½” Electric Control Valve for Landscape .....	Page 29
2” Electric Control Valve for Landscape .....	Page 30
Iron and Bronze Valves .....	Page 31
<b>10.0 HYDROMETER</b> .....	Page 32
<b>11.0 WATER METERS AND FLOW COMPUTERS</b>	
Metal ‘M’ Series Water Meters .....	Page 33
Composite ‘M’ Series Water Meters .....	Page 33
Netafim Flow Computer .....	Page 34

## 12.0 COMPONENTS

Air/Vacuum Relief Vent .....	Page 36
Combination Air Vent .....	Page 37
Automatic Flush Valve .....	Page 37
In-Line Check Valve .....	Page 38
Operation Pressure Indicator Stake .....	Page 39

## 1.0 DRIPLINES

### **TECHLINE® HCVXR**

#### **Description**

Techline HCVXR is a continuous self-cleaning, recycled content, pressure compensating dripline with built-in check valve and be Cupron® copper oxide infused for root intrusion deterrent. This low volume dripline has integral and evenly spaced pressure compensating check valve emitters welded to the inside of the tubing that is made with recycled content. Techline HCVXR is available with emitters in four discharge rates (0.33, 0.53, 0.77, and 1.16 gallons per hour [GPH]) evenly spaced at 12", 18", or 24" centers. Techline HCVXR is available in 100', 250', 500' and 1,000' coils. Techline HCVXR Blank Tubing is available in 100', 250', 500' and 1,000' coils.

#### **Construction**

Techline HCVXR shall be nominally sized to 17mm (½") low-density linear polyethylene tubing made with recycled content qualifying for maximum LEED credits. Techline HCVXR shall be constructed with pressure compensation, continuously self-cleaning, integral emitters with an internal check valve with root intrusion component at these spacings (12", 18", or 24" centers). Techline HCVXR may also be manufactured without emitters installed. The exterior of the tubing shall be Dark brown in color and conform to an outside diameter (O.D.) of 0.66 inches and an inside diameter (I.D.) of 0.56 inches and be laser etched on the exterior wall with manufacturer, product ID, flow rate of emitter and on-center spacing of emitters and date code. Individual pressure compensating emitters shall be welded to the inside wall of the tubing as an integral part of the manufacturing process. These emitters shall be constructed of a two (2) piece plastic emitter housing containing a continuously self-flushing molded silicone diaphragm. The emitter shall have a built-in check valve that will hold back an 8.5' column of water. The emitter shall be installed into the tubing so that the inlet to the emitter is toward the center of the tubing cross section. The emitter shall also have a built-in physical root barrier whereby the water shall exit the emitter from one location and shall exit the tubing from a second location. This physical barrier shall create an air gap inside the exit bath of the emitter. The emitter shall have the upper half constructed with a root deterrent material Cupron® copper oxide which during the manufacturing process is mixed with the emitter resin material infusing the copper oxide in the emitter. It will not wash off, wear off or leach out of the emitter. The product shall be warranted by the manufacturer to be free of emitter plugging due to root intrusion for a period of fifteen (15) years\* and from environmental stress cracking for a period of seven (7) years and defects in materials and workmanship of emitters for a period of five (5) years from the date of original delivery when used with fittings and control kits of the same manufacturer as the drip tubing. The control zone kits shall include a valve, filter and pressure regulator by Netafim and sized correctly based upon flow rates of system.

#### **Operation**

Each emitter shall have the ability to independently regulate discharge rates, with an inlet pressure range of 21.8 - 58 pounds per square inch (psi), at a constant flow and with a manufacturer's coefficient of variability (HCVXR) of 0.03 or less. Recommended operating pressure shall be between 21.8 - 58 psi. The emitter discharge rate shall be 0.33, 0.53, 0.77, or 1.16 gallons per hour (GPH) utilizing a combination of turbulent flow

and reduced pressure compensation by molded silicone diaphragm. The emitters shall be capable of continuously cleaning themselves while in operation and have an anti-siphon feature which prevents debris from entering outlet at system shutdown. The dripline shall be available with 12", 18", and 24" spacing between emitters unless otherwise specified. For subsurface installation, Techline HCVXR pipe depth shall be 4" to 6". Maximum system pressure shall be 58 psi for maximum fitting integrity. Filtration shall be 120 mesh or finer. Bending radius shall not be smaller than 7" or tubing kinking may result.

For on-surface or under mulch installations, 6" metal wire staples (TLS6UW-B) shall be installed 3' - 5' on center, (depending on soil type) and two staples shall be installed over every change-of-direction fitting.

Techline HCVXR shall be Netafim Model Number TLHCVXR \_\_\_\_-\_\_\_\_.

Techline HCVXR Blank Tubing shall be Netafim Model Number TLHCVXR0\_\_\_\_.

## **TECHLINE® CV**

### **Description**

Techline CV is a continuous self-cleaning, recycled content, pressure compensating dripline with built-in check valve. This low volume dripline has integral and evenly spaced pressure compensating check valve emitters welded to the inside of the tubing that contains recycled content. Techline CV is available with emitters in four discharge rates (0.26, 0.4, 0.6, and 0.9 gallons per hour [GPH]) evenly spaced at 12", 18", or 24" centers. Techline CV is available in 100', 250', 500', and 1,000' coils. Techline CV Blank Tubing is available in 100', 250', 500' and 1,000' coils.

### **Construction**

Techline CV shall be nominally sized to 17mm (½") low-density linear polyethylene tubing with recycled content qualifying for maximum LEED credits. Techline CV shall be constructed with pressure compensation, continuously self-cleaning, integral emitters with an internal check valve at these spacings (12", 18", or 24" centers). Techline CV may also be manufactured without emitters installed. The exterior of the tubing shall be brown in color and conform to an outside diameter (O.D.) of 0.66 inches and an inside diameter (I.D.) of 0.56 inches. Individual pressure compensating emitters shall be welded to the inside wall of the tubing as an integral part of the manufacturing process. These emitters shall be constructed of a two (2) piece plastic emitter housing containing a continuously self-flushing molded silicone diaphragm. The emitter shall have a built-in check valve that will hold back a 4.6' column of water. The emitter shall be installed into the tubing so that the inlet to the emitter is toward the center of the tubing cross section. The emitter shall also have a built-in physical root barrier whereby the water shall exit the emitter from one location and shall exit the tubing from a second location. This physical barrier shall create an air gap inside the exit bath of the emitter.

### **Operation**

Each emitter shall have the ability to independently regulate discharge rates, with an inlet pressure range of 14.5 - 58 pounds per square inch (psi), at a constant flow and with a manufacturer's coefficient of variability (Cv) of 0.03 or less. Recommended operating

pressure shall be between 14.5 - 58 psi. The emitter discharge rate shall be 0.26, 0.4, 0.6, or 0.9 gallons per hour (GPH) utilizing a combination of turbulent flow and reduced pressure compensation by molded silicone diaphragm. The emitters shall be capable of continuously cleaning themselves while in operation and have an anti-siphon feature which prevents debris from entering outlet at system shutdown.. The dripline shall be available with 12", 18", and 24" spacing between emitters unless otherwise specified. For subsurface installation, Techline CV pipe depth shall be 4" to 6". Maximum system pressure shall be 58 psi for maximum fitting integrity. Filtration shall be 120 mesh or finer. Bending radius shall not be smaller than 7" or tubing kinking may result.

For on-surface or under mulch installations, 6" metal wire staples (TSL6) shall be installed 3' - 5' on center, (depending on soil type) and two staples shall be installed over every change-of-direction fitting.

Techline CV shall be Netafim Model Number TLCV \_\_\_\_-\_\_\_\_.

Techline CV Blank Tubing shall be Netafim Model Number TLCV0\_\_\_\_.

## **TECHLINE® DL**

### **Description**

Techline DL is a self-cleaning, pressure compensating dripline. This low volume dripline has integral and evenly spaced pressure compensating emitters welded to the inside of the tubing that contains recycled content. Techline DL is available with emitters in three discharge rates (0.4, 0.6, and 0.9 gallons per hour [GPH]) evenly spaced at 12", 18", or 24" centers. Techline DL is available in 100', 250', and 1,000' coils. Techline DL Blank Tubing is available in 100', 250', and 1,000' coils.

### **Construction**

Techline DL shall be nominally sized to 17mm (½") low-density linear polyethylene tubing with recycled content qualifying for maximum LEED credits. It shall be constructed with pressure compensation, and be continuously self-cleaning. It is manufactured at these spacings (12", 18", or 24" centers). Techline DL may also be manufactured without emitters installed. The exterior of the tubing shall be brown in color and conform to an outside diameter (O.D.) of 0.66 inches and an inside diameter (I.D.) of 0.56 inches. Individual pressure compensating emitters shall be welded to the inside wall of the tubing as an integral part of the manufacturing process. These emitters shall be constructed of a two (2) piece plastic emitter housing containing a continuously self-flushing molded silicone diaphragm. The emitter shall be installed into the tubing so that the inlet to the emitter is toward the center of the tubing cross section.

### **Operation**

Each emitter shall have the ability to independently regulate discharge rates, with an inlet pressure range of 6 - 58 pounds per square inch (psi), at a constant rate of flow and with a manufacturer's coefficient of variability (Cv) of 0.03 or less. Recommended operating pressure shall be between 6 - 58 psi. The emitter discharge rate shall be 0.4, 0.6, or 0.9 gallons per hour (GPH) utilizing a combination of turbulent flow and reduced pressure compensation by molded silicone diaphragm. The emitters shall be capable of

continuously cleaning themselves while in operation and have an anti-siphon feature which prevents debris from entering outlet at system shutdown.. The dripline shall be available with 12", 18", and 24" spacing between emitters unless otherwise specified. For subsurface installation, Techline DL pipe depth shall be 4" to 6". Maximum system pressure shall not exceed 58 psi for maximum fitting integrity. Filtration shall be 120 mesh or finer. Bending radius shall not be smaller than 7" or tubing kinking may result.

For on-surface or under mulch installations, 6" metal wire staples (TLS6) shall be installed 3'-5' on center, (depending on soil type) and two staples shall be installed over every change-of-direction fitting.

Techline DL shall be Netafim Model Number TLDL \_\_\_\_-\_\_\_\_.

Techline DL Blank Tubing shall be Netafim Model Number TLDL0\_\_\_\_.

## **TECHLINE® RW**

### **Description**

Techline for Reclaimed/Recycled Water Use (Referred to as "RW") is a continuous self-flushing, pressure compensating dripline. This low volume dripline has integral and evenly spaced pressure compensating emitters welded to the inside of the tubing. Techline RW is available with emitters in three discharge rates (0.26, 0.4, 0.6, and 0.9 gallons per hour [GPH]) evenly spaced at 12", 18", or 24" centers. Techline RW is available in 250' and 1,000' coils. Techline RW Blank Tubing is available in 1,000' coils.

### **Construction**

Techline RW shall be nominally sized to 17mm (½") low-density linear polyethylene tubing with recycled content qualifying for maximum LEED credits. It shall be constructed with pressure compensation, and be continuously self-cleaning. It is manufactured at these spacings (12", 18", or 24" centers). Techline RW may also be manufactured without emitters installed. The exterior of the tubing shall be brown in color and conform to an outside diameter (O.D.) of 0.66 inches and an inside diameter (I.D.) of 0.56 inches. For proper identification of Techline RW, a purple stripe is co-extruded onto the outside of the pipe. Individual pressure compensating emitters shall be welded to the inside wall of the tubing as an integral part of the manufacturing process. These emitters shall be constructed of a two (2) piece plastic emitter housing containing a continuously self-flushing molded silicone diaphragm. The emitter shall be installed into the tubing so that the inlet to the emitter is toward the center of the tubing cross section. The emitter shall also have a built-in physical root barrier whereby the water shall exit the emitter from one location and shall exit the tubing from a second location. This physical barrier shall create an air gap inside the exit bath of the emitter.

### **Operation**

Each emitter shall have the ability to independently regulate discharge rates, with an inlet pressure range of 7 - 58 pounds per square inch (psi), at a constant rate of flow and with a manufacturer's coefficient of variability (Cv) of 0.03 or less. Recommended operating pressure shall be between 7 - 58 psi. The emitter discharge rate shall be 0.26, 0.4, 0.6, or 0.9 gallons per hour (GPH) utilizing a combination of turbulent flow and reduced pressure compensation by silicone diaphragm. The emitters shall be capable of

continuously cleaning themselves while in operation and have an anti-siphon feature which prevents debris from entering outlet at system shutdown.. The dripline shall be available with 12", 18", and 24" spacing between emitters unless otherwise specified. For subsurface installation, Techline RW depth shall be 4" to 6". Maximum system pressure shall be 50 psi for maximum fitting integrity. Filtration shall be 120 mesh or finer. Bending radius shall not be smaller than 7" or tubing kinking may result.

For on-surface or under mulch installations, 6" metal wire staples (TLS6) shall be installed 3'-5' on center, (depending on soil type) and two staples shall be installed over every change-of-direction fitting.

Techline RW shall be Netafim Model Number TLRW \_\_\_\_-\_\_\_\_.

Techline RW Blank Tubing shall be Netafim Model Number TLRW010.

## **TECHLINE® EZ**

### **Description**

Techline EZ is a self-cleaning, pressure compensating dripline. This low volume dripline has integral and evenly spaced pressure compensating emitters welded to the inside of the tubing that contains recycled content. Techline EZ is available with emitters in four discharge rates (0.26, 0.4, 0.6, and 0.9 gallons per hour [GPH]) evenly spaced at 6", 12", or 18" centers. Techline EZ is available in 200', 250', 300', 500', and 1,000' coils. Techline EZ Blank Tubing is available in 250', and 500' coils.

### **Construction**

Techline EZ shall be nominally sized to 12mm ( $\frac{3}{8}$ " ) low-density linear polyethylene tubing with recycled content qualifying for maximum LEED credits. It shall be constructed with pressure compensation, and be continuously self-cleaning. It is manufactured at these spacings (6", 12", or 18" centers). Techline EZ may also be manufactured without emitters installed. The exterior of the tubing shall be brown in color and conform to an outside diameter (O.D.) of 0.510 inches and an inside diameter (I.D.) of 0.426 inches. Individual pressure compensating emitters shall be welded to the inside wall of the tubing as an integral part of the manufacturing process. These emitters shall be constructed of a two (2) piece plastic emitter housing containing a continuously self-flushing molded silicone diaphragm. The emitter shall be installed into the tubing so that the inlet to the emitter is toward the center of the tubing cross section.

### **Operation**

Each emitter shall have the ability to independently regulate discharge rates, with an inlet pressure range of 6 - 58 pounds per square inch (psi), at a constant rate of flow and with a manufacturer's coefficient of variability (Cv) of 0.03 or less. Recommended operating pressure shall be between 6 - 58 psi. The emitter discharge rate shall be 0.26, 0.4, 0.6, or 0.9 gallons per hour (GPH) utilizing a combination of turbulent flow and reduced pressure compensation by molded silicone diaphragm. The emitters shall be capable of continuously cleaning themselves while in operation. The dripline shall be available with 6", 12", and 18" spacing between emitters unless otherwise specified. For subsurface installation, Techline EZ pipe depth shall be 6" or less. Maximum system

pressure shall not exceed 50 psi for maximum fitting integrity. Filtration shall be 120 mesh or finer. Bending radius shall not be smaller than 6" or tubing kinking may result.

For on-surface or under mulch installations, 6" metal wire staples (TLS6) shall be installed 3'-5' on center, (depending on soil type) and two staples shall be installed over every change-of-direction fitting.

Techline EZ shall be Netafim Model Number TLEZ\_\_-\_\_\_\_.

Techline EZ Blank Tubing shall be Netafim Model Number TLEZ0025 or TLEZ005.

## 2.0 TECHFILTER®

### Description

Techfilter is the incorporation of a disc filter and a chemical root intrusion preventer (trifluralin) with a required amount of Techline® DL, Techline® CV, or Techline® RW dripline. Techfilter is available in 5 filter sizes, ( $\frac{3}{4}$ ", 1", 1" Long, 1½" Long, and 2") with emitter flow rates of 0.4, 0.6, and 0.9 GPH for Techline DL or Techline RW, and 0.26, 0.4, 0.6, and 0.9 GPH for Techline CV, spaced at 12" or 18" centers, and a specific amount of Techline DL, Techline CV or Techline RW with each Techfilter ordered. The mesh rating is 120, and maximum system pressure is 140 psi.

### Construction

**Filter:** The filter shall be a multiple disc filter with trifluralin incorporated into the replaceable disk ring assembly inside the filter housing. The disc filter body shall be molded of black plastic with male pipe threads for both inlet and outlet. The disc filter shall be capable of periodic servicing and replacement of the chemically treated disk ring set by unscrewing a threaded cap or unlatching the band.

**Dripline:**

**Techline CV:** The Techline CV emitters shall have the ability to independently regulate discharge rates, with an inlet pressure of fourteen point five to fifty-eight (14.5 - 58) pounds per square inch (psi), at a constant flow and with a manufacturer's coefficient of variability (Cv) of 0.03 or less. Recommended operating pressure shall be between 14.5 - 58 psi. The emitter discharge rate shall be 0.26, 0.4, 0.6, or 0.9 gallons per hour (GPH) utilizing a combination turbulent flow/reduced pressure compensation cell mechanism with a check valve and a diaphragm to maintain uniform discharge rates. The emitters shall continuously clean themselves while in operation and have an anti-siphon feature which prevents debris from entering outlet at system shutdown.. The dripline shall be available in 12", 18", and 24" spacing between emitters unless otherwise specified. For subsurface installation, Techline pipe depth shall be 4" to 6". Maximum system pressure shall not exceed 50 psi for maximum fitting integrity.

**Techline DL:** The Techline DL emitters shall have the ability to independently regulate discharge rates, with an inlet pressure of six to fifty-eight (6 - 58) pounds per square inch (psi), at a constant flow and with a manufacturer's coefficient of variability (Cv) of 0.03 or less. Recommended operating pressure shall be between 6 - 58 psi. The emitter discharge rate shall be 0.4, 0.6, or 0.9 gallons per hour (GPH) utilizing a combination turbulent flow/reduced pressure compensation cell mechanism and a diaphragm to maintain uniform discharge rates. The emitters shall continuously clean themselves

while in operation and have an anti-siphon feature which prevents debris from entering outlet at system shutdown.. The dripline shall be available in 12", 18", and 24" spacing between emitters unless otherwise specified. For subsurface installation, Techline pipe depth shall be 4" to 6". Maximum system pressure shall not exceed 50 psi for maximum fitting integrity.

Techline RW: The Techline RW emitters shall have the ability to independently regulate discharge rates, with an inlet pressure of seven to fifty-eight (7 - 58) pounds per square inch (psi), at a constant flow and with a manufacturer's coefficient of variability (Cv) of 0.03 or less. Recommended operating pressure shall be between 7 - 58 psi. The emitter discharge rate shall be 0.26, 0.4, 0.6, or 0.9 gallons per hour (GPH) utilizing a combination turbulent flow/reduced pressure compensation cell mechanism with a check valve and a diaphragm to maintain uniform discharge rates. The emitters shall continuously clean themselves while in operation and have an anti-siphon feature which prevents debris from entering outlet at system shutdown.. The dripline shall be available in 12", 18", and 24" spacing between emitters unless otherwise specified. For subsurface installation, Techline pipe depth shall be 4" to 6". Maximum system pressure shall not exceed 50 psi for maximum fitting integrity.

### **Operation**

When water passes through the filter, a very low concentration of trifluralin (parts per billion) is transmitted throughout the Techline®, Techline® CV or Techline® RW piping network. This provides for precise and even distribution of trifluralin throughout the piping network and effectively inhibits root growth into the emitter outlets.

The trifluralin-treated filter ring set shall be replaced every two (2) years, or two hundred (200) hours of operation, whichever occurs first.

The Techfilter system shall be Netafim Model Number TF \_\_\_\_\_ - \_\_\_\_ for Techline®, TF \_\_\_\_\_ - \_\_\_\_ CV for Techline® CV and TF \_\_\_\_\_ - \_\_\_\_ RW for Techline® RW.

## **3.0 17MM FITTINGS**

### **17MM STANDARD FITTINGS**

#### **Description**

17 MM Fittings shall be constructed in one of the following end configurations:

Barbed insert fittings only,

Male pipe threads (MPT) with barbed insert fittings, or

Female pipe threads (FPT) with barbed insert fittings.

#### **Construction**

All fittings shall be constructed of injection molded, brown plastic having a nominal outside dimension of 17mm (0.56"). Female and male threaded ends shall be capable of mating to standard PVC pipe with tapered threads.

#### **Operation**

Techline fittings shall be mated with Netafim Techline® HCVXR, Techline® CV, Techline® DL, Techline® RW dripline by pushing the fitting into the tubing while twisting side to side until the tubing abuts to either adjoining tubing or a fitting stop.

Maximum system pressure without clamps shall be 58 psi.

17MM fittings shall be Netafim Model Numbers TLTEE, TLCOUP, TL2W075MA, TLELL, TLCROS, TL050MA, TL075MA, and TL075FTEE.

## **17MM SPECIALTY FITTINGS**

### **TECHLINE® INSERT ADAPTER FOR POLYETHYLENE**

#### **Description**

The Techline Insert Adapter for Polyethylene is a 2-piece threaded-connection fitting designed to transition from 1" or larger polyethylene pipe to Techline HCVXR, CV, DL, or RW.

#### **Construction**

The Techline Insert Adapter for Polyethylene shall be a 2-piece threaded-connection fitting constructed of an injection-molded plastic.

#### **Operation**

The fitting shall unthread to allow the inlet end to be pressed into a pre-drilled 11mm, 7/16" or 1/2" hole created using a forstner drill bit in 1" or larger medium or high density PE pipe. Tightening the fitting by threading the 2 pieces together shall create a waterproof connection. Maximum system pressure without clamps shall be 50 psi.

The Techline Insert Adapter for Polyethylene shall be Netafim Model Number TLIAPE-B.

### **TECHLINE® INSERT ADAPTER FOR PVC**

#### **Description**

The Techline Insert Adapter for PVC is a two-piece fitting designed to transition from rigid 1½" or larger CL160, CL200 or Sch. 40 PVC pipe to Techline HCVXR, CV, DL or RW.

#### **Construction**

The Techline Insert Adapter for PVC shall consist of a rubber grommet and an injection molded plastic insert adapter.

#### **Operation**

The rubber grommet shall fit into a hole drilled with a Netafim TDBIT16.5 drill bit or other pre-drilled 16.5mm (21/32") hole in rigid 1½" or larger CL160 or Sch. 40 PVC pipe. The flared top of the grommet shall seat against the outside of the PVC pipe. The short end of the insert adapter is then press-fit into the seated rubber grommet. Maximum system pressure without clamps shall be 50 psi.

The Techline Insert Adapter for PVC shall be Netafim Model Number TLIAPVC-B.

## EMITTER PLUG RING

### **Description**

The Netafim Emitter Plug Ring is a pre-formed plastic ring with a rounded inside plug that can be used to plug a Techline HCVXR, CV, DL, or RW emitter outlet.

### **Construction**

The Emitter Plug Ring shall be constructed of an injection-molded plastic of a diameter slightly larger than the outside diameter of the Techline HCVXR, CV, DL, or RW tubing. The circular design shall be open on one end to enable it to be slipped over the tubing. Within the interior of this ring (opposite the open end) is a rounded plug made to press-fit into the water outlet of the emitter to prevent water emission.

### **Operation**

Slip the Emitter Plug Ring over the Techline tubing and push the plug into the tubing outlet hole until it seats securely in the hole.

The Emitter Plug Ring shall be Netafim Model Number TLDPLUG.

## EMITTER MICRO-TUBING ADAPTER

### **Description**

The Netafim Emitter Micro-Tubing Adapter is a pre-formed plastic saddle with a micro-tubing adapter outlet that can be attached over a Techline HCVXR, CV, DL or RW emitter outlet. This allows water to be moved via micro-tubing to a specific area away from the dripline location.

### **Construction**

The Emitter Micro-Tubing Adapter shall be constructed of molded plastic and shall have the ability to be tightened over the Techline emitter outlet hole. It shall have an outlet fitting capable of accepting 0.160" x 0.220" micro-tubing.

### **Operation**

The Emitter Micro-Tubing Adapter shall fit over the Techline HCVXR, CV, DL or RW emitter outlet hole and be squeezed until the fitting is securely attached to the tubing. Insert 0.160" x 0.220" micro-tubing onto the outlet end of the fitting and place the micro-tubing adjacent to the area to be irrigated.

The Emitter Micro-Tubing Adapter shall be Netafim Model Number TLMTUBEADP.

## STAINLESS STEEL CLAMPS (for operating pressures in excess of 58 psi)

### **Description**

Stainless steel clamps are used to secure Techline HCVXR, CV, DL or RW to barbed insert fittings. Clamps shall be manufactured by "Oetiker" and shall be one "ear" type.

Nominal size that is recommended for use with Techline driplines is 13/16", Part No. 210SS.

### **Construction**

Oetiker clamps shall be constructed of 304 AISI stainless steel. Clamps shall be one "ear" type and formed with a "dimple", allowing for thermal expansion and contraction properties without loosening the clamp.

Interior clamp wall shall be smooth to prevent crimping or pinching of tubing. Wall thickness of clamps shall be 0.0236" (0.6 mm) with an overall band width of 1/4" (7 mm).

### **Operation**

Stainless steel clamps are used to secure Techline HCVXR, CV, DL or RW over barbed insert fittings when design-operating pressures exceed 50 psi. Clamps are to be slipped over the tubing before being fitted to barbed insert fittings. Place the clamp between the first and second ridge of the barbed insert fittings. Crimp the "ear" of the clamp tightly with an Oetiker pincer tool. Crimp twice to ensure proper seating.

## **4.0 12MM FITTINGS**

### **12MM STANDARD FITTINGS**

#### **Description**

12 MM Fittings shall be constructed in one of the following end configurations:

Barbed insert fittings only,  
Male pipe threads (MPT) with barbed insert fittings, or  
Female pipe threads (FPT) with barbed insert fittings.

#### **Construction**

All fittings shall be constructed of injection molded, brown plastic having a nominal outside dimension of 12mm (0.426"). Female and male threaded ends shall be capable of mating to standard PVC pipe with tapered threads.

#### **Operation**

Techline® EZ fittings shall be mated with Netafim Techline EZ dripline by pushing the fitting into the tubing while twisting side to side until the tubing abuts to either adjoining tubing or a fitting stop.

Maximum system pressure without clamps shall be 58 psi.

12MM fittings shall be Netafim Model Numbers T12COUP, T12RCOUP, T12TEE, T12ELL, T12050MA, T12075MA, T12075FTEE and T122W075MA.

### **12MM SPECIALTY FITTINGS**

TECHLINE® INSERT ADAPTER FOR POLYETHYLENE

**Description**

The Techline EZ Insert Adapter for Polyethylene is a 2-piece threaded-connection fitting designed to transition from 1" or larger polyethylene pipe to Techline EZ.

**Construction**

The Techline EZ Insert Adapter for Polyethylene shall be a 2-piece threaded-connection fitting constructed of an injection-molded plastic.

**Operation**

The fitting shall unthread to allow the inlet end to be pressed into a pre-drilled 11mm, 7/16" or 1/2" hole created using a forstner drill bit in 1" or larger medium or high density PE pipe. Tightening the fitting by threading the 2 pieces together shall create a waterproof connection. Maximum system pressure without clamps shall be 50 psi.

The Techline Insert Adapter for Polyethylene shall be Netafim Model Number TL12IAPE-B.

**TECHLINE® INSERT ADAPTER FOR PVC****Description**

The Techline EZ Insert Adapter for PVC is a two-piece fitting designed to transition from rigid 1 1/2" or larger CL160, CL200 or Sch. 40 PVC pipe to Techline® EZ.

**Construction**

The Techline EZ Insert Adapter for PVC shall consist of a rubber grommet and an injection molded plastic insert adapter.

**Operation**

The rubber grommet shall fit into a hole drilled with a Netafim TDBIT16.0 drill bit or other pre-drilled 16.0mm hole in rigid 1 1/2" or larger CL160 or Sch. 40 PVC pipe. The flared top of the grommet shall seat against the outside of the PVC pipe. The short end of the insert adapter is then press-fit into the seated rubber grommet. Maximum system pressure without clamps shall be 50 psi.

The Techline EZ Insert Adapter for PVC shall be Netafim Model Number TL12IAPVC-B.

## 5.0 LOW VOLUME CONTROL ZONE KITS

### ***LVCZ KIT - Low Flow 0.25 - 4.4 GPM:***

#### **Description**

The Low-Volume Control Zone Kit is a completely assembled assembly comprised of a 1" 24VAC valve, 3/4" filter and low-flow pressure regulator. It is designed to operate zones ranging from 0.25 - 4.4 GPM, provide filtration of 140 mesh (115 microns), and downstream outlet pressure of 42 psi.

#### **Construction**

**Valve:** The valve shall be a 1" S-80 Electric Control Valve shall have 1" threaded inlet and outlet connections. The valve body shall be made of Glass Reinforced Polyamide. The diaphragm shall be made of Natural Rubber and the diaphragm seat made of Glass Reinforced Polyamide. Spring shall be made of SST302. Nuts, bolts and washers should be made of SST 304.

**Filter:** The filter shall be a multiple disc filter with color-coded filter elements indicating the mesh size of the element being used. The discs shall be constructed of chemical-resistant thermoplastic for corrosion resistance. The disc filter body shall be molded of black plastic with male pipe threads for both inlet and outlet. The disc filter shall be capable of periodic servicing by unscrewing a threaded cap or unlatching the band. The disc filter ring color-coding shall be Black (140 Mesh /115 Micron).

**Pressure Regulator:**

The Pressure Regulator shall be a Netafim spring-operated, in-line piston-type regulator. The body shall be molded of black plastic with 3/4" female/female pipe threaded inlet and outlet. Directional arrows shall show flow direction of water.

#### **Operation**

**Valve:** The valve is an electric on/off valve and shall be capable of opening when an electric signal is sent by a controller. The minimum operating pressure is 7 psi. The maximum operating pressure is 145 psi. The minimum operating flow is 0.01 GPM and the maximum operating flow is 44 GPM.

The solenoid operates within a plus minus 10% of the nominal voltage. For example, a 24VAC will be able to actuate between 22 and 26 volts. In addition, an inrush and holding currents are necessary to maintain the valve in open position, of 220 and 95 mA, respectively. The solenoid includes a manual override that simulates activation of the controller, when the controller is not engaging the solenoid. If the controller is engaging the solenoid, the manual override is not functional.

For latching solenoid operation, in addition to a 9V battery operation, a minimum pulse length is required of 25 milliseconds.

The manual flow control stem is used to limit the maximum flow across the valve, and can be used as a manual shutoff of the valve.

Valves are equipped with internal filters and clog free labyrinth mechanism to assure that the top cap of the valve is receiving clean water at all times. Based on water quality, it is recommended to periodically maintain the valves by visually inspecting the internal parts (after one year, then after two years).

Water temperature shall not exceed 140 F.

The valve shall be a Netafim Model Number LVET1GH2.

**Filter:** The filter shall be capable of filtering suspended particles from water. The filter shall be capable of operating in a range of flows up to 17 GPM. Disc filters can be installed downstream of the remote control valve to allow for periodic servicing when the remote control valve is not operating. It can be installed upstream of the remote control valve if the disc filter is specified with manual shut-off valve or when a line-sized shut-off valve is also specified to allow for periodic servicing with a pressurized main line. Recommended installation of disc filters shall be as specified. It may be installed below grade positioned in a valve box large enough to remove the disk filter cap and internal disc element, or above grade. A gravel sump in the bottom of the valve box is recommended.

The Disc Filter shall be a Netafim Model Number DF075-140.

**Pressure Regulator:** The Pressure Regulator shall be able to respond immediately to any inlet pressure variation. The regulator shall be capable of regulating downstream pressure to 42 psi. The Pressure Regulator shall operate in a flow range of 0.25 - 4.4 GPM. Maximum pressure at inlet shall not exceed 145 psi.

The Pressure Regulator shall be a Netafim Model Number PRV075LF42V2.

The complete assembly shall be a Netafim Model Number LVCZ10075-LF.

### ***LVCZ KIT - High Flow 4.5 – 17.6 GPM:***

#### **Description**

The Low-Volume Control Zone Kit is a completely assembled assembly comprised of a 1" 24VAC valve, 3/4" filter and low-flow pressure regulator. It is designed to operate zones ranging from 4.5 - 17.6 GPM, provide filtration of 140 mesh (115 microns), and downstream outlet pressure of 57 psi.

#### **Construction**

**Valve:** The valve shall be a 1" S-80 Electric Control Valve shall have 1" threaded inlet and outlet connections. The valve body shall be made of Glass Reinforced Polyamide. The diaphragm shall be made of Natural Rubber and the diaphragm seat made of Glass Reinforced Polyamide. Spring shall be made of SST302. Nuts, bolts and washers should be made of SST 304.

**Filter:** The filter shall be a multiple disc filter with color-coded filter elements indicating the mesh size of the element being used. The discs shall be constructed of chemical-resistant thermoplastic for corrosion resistance. The disc filter body shall be molded of black plastic with male pipe threads for both inlet and outlet. The disc filter shall be capable of periodic servicing by unscrewing a threaded cap or unlatching the band. The disc filter ring color-coding shall be Black (140 Mesh /115 Micron).

**Pressure Regulator:** The Pressure Regulator shall be a Netafim spring-operated piston-type regulator with an externally accessible regulation unit that can be serviced without removing the valve body from the piping. The body shall be molded of black plastic with 3/4" FPT x FPT threaded inlet and outlet.

## **Operation**

**Valve:** The valve is an electric on/off valve and shall be capable of opening when an electric signal is sent by a controller. The minimum operating pressure is 7 psi. The maximum operating pressure is 145 psi. The minimum operating flow is 0.01 GPM and the maximum operating flow is 44 GPM.

The solenoid operates within a plus minus 10% of the nominal voltage. For example, a 24VAC will be able to actuate between 22 and 26 volts. In addition, an inrush and holding currents are necessary to maintain the valve in open position, of 220 and 95 mA, respectively. The solenoid includes a manual override that simulates activation of the controller, when the controller is not engaging the solenoid. If the controller is engaging the solenoid, the manual override is not functional.

For latching solenoid operation, in addition to a 9V battery operation, a minimum pulse length is required of 25 milliseconds.

The manual flow control stem is used to limit the maximum flow across the valve, and can be used as a manual shutoff of the valve.

Valves are equipped with internal filters and clog free labyrinth mechanism to assure that the top cap of the valve is receiving clean water at all times. Based on water quality, it is recommended to periodically maintain the valves by visually inspecting the internal parts (after one year, then after two years).

Water temperature shall not exceed 140 F.

The valve shall be a Netafim Model Number LVET1GH2.

**Filter:** The filter shall be capable of filtering suspended particles from water. The filter shall be capable of operating in a range of flows up to 17 GPM. Disc filters can be installed downstream of the remote control valve to allow for periodic servicing when the remote control valve is not operating. It can be installed upstream of the remote control valve if the disc filter is specified with manual shut-off valve or when a line-sized shut-off valve is also specified to allow for periodic servicing with a pressurized main line. Recommended installation of disc filters shall be as specified. It may be installed below grade positioned in a valve box large enough to remove the disc filter

cap and internal disc element, or above grade. A gravel sump in the bottom of the valve box is recommended.

The Disc Filter shall be a Netafim Model Number DF075-140.

**Pressure Regulator:** The Pressure Regulator shall have a built-in indicator that indicates when it is operating. It shall be able to respond immediately to any inlet pressure variation. The regulator shall be capable of regulating downstream pressure to 57 psi. The Pressure Regulator shall operate in a flow range of 4.5 - 17.5 GPM. Maximum pressure at inlet shall be 145 psi.

The Pressure Regulator shall be a Netafim Model Number PRV075HF57V2.

The complete assembly shall be a Netafim Model Number LVCZ10075-HFHP.

### ***LVCZ KIT – 1.5” High Flow 11 - 35 GPM:***

#### **Description**

The Low-Volume Control Zone Kit is a completely assembled assembly comprised of a 1.5” 24VAC valve, 1.5” filter and 1.5” high-flow pressure regulator. It is designed to operate zones ranging from 11 - 35 GPM, provide filtration of 140 mesh (115 microns), and downstream outlet pressure of 57 psi.

#### **Construction**

**Valve:** The 1.5” S-80 Electric Control Valve shall have 1.5” threaded inlet and outlet connections. The valve body shall be made of Glass Reinforced Polyamide. The diaphragm shall be made of Natural Rubber and the diaphragm seat made of Glass Reinforced Polyamide. Spring shall be made of SST302. Nuts, bolts and washers should be made of SST 304.

**Filter:** The filter shall be a multiple disc filter with color-coded filter elements indicating the mesh size of the element being used. The discs shall be constructed of chemical-resistant thermoplastics for corrosion resistance.

The disc filter body shall be molded of black plastic with male pipe threads for both inlet and outlet. The disc filter shall be capable of periodic servicing by unscrewing a threaded cap. Disc filter ring set shall be black (140-Mesh).

**Pressure Regulator:** The Pressure Regulator shall be a Netafim spring-operated piston-type regulator with an externally accessible regulation unit that can be serviced without removing the valve body from the piping. The body shall be molded of black plastic with 1.5” MPT x MPT threaded inlet and outlet

#### **Operation**

**Valve:** The valve is an electric on/off valve and shall be capable of opening when an electric signal is sent by a controller. The minimum operating pressure is 7 psi. The maximum operating pressure is 145 psi. The minimum operating flow is 0.25 GPM and the maximum operating flow is 110 GPM.

The solenoid operates within a plus minus 10% of the nominal voltage. For example, a 24VAC will be able to actuate between 22 and 26 volts. In addition, an inrush and holding currents are necessary to maintain the valve in open position, of 220 and 95 mA, respectively. The solenoid includes a manual override that simulates activation of the controller, when the controller is not engaging the solenoid. If the controller is engaging the solenoid, the manual override is not functional.

For latching solenoid operation, in addition to a 9V battery operation, a minimum pulse length is required of 25 milliseconds.

The manual flow control stem is used to limit the maximum flow across the valve, and can be used as a manual shutoff of the valve.

Valves are equipped with internal filters and clog free labyrinth mechanism to assure that the top cap of the valve is receiving clean water at all times. Based on water quality, it is recommended to periodically maintain the valves by visually inspecting the internal parts (after one year, then after two years).

Water temperature shall not exceed 140 F.

The valve shall be a Netafim Model Number LVET1GH2.

**Filter:** The filter shall be capable of filtering suspended particles from water. The filter shall be capable of operating in a range of flows of 10 to 35 GPM. Disc filters can be installed downstream of the remote control valve to allow for periodic servicing when the remote control valve is not operating. It can be installed upstream of the remote control valve if the disc filter is specified with manual shut-off valve or when a line-sized shut-off valve is also specified to allow for periodic servicing with a pressurized main line. Recommended installation of disc filters shall be as specified. It may be installed below grade positioned in a valve box large enough to remove the disk filter cap and internal disc element, or above grade. A gravel sump in the bottom of the valve box is recommended.

The Disc Filter shall be a Netafim Model Number DF150-140.

**Pressure Regulator:** The Pressure Regulator shall have a built-in indicator that indicates when it is operating. It shall be able to respond immediately to any inlet pressure variation. The regulator shall be capable of regulating downstream pressure to 45 psi. The Pressure Regulator shall operate in a flow range of 11 - 35 GPM. Maximum pressure at inlet shall be 145 psi.

The Pressure Regulator shall be a Netafim Model Number PRV15057V2K.

The complete assembly shall be a Netafim Model Number LVCZ-150HP.

## 6.0 REGULATING

### ***PRESSURE REGULATOR: HIGH FLOW***

#### **Description**

The purpose of the Pressure Regulator is to control downstream pressure at or below the specified system operating pressure. Unregulated pressures in excess of the recommended operating ranges can diminish and disable line flushing valves or cause the integrity of the Techline®/Techlite fittings connection to weaken and/or fail.

#### **Construction**

The Pressure Regulator shall be a Netafim spring-operated piston-type regulator with an externally accessible regulation unit that can be serviced without removing the valve body from the piping. The body shall be molded of black plastic with a combination of male/female pipe threaded inlet and outlet.

#### **Operation**

The Pressure Regulator shall have a built-in indicator that indicates when it is operating. It shall be able to respond immediately to any inlet pressure variation. The regulator shall be capable of regulating downstream pressure to 15 psi, 20 psi, 25 psi, 35 psi, 45 psi, 50 psi or 57n psi in ¾" or 1½" configurations. The Pressure Regulator shall operate in a flow range of 4.5 - 17.6 GPM in the ¾" configuration and 11 - 35 GPM in the 1½" configuration. Maximum pressure at inlet shall be 145 psi.

The Pressure Regulator shall be Netafim Model Number PRV \_\_\_\_\_.

### ***PRESSURE REGULATOR: IN-LINE LOW FLOW***

#### **Description**

The purpose of the Pressure Regulator is to control downstream pressure at or below the specified system operating pressure. Unregulated pressures in excess of the recommended operating ranges can diminish and disable line flushing valves or cause the integrity of the Techline®/Techlite fittings connection to weaken and/or fail.

#### **Construction**

The Pressure Regulator shall be a Netafim spring-operated, in-line piston-type regulator. The body shall be molded of black plastic with ¾" female/female pipe threaded inlet and outlet. Directional arrows shall show flow direction of water.

#### **Operation**

The Pressure Regulator shall be able to respond immediately to any inlet pressure variation. The regulator shall be capable of regulating downstream pressure to 15 psi, 20 psi, 25 psi, 35 psi, or 42 psi. The Pressure Regulator shall operate in a flow range of 0.25 - 4.4 GPM. Maximum pressure at inlet shall not exceed 145 psi.

The Pressure Regulator shall be Netafim Model Number PRV075LF\_\_V2K.

## 7.0 POINT SOURCE COMPONENTS

### ***SELF-PIERCING EMITTERS***

#### **Description**

Self-Piercing Emitters are pressure compensating, continuous self-cleaning emitters with check valves. These point source emitters are used in areas where very precise watering is required. They may be used alone or in combination to irrigate specific plants, trees, or areas.

#### **Construction**

Emitters shall be pressure compensating, continuous self-flushing with a built-in 1.74 psi check valve to prevent low-pressure drainage. They shall be constructed of molded plastic and have colored bodies to denote flow-rate. A blue body shall denote 0.5 GPH, black shall denote 1.0 GPH and red shall denote 2.0 GPH. The emitter shall utilize a pressure differential mechanism with molded silicone diaphragm to continually regulate each emitter's flow rate. An anti-siphon feature shall prevent contaminants from being drawn into the emitter.

The self-piercing inlet hole of the emitter shall be shaped like a cone to identify it as the inlet. The inlet shall be installed directly into poly tubing. An individual punched hole is not required. The outlet end of the emitter shall be barbed to accept 0.160" I.D. micro-tubing.

Individual emitters shall have color-coded bodies.

#### **Operation**

The emitter shall have a pressure-compensating operating range of 10.15 - 58 psi. The emitter shall be able to flush debris that could cause plugging at any time during the irrigation cycle. The emitter shall have a built-in check valve that will hold back a 3.9' column of water. The emitter shall be installed at-grade, above grade, or below grade. Filtration shall be 120 mesh or finer.

Self-Piercing Emitters shall be Netafim Model Number SPCV()- \_\_\_\_\_.

### ***TECHFLOW EMITTERS***

#### **Description**

Techflow Emitters are pressure compensating, continuous self-cleaning emitters with check valves. These point source emitters are used in areas where very precise watering is required. Techflow emitters are used alone or in combination to irrigate specific plants, trees, or areas.

#### **Construction**

Techflow emitters shall be pressure compensating, continuous self-flushing with a built-in 2.2 psi check valve to prevent low pressure drainage. They shall be constructed of thermoplastics, be brown in color with color-coding for flow rate and shall utilize a

pressure differential mechanism with molded silicone diaphragm to continually regulate each emitter's flow rate. An anti-siphon feature shall prevent contaminants from being drawn into the emitter.

The inlet of the emitter shall be barbed, and be installed directly into poly tubing after a hole has been created using a 5mm punch tool, or be inserted into 0.160" x 0.220" micro-tubing. The outlet end of the Techflow WPC emitter shall have a raised smooth nipple to accept 0.160" x 0.220" micro-tubing. The Techflow PC emitter shall have an outlet end that does not accept micro tubing. The Techflow WPCT shall have a 1/2" FPT inlet end and nipple outlet.

Individual emitters shall be color-coded. Red shall denote 0.5 GPH, Black shall denote 1.0 GPH, and Green shall denote 2.0 GPH. The hole in the inlet end of the emitter shall be shaped like a cross to denote it is the inlet of the emitter.

The Techflow WPC emitter shall be able to accept either a WPBC Bug Cap or WPBA Barbed Adapter for Nipple on the outlet end.

### **Operation**

The Techflow WPC and PC emitter shall have a pressure-compensating operating range of 14.5 - 58 psi. The Techflow Emitter shall be installed at-grade, above grade, or below grade. Filtration shall be 120-mesh or finer. The emitter shall have a built-in check valve that will hold back a 5.0' column of water.

Techflow Emitters with barbed outlet shall be Netafim Model Number WPC()-\_\_.

Techflow Emitters without barbed outlet shall be Netafim Model Number PC()-\_\_.

## ***BD AND WP EMITTERS***

### **Description**

BD and WP point source emitters are non-pressure compensating emitters designed to be used in piping networks with limited pressure variation. BD and WP emitters are used alone or in combination to irrigate specific plants, trees or areas.

### **Construction**

BD and WP emitters shall be non-pressure compensating emitters. They shall be constructed of thermoplastics, be black in color with color-coding for flow rate and shall utilize a wide turbulent flow passage to resist clogging.

The inlet of the emitter shall be barbed, and be installed directly into poly tubing after a hole has been created using a 5mm punch tool, or be inserted into 0.160" x 0.220" micro-tubing. The outlet end of the WP emitter shall be barbed to accept 0.160" x 0.220" micro-tubing. The BD emitter shall have an outlet end that does not accept micro tubing.

Individual emitters shall be color-coded to denote nominal flow rates. Red shall denote 0.5 GPH, black shall denote 1.0 GPH, and green shall denote 2.0 GPH. The hole in the inlet end of the emitter shall be shaped like a cross to denote it is the inlet of the emitter.

### **Operation**

The BD and WP emitter shall operate to a maximum pressure of 29 psi. Recommended operating pressure shall be 7 - 29 psi. The BD and WP Emitter shall be installed above grade, or at-grade. Filtration shall be 120 mesh or finer.

BD Emitters shall be Netafim Model Number BD()-\_\_\_\_\_.

WP Emitters shall be Netafim Model Number WP()-\_\_\_\_\_.

## **POLYETHYLENE TUBING**

### **Description**

Polyethylene Tubing is for use with point source drip emitters, micro-spray or micro-sprinklers. Also provides flexible and durable headers or transition to dripline.

### **Construction**

The black polyethylene tubing shall have the following I.D., O.D. and pressure ratings.:

16mm:	0.520" ID x 0.620" OD. Pressure Rating: 70 psi
1/2":	0.620" ID x 0.710" OD. Pressure Rating: 52 psi
1/2"	0.600"ID x 0.700" OD (0.050" wall). Pressure Rating: 61 psi
3/4":	0.820" x 0.940" OD. Pressure Rating: 54 psi.
1"	1.060" x 1.200" OD. Pressure Rating: 49 psi.

### **Operation**

The tubing shall be for on-surface or subsurface installations. The tubing positions on-line emission devices in hard to reach places.

Distribution tubing shall be Netafim Part Number PE\_\_\_\_\_ -\_\_.

## **MICRO TUBING**

### **Description**

Micro Tubing delivers water to a location away from a piping network. Point source emitters may be attached upstream of the emitter, downstream of the emitter, (if available with a downstream connection) or both.

### **Construction**

The black distribution tubing shall consist of low-density linear polyethylene tubing with an I.D. of 0.160" (4 mm) and an O.D. of 0.220" (6 mm).

### **Operation**

The tubing shall work with all 4 mm insert fittings. The tubing shall either connect to a larger piping network and move water to a remote location, connect to a larger piping network and move water to emitters in a remote location, or move water from the outlet of an emitter to a remote location.

Distribution tubing shall be Netafim Part Number EDTUBE-01 (100' coil) or EDTUBE-10 (1,000').

## 8.0 FILTERS

### **MANUAL DISC FILTERS**

#### **Description**

The purpose of the Disc Filter is to capture and retain water-transported debris or sediment.

#### **Construction**

The filter shall be a multiple disc filter with color-coded filter elements indicating the mesh size of the element being used. The discs shall be constructed of chemical-resistant thermoplastic for corrosion resistance. The disc filter body shall be molded of black plastic with male pipe threads for both inlet and outlet. The disc filter shall be capable of periodic servicing by unscrewing a threaded cap or unlatching the band. The 3/4" DFV model shall have an integral manual shut-off valve. Disc filter ring color-coding shall be: Yellow (80 Mesh / 200 Micron), Red (120 Mesh / 130 Micron), Black (140 Mesh / 115 Micron), or Green (200 Mesh / 55 Micron).

#### **Operation**

Installation of the Disc Filter shall be as detailed. Disc filters can be installed downstream of the remote control valve to allow for periodic servicing when the remote control valve is not operating. It can be installed upstream of the remote control valve if the disc filter is specified with manual shut-off valve or when a line-sized shut-off valve is also specified to allow for periodic servicing with a pressurized main line. Recommended installation of disc filters shall be as specified. It may be installed below grade positioned in a valve box large enough to remove the disk filter cap and internal disc element, or above grade. A gravel sump in the bottom of the valve box is recommended.

The Manual Disc Filter shall be Netafim Model Number DF\_\_\_-\_\_\_.

### **2" COMPACT LP DISC-KLEEN FILTER**

#### **Description**

The 2" Compact LP Disc-Kleen Filter is an automatic self-cleaning filter using disc technology to achieve high filtration efficiency. Two models are available. The AC model requires 110 volt AC power source. The DC Model uses batteries to power the backflushing controller. The Filter arrives completely assembled for easy installation. The filter is available with filtration grades (mesh or micron rating) of 40, 80, 120, 140, or 200 mesh.

#### **Construction**

The 2" Compact Disc-Kleen Filter shall have 2" threaded inlet and outlet connections. The filter body shall be made of high density polypropylene. The filter element shall be made of polypropylene discs stacked to a height of 10 1/4 inches. The discs will have grooves on both sides so that the grooves of one disc and the grooves of the disc

immediately below it will cross at an angle of about 45 degrees. The 2" Backflush Valves are made of plastic.

### **Operation**

The filter shall be capable of filtering suspended particles from water. The maximum operating pressure of the filter is 140 psi. The minimum pressure required for backflush will be 30 psi during backflush. The maximum flow for this filter is 80 gpm. The minimum flow required for flushing is 35 gpm. A low flow model is available that only requires 20 gpm for flushing.

The filter shall clean itself automatically when a pressure differential (PD) gauge triggers a built in backflush controller to initiate a backflush. The optimum setting for the PD gauge is 7 psi. The backflush controller will transmit an electric pulse to the solenoid that will command the backflush valves to change from filtration mode to backflush mode. During backflush, the disks shall separate and clean filtered water will spray towards the disks from 3 banks of nozzles that are located on a spine component inside of the disks. The flushing time shall be 20 seconds. During flush, there will be no water supplied downstream of the filter.

The end user will need to install a drain manifold that directs the dirty flush water to an area chosen by the end user (Drain, sewer, back to the pond, river, canal, etc.).

The 2" Compact Filter shall be Netafim Model Number DFALP\_\_\_\_-\_\_\_\_\_.

## ***2" LP DISC-KLEEN FILTER (2, 3, OR 4-unit)***

### **Description**

The 2" LP Disc-Kleen Filter is an automatic self-cleaning filter using disc technology to achieve high filtration efficiency. The Filter arrives completely assembled for easy installation. The filter is available with filtration grades (mesh or micron rating) of 40, 80, 120, 140, or 200 mesh. The Filter shall have \_\_\_\_\_ (2, 3, or 4) filter bodies, each with one (1) filter element.

### **Construction**

The 2" LP Disc-Kleen Filter shall have 4" inlet and outlet manifolds with grooved connection ends. The manifolds and filter body shall be made from high density polypropylene. The filter element shall be made of polypropylene discs stacked to a height of 10 ¼ inches. The discs will have grooves on both sides so that the grooves of one disc and the grooves of the disc immediately below it will cross at an angle of about 45 degrees. The 2" Backflush Valves are made of plastic. Each backflush valve shall have a normally closed solenoid installed to its bonnet.

### **Operation**

The filter shall be capable of filtering suspended particles from water. The maximum operating pressure of the filter is 140 psi. The minimum pressure required for backflush will be 30 psi during backflush. The minimum flow required for flushing is 35 gpm.

The filter shall clean itself automatically when a pressure differential (PD) gauge triggers a backflush controller to initiate a backflush. The optimum setting for the PD gauge is 7 psi. The backflush controller will transmit an electric pulse to the 24-volt solenoid that will command the backflush valves to change from filtration mode to backflush mode. During backflush, the disks shall separate and clean filtered water will spray towards the disks from 3 banks of nozzles that are located on a spine component inside of the disks. The flushing time shall be 20 seconds. During flush, filtered water will continue to be supplied downstream of the filter. The filters will flush one at a time sequentially.

The end user will need to install a drain manifold to the Disc Kleen drain manifold that directs the dirty flush water to an area chosen by the end user (Drain, sewer, back to the pond, river, canal, etc.).

The 2" LP Disk-Kleen Filter shall be Netafim Model Number DFALP\_\_\_\_-\_\_\_\_.

### **3" LP DISC-KLEEN FILTER (3, 4, or 5-unit)**

#### **Description**

The 3" LP Disc-Kleen Filter is an automatic self-cleaning filter using disc technology to achieve high filtration efficiency. The Filter arrives completely assembled for easy installation. The filter is available with filtration grades (mesh or micron rating) of 40, 80, 120, 140, or 200 mesh. The Filter shall have \_\_\_\_\_ (3, 4, or 5) filter bodies, each with two (2) filter elements.

#### **Construction**

The 3" LP Disc-Kleen Filter shall have 6" inlet and outlet manifolds with grooved connection ends. The manifolds and filter bodies shall be made from high density polypropylene. The filter element shall be made of polypropylene discs stacked to a height of 10 ¼ inches. The discs will have grooves on both sides so that the grooves of one disc and the grooves of the disc immediately below it will cross at an angle of about 45 degrees. The 3" Backflush Valves are made of plastic. Each backflush valve shall have a normally closed solenoid installed to its bonnet.

#### **Operation**

The filter shall be capable of filtering suspended particles from water. The maximum operating pressure of the filter is 140 psi. The minimum pressure required for backflush will be 30 psi during backflush. The minimum flow required for flushing is 70 gpm.

The filter shall clean itself automatically when a pressure differential (PD) gauge triggers a backflush controller to initiate a backflush. The optimum setting for the PD gauge is 7 psi. The backflush controller will transmit an electric pulse to the 24-volt solenoid that will command the backflush valves to change from filtration mode to backflush mode. During backflush, the disks shall separate and clean filtered water will spray towards the disks from 3 banks of nozzles that are located on a spine component inside of the disks. The flushing time shall be 20 seconds. During flush, filtered water will continue to be supplied downstream of the filter. The filters will flush one at a time sequentially.

The end user will need to install a drain manifold to the Disc Kleen drain manifold that directs the dirty flush water to an area chosen by the end user (Drain, sewer, back to the pond, river, canal, etc.).

The 3" LP Disk-Kleen Filter shall be Netafim Model Number DFALP\_\_\_\_-\_\_\_\_.

## ***APOLLO DISC-KLEEN FILTER (3 to 8-unit)***

### **Description**

The Apollo Disc-Kleen Filter is an automatic self-cleaning filter using disc technology to achieve high filtration efficiency. The Filter arrives completely assembled for easy installation. The filter is available with filtration grades (mesh or micron rating) of 40, 80, 120, 140, or 200 mesh. The Filter shall have \_\_\_\_\_ (3 to 8) filter bodies, each with two (2) filter elements.

### **Construction**

The Apollo Disc-Kleen Filter shall have inlet and outlet manifolds with flanged connection ends. The manifolds shall be made from high density polypropylene. The filter body shall be made of reinforced polyamide. The filter element shall be made of polypropylene discs stacked to a height of 19 1/4 inches. The discs will have grooves on both sides so that the grooves of one disc and the grooves of the disc immediately below it will cross at an angle of about 45 degrees. The 4" Backflush Valves are made of nylon. Each backflush valve shall have a normally closed solenoid installed to its bonnet.

### **Operation**

The filter shall be capable of filtering suspended particles from water. The maximum operating pressure of the filter is 140 psi. The minimum pressure required for backflush will be 30 psi during backflush. The minimum flow required for flushing is 210 gpm.

The filter shall clean itself automatically when a pressure differential (PD) gauge triggers a backflush controller to initiate a backflush. The optimum setting for the PD gauge is 7 psi. The backflush controller will transmit an electric pulse to the 24-volt solenoid that will command the backflush valves to change from filtration mode to backflush mode. During backflush, the disks shall separate and clean filtered water will spray towards the disks from 3 banks of nozzles that are located on a spine component inside of the disks. The flushing time shall be 20 seconds. During flush, filtered water will continue to be supplied downstream of the filter. The filters will flush one at a time sequentially.

The end user will need to install a drain manifold to the Apollo drain manifold that directs the dirty flush water to an area chosen by the end user (Drain, sewer, back to the pond, river, canal, etc.).

The Apollo Disk-Kleen Filter shall be Netafim Model Number DFAAPM\_\_\_\_-\_\_\_\_ACHP.

## 9.0 VALVES

### **SERIES 80 NYLON CONTROL VALVES**

#### **3/4" ELECTRIC CONTROL VALVE FOR LANDSCAPE**

##### **Description**

The 3/4" S-80 Electric Control Valve is an electric valve designed for residential and commercial landscape irrigation applications. The valve is suitable for mild corrosive and mild acidity levels in the water, as well as for reclaimed water applications including municipally treated reclaimed water designated for irrigation. Valves are tight sealing type. Valves come with a manual flow control stem and manual shutoff handle on top of the top chamber. In addition, the solenoid is equipped with a manual override for ease of operation until a controller is connected to the solenoid for remote control operation. Steel bolts are captured for ease of service. Five models are available: 24VAC, 24VDC, 120VAC, 12VDC and 12VDC-Latching. Valves are equipped with a clog-free mechanism at the top chamber, to avoid clogging of the opening and closure mechanism.

##### **Construction**

The 3/4" S-80 Electric Control Valve shall have 3/4" threaded inlet and outlet connections. The valve body shall be made of Glass Reinforced Polyamide. The diaphragm shall be made of Natural Rubber and the diaphragm seat made of Glass Reinforced Polyamide. Spring shall be made of SST302. Nuts, bolts and washers should be made of SST 304.

##### **Operation**

The valve is an electric on/off valve and shall be capable of opening when an electric signal is sent by a controller. The minimum operating pressure is 7 psi. The maximum operating pressure is 145 psi. The minimum operating flow is 0.01 GPM and the maximum operating flow is 26 GPM.

The solenoid operates within a plus minus 10% of the nominal voltage. For example, a 24VAC will be able to actuate between 22 and 26 volts. In addition, an inrush and holding currents are necessary to maintain the valve in open position, of 220 and 95 mA, respectively. The solenoid includes a manual override that simulates activation of the controller, when the controller is not engaging the solenoid. If the controller is engaging the solenoid, the manual override is not functional.

For latching solenoid operation, in addition to a 9V battery operation, a minimum pulse length is required of 25 milliseconds.

The manual flow control stem is used to limit the maximum flow across the valve, and can be used as a manual shutoff of the valve.

Valves are equipped with internal filters and clog free labyrinth mechanism to assure that the top cap of the valve is receiving clean water at all times. Based on water quality, it is recommended to periodically maintain the valves by visually inspecting the internal parts (after one year, then after two years).

Water temperature shall not exceed 140 F.

The valve shall be a Netafim Model Number LVET.75GH2.

## **1" ELECTRIC CONTROL VALVE FOR LANDSCAPE**

### **Description**

The 1" S-80 Electric Control Valve is an electric valve designed for residential and commercial landscape irrigation applications. The valve is suitable for mild corrosive and mild acidity levels in the water, as well as for reclaimed water applications including municipally treated reclaimed water designated for irrigation. Valves are tight sealing type. Valves come with a manual flow control stem and manual shutoff handle on top of the top chamber. In addition, the solenoid is equipped with a manual override for ease of operation until a controller is connected to the solenoid for remote control operation. Steel bolts are captured for ease of service. Five models are available: 24VAC, 24VDC, 120VAC, 12VDC and 12VDC-Latching. Valves are equipped with a clog-free mechanism at the top chamber, to avoid clogging of the opening and closure mechanism.

### **Construction**

The 1" S-80 Electric Control Valve shall have 1" threaded inlet and outlet connections. The valve body shall be made of Glass Reinforced Polyamide. The diaphragm shall be made of Natural Rubber and the diaphragm seat made of Glass Reinforced Polyamide. Spring shall be made of SST302. Nuts, bolts and washers should be made of SST 304.

### **Operation**

The valve is an electric on/off valve and shall be capable of opening when an electric signal is sent by a controller. The minimum operating pressure is 7 psi. The maximum operating pressure is 145 psi. The minimum operating flow is 0.01 GPM and the maximum operating flow is 44 GPM.

The solenoid operates within a plus minus 10% of the nominal voltage. For example, a 24VAC will be able to actuate between 22 and 26 volts. In addition, an inrush and holding currents are necessary to maintain the valve in open position, of 220 and 95 mA, respectively. The solenoid includes a manual override that simulates activation of the controller, when the controller is not engaging the solenoid. If the controller is engaging the solenoid, the manual override is not functional.

For latching solenoid operation, in addition to a 9V battery operation, a minimum pulse length is required of 25 milliseconds.

The manual flow control stem is used to limit the maximum flow across the valve, and can be used as a manual shutoff of the valve.

Valves are equipped with internal filters and clog free labyrinth mechanism to assure that the top cap of the valve is receiving clean water at all times. Based on water quality,

it is recommended to periodically maintain the valves by visually inspecting the internal parts (after one year, then after two years).

Water temperature shall not exceed 140 F.

The valve shall be a Netafim Model Number LVET1GH2.

## **1.5" ELECTRIC CONTROL VALVE FOR LANDSCAPE**

### **Description**

The 1.5" S-80 Electric Control Valve is an electric valve designed for residential and commercial landscape irrigation applications. The valve is suitable for mild corrosive and mild acidity levels in the water, as well as for reclaimed water applications including municipally treated reclaimed water designated for irrigation. Valves are tight sealing type. Valves come with a manual flow control stem and manual shutoff handle on top of the top chamber. In addition, the solenoid is equipped with a manual override for ease of operation until a controller is connected to the solenoid for remote control operation. Steel bolts are captured for ease of service. Five models are available: 24VAC, 24VDC, 120VAC, 12VDC and 12VDC-Latching. Valves are equipped with a clog-free mechanism at the top chamber, to avoid clogging of the opening and closure mechanism.

1.5" S-80 Electric Control Valves can be supplied either in a globe or angle configuration.

### **Construction**

The 1.5" S-80 Electric Control Valve shall have 1.5" threaded inlet and outlet connections. The valve body shall be made of Glass Reinforced Polyamide. The diaphragm shall be made of Natural Rubber and the diaphragm seat made of Glass Reinforced Polyamide. Spring shall be made of SST302. Nuts, bolts and washers should be made of SST 304.

### **Operation**

The valve is an electric on/off valve and shall be capable of opening when an electric signal is sent by a controller. The minimum operating pressure is 7 psi. The maximum operating pressure is 145 psi. The minimum operating flow is 0.25 GPM and the maximum operating flow is 110 GPM.

The solenoid operates within a plus minus 10% of the nominal voltage. For example, a 24VAC will be able to actuate between 22 and 26 volts. In addition, an inrush and holding currents are necessary to maintain the valve in open position, of 220 and 95 mA, respectively. The solenoid includes a manual override that simulates activation of the controller, when the controller is not engaging the solenoid. If the controller is engaging the solenoid, the manual override is not functional.

For latching solenoid operation, in addition to a 9V battery operation, a minimum pulse length is required of 25 milliseconds.

The manual flow control stem is used to limit the maximum flow across the valve, and can be used as a manual shutoff of the valve.

Valves are equipped with internal filters and clog free labyrinth mechanism to assure that the top cap of the valve is receiving clean water at all times. Based on water quality,

it is recommended to periodically maintain the valves by visually inspecting the internal parts (after one year, then after two years).

Water temperature shall not exceed 140 F.

The valve shall be a Netafim Model Number LVET1.5GH2 or LVET1.5GH2-AN (angle configuration).

## **2" ELECTRIC CONTROL VALVE FOR LANDSCAPE**

### **Description**

The 2" S-80 Electric Control Valve is an electric valve designed for residential and commercial landscape irrigation applications. The valve is suitable for mild corrosive and mild acidity levels in the water, as well as for reclaimed water applications including municipally treated reclaimed water designated for irrigation. Valves are tight sealing type. Valves come with a manual flow control stem and manual shutoff handle on top of the top chamber. In addition, the solenoid is equipped with a manual override for ease of operation until a controller is connected to the solenoid for remote control operation. Steel bolts are captured for ease of service. Five models are available: 24VAC, 24VDC, 120VAC, 12VDC and 12VDC-Latching. Valves are equipped with a clog-free mechanism at the top chamber, to avoid clogging of the opening and closure mechanism.

2" S-80 Electric Control Valves can be supplied either in a globe or angle configuration.

### **Construction**

The 2" S-80 Electric Control Valve shall have 2" threaded inlet and outlet connections. The valve body shall be made of Glass Reinforced Polyamide. The diaphragm shall be made of Natural Rubber and the diaphragm seat made of Glass Reinforced Polyamide. Spring shall be made of SST302. Nuts, bolts and washers should be made of SST 304.

### **Operation**

The valve is an electric on/off valve and shall be capable of opening when an electric signal is sent by a controller. The minimum operating pressure is 7 psi. The maximum operating pressure is 145 psi. The minimum operating flow is 0.25 GPM and the maximum operating flow is 176 GPM.

The solenoid operates within a plus minus 10% of the nominal voltage. For example, a 24VAC will be able to actuate between 22 and 26 volts. In addition, an inrush and holding currents are necessary to maintain the valve in open position, of 220 and 95 mA, respectively. The solenoid includes a manual override that simulates activation of the controller, when the controller is not engaging the solenoid. If the controller is engaging the solenoid, the manual override is not functional.

For latching solenoid operation, in addition to a 9V battery operation, a minimum pulse length is required of 25 milliseconds.

The manual flow control stem is used to limit the maximum flow across the valve, and can be used as a manual shutoff of the valve.

Valves are equipped with internal filters and clog free labyrinth mechanism to assure that the top cap of the valve is receiving clean water at all times. Based on water quality, it is recommended to periodically maintain the valves by visually inspecting the internal parts (after one year, then after two years).

Water temperature shall not exceed 140 F.

The valve shall be a Netafim Model Number LVET2GH2 or LVET2GH2-AN (angle configuration).

## **IRON AND BRONZE VALVES**

### **Description**

The NetafimUSA Iron and Bronze Valves are an electric valve designed for residential and commercial landscape irrigation applications. The valves function as an electric master valve, pressure reducing electric valve, or quick relief pump control valve. Five models are available: 24VAC, 24VDC, 120VAC, 12VDC and 12VDC-Latching. The Iron and Bronze valves can be supplied either in globe or angle configurations.

### **Construction**

The valve body shall be constructed of either cast iron or bronze. The nuts, bolts, washers and spring shall be stainless steel, and the diaphragm assembly shall be constructed from natural rubber.

### **Operation**

The valve is an electric on/off valve and shall be capable of opening when an electric signal is sent by a controller. The solenoid operates within a plus minus 10% of the nominal voltage. For example, a 24VAC will be able to actuate between 22 and 26 volts.

The maximum operating pressure is up to 235 psi.

The Recommended Flow Rates shall be as follows (shown in GPM):

Size	Nominal Continuous Valve (8 feet per second)	Maximum Continuous Valve (18 feet per second)	Maximum Intermittent Valve (49 feet per second)
1"	22	44	118
1.5"	50	110	300
2"	80	180	485
2.5"	120	260	485
3"	176	400	1,080
4"	330	700	1,915
6"	700	1,500	4,200
7"	700	1,500	4,200
8"	960	2,100	5,770

## 10.0 HYDROMETER

### Description

The NetafimUSA Hydrometer provides a combination of the following functions within a single unit:

Master Valve / Valve

Water Metering

Flow Monitoring

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### Construction

The Hydrometer shall be constructed with a cast iron body with epoxy coating. A double-chambered valve design with a globe configuration designed for a no straight pipe installations. Connection configurations are: Threaded Union (1 1/2"), Threaded (2") and Flanged (3", 4", 6", 8"). Valve configuration options are: Normally Open (NO) and Normally Closed (NC). Pilot options are: manual electric, pressure sustaining manual electric and pressure reducing manual electric. Manual three-way selector is standard on all models.

### Operation

Flow ranges supported are from 1.8 GPM to 1500 GPM.

Maximum working pressure is 235 psi (140 psi w/ pressure reducing manual electric option). Minimum working pressure is 14 psi.

Maximum liquid temperature is 140 F.

All models of the Hydrometer can be configured with a Reed Switch Output Register or a Photo Diode Output Register. Both versions require that the register lid remain closed during normal operation in order to assure protection from the elements and proper accuracy for the output signal. Photo Diode Register option requires a constant supply of DC power for output function. Both register options are sealed and magnetically driven.

Units should be installed horizontally with the register facing upwards only.

Meter must be installed so that the pipe will be full of water at all times during metering

Recommendation: Continuous Acting Air Vents of proper size and type be installed to eliminate air.

The hydrometer shall be Netafim Model Number LHM\_\_\_\_-\_\_\_\_.

## 11.0 WATER METERS AND FLOW COMPUTERS

### **METAL 'M' SERIES WATER METER**

#### **Description**

M Series Water Meters are used to measure both current flow (GPM) and the totalized volume of water used over time.

#### **Construction**

The M Series Water Meters shall be constructed with a body made of a corrosion proof copper alloy and coated with a durable red long life epoxy. The unit will be available in the following sizes/configurations:

¾" MPT

1" MPT

#### **Operation**

The M Series Water Meters shall automatically begin recording flow (GPM) and totalizing volume at the beginning of the irrigation cycle as the system fills with water. Starting flows for these units are 0.2 GPM for the ¾" unit and 0.3 GPM for the 1" unit. Nominal flows for these units are 11 GPM for the ¾" unit and 15.4 GPM for the 1" unit. Maximum flows for these units are 14 GPM for the ¾" unit and 20 GPM for the 1" unit.

*Note:* Permanent damage could occur to the M Series Water Meters if subjected to system winterization via a compressed air blowout procedure. NetafimUSA recommends installing these units only on systems or segments of systems that will be gravity drained for winterization. If the system will be blown out using compressed air the water meter must be isolated from this procedure via manual ball valves or removed completely and replaced with a PCV or Poly blank section prior to system blow out.

M Series Water Meters can be configured with a Reed Switch Output Register or a Photo Diode Output Register. Both versions require that the register lid remain closed during normal operation in order to assure protection from the elements and proper accuracy for the output signal. Photo Diode Register option requires a constant supply of DC power for output function

Both register options are sealed and magnetically driven.

Units should be installed horizontally with the register facing upwards only.

Meter must be installed so that the pipe will be full of water at all times during metering  
Recommendation: Continuous Acting Air Vents of proper size and type be installed to eliminate air.

The M Series Water Meter shall be Netafim Model Number \_\_\_\_\_.

### **COMPOSITE 'M' SERIES WATER METERS**

#### **Description**

M Series Water Meters is used to measure both current flow (GPM) and the totalized volume of water used over time.

## Construction

The M Series Water Meters shall be constructed with a body composed of polyethylene filled with glass fibers. The unit will be available in the following sizes/configurations:

¾" MPT

1" MPT

## Operation

The M Series Water Meters shall automatically begin recording flow (GPM) and totalizing volume at the beginning of the irrigation cycle as the system fills with water. Starting flows for these units are 0.2 GPM for the ¾" unit and 0.3 GPM for the 1" unit.

Nominal flows for these units are 11 GPM for the ¾" unit and 15.4 GPM for the 1" unit.

Maximum flows for these units are 14 GPM for the ¾" unit and 20 GPM for the 1" unit.

*Note:* Permanent damage could occur to the M Series Water Meters if subjected to system winterization via a compressed air blowout procedure. NetafimUSA recommends installing these units only on systems or segments of systems that will be gravity drained for winterization. If the system will be blown out using compressed air the water meter must be isolated from this procedure via manual ball valves or removed completely and replaced with a PCV or Poly blank section prior to system blow out.

The M Series Water Meters can be configured with a Reed Switch Output Register or a Photo Diode Output Register. Both versions require that the register lid remain closed during normal operation in order to assure protection from the elements and proper accuracy for the output signal. Photo Diode Register option requires a constant supply of DC power for output function.

Both register options are sealed and magnetically driven.

Units should be installed horizontally with the register facing upwards only.

Meter must be installed so that the pipe will be full of water at all times during metering

Recommendation: Continuous Acting Air Vents of proper size and type be installed to eliminate air.

The M Series Water Meter shall be Netafim Model Number \_\_\_\_\_.

## **NETAFIM FLOW COMPUTER (NFC)**

### Description

The NetafimUSA Flow Computer is an independent unit capable of receiving and displaying and outputting (w/ or w/o converting) an input signal from any NetafimUSA flow meter or Hydrometer register with output capabilities (Reed Switch, Photo Diode, MPE).

The capabilities are as follows:

Flow rate and total measurement for most pulse type water meters

Internal data logging - stores up to 64 totals for each 24 hour period (64 days of data)

Local readout with flow rate as 4 - 20 mA signal and total retransmission as a scaled pulse output

Metering pump dosing control. Ratio control based on flow

Adjustable time delay for filtering flow rate display and current output  
Flow rate alarm - high or low,  $\pm 1\%$  accuracy

Applications for the Flow Computer include:

Remote display for reading difficult to reach underground meters

Data recording

Output devices – fertilizer pumps, variable speed drive pumps, Netafim and most other manufacturer controllers.

### **Operation**

Operating temperature for the Flow Computer is  $-4^{\circ}$  F to  $158^{\circ}$  F.

The power supply requirements are as follows:

Netafim Flow Computer 110-0 is not available with a power supply. 12 or 24 VDC via a converter or battery is required. 24 VDC is required for use of 4 - 20 mA output. Battery must have charger to support photo diode register input.

Netafim Flow Computer 110-24 is equipped with a 24 VAC converter (built in 24 VAC to 24 VDC converter)

Netafim Flow Computer 110-D-bat is equipped with battery power supply

### **The input types (pulses from Netafim Water Meter) are as follows:**

Flow Signal Input from one of the following:

- Netafim Hydrometer Pulse Reed Switch (RS)
- Photo Diode (PD)
- Photo Diode High Frequency (PDH) Register

No Flow Switch Input is used to drive the flow rate display and the 4 - 20 mA flow rate output to zero and 4 mA respectively when pump is cut off, or valve is closed, stopping flow. This prevents display of flow continuing due to long delay (dLY) settings.

### **The output types are as follows:**

Scaled pulse output or programmable alarm output

4 - 20 mA out

### **The output specifications are as follows:**

For Models with battery power, output is 100 VDC/100 mA DC open drain sinking with reverse polarity protection.

For Netafim Flow Computers not powered by a battery, output is 100 VDC/100 mA isolated, no polarity.

The Flow Computer shall be Netafim Model Number NFC200.

## 12.0 COMPONENTS

### ***AIR/VACUUM RELIEF VENT***

#### **Description**

The Air/Vacuum Relief Vents serves several purposes:

To evacuate air from the Techline® laterals during system start-up.

To prevent a vacuum from occurring after the remote control valve has closed, thus preventing debris intrusion into the emitters via back siphonage.

#### **Construction**

**1/2" Size:** The Air/Vacuum Relief Vent shall be constructed of black and/or grey plastic with a 1/2" male pipe thread capable of mating with a threaded PVC reduction bushing or 1/2" FPT fitting.

**3/4" Size:** The Guardian Air/Vacuum Relief Vent shall be black with an orange cap, constructed with corrosion-resistant reinforced UV protected composite material with a male pipe thread capable of mating with a threaded PVC reduction bushing or 3/4" FPT fitting. There shall be no metal parts to rust or corrode.

**1" Size:** The Guardian Air/Vacuum Relief Vent shall be black with an orange cap, constructed with corrosion-resistant reinforced UV protected composite material with a male pipe thread capable of mating with a threaded PVC reduction bushing or 1" FPT fitting. There shall be no metal parts to rust or corrode.

#### **Operation**

Subsurface Techline installations require that air/vacuum relief vents be installed at the highest elevation in each zone (some zones may require more than one) in order to expel air and relieve vacuum. In a zone where the highest elevation occurs between the intake and exhaust headers (such as a mound or berm), an air/vacuum relief lateral shall interconnect all the Techline® driplines to avoid the necessity of installing one air/vacuum relief vent on each Techline® lateral. Air/Vacuum Relief Vents can be installed below grade in valve boxes to allow for periodic inspection.

Air/Vacuum Relief Vents shall not be required on zones of Techline HCVXR or CV dripline.

The 1/2" Air/Vacuum Relief Vent shall be Netafim Model Number TLAVRV.

The 3/4" Air/Vacuum Relief Vent shall be Netafim Model Number 65ARIA075.

The 1" Air/Vacuum Relief Vent shall be Netafim Model Number 65ARIA100.

## **COMBINATION AIR VENT**

### **Description**

The Combination Air Vent has the features of both an air release vent and an air & vacuum vent. The air release component is designed to automatically release small pockets of air to the atmosphere as they accumulate along a pipeline or piping system when it is full and operating under pressure. They are available in 1/2", 3/4" and 1" sizes.

### **Construction**

1/2" Size: The MINI Combination Air Vent shall be blue and gray with a red outlet, constructed with corrosion-resistant reinforced UV protected composite material with a male pipe thread capable of mating with a threaded PVC reduction bushing or 1/2" FPT fitting. There shall be no metal parts to rust or corrode.

3/4" Size: The MINI Combination Air Vent shall be blue and gray with a red outlet, constructed with corrosion-resistant reinforced UV protected composite material with a male pipe thread capable of mating with a threaded PVC reduction bushing or 3/4" FPT fitting. There shall be no metal parts to rust or corrode.

1" Size: The Combination Air Vent shall be gray with an orange outlet, constructed with corrosion-resistant reinforced UV protected composite material with a male pipe thread capable of mating with a threaded PVC reduction bushing or 1" FPT fitting. There shall be no metal parts to rust or corrode.

### **Operation**

The Combination Air Vent should be placed before a check valve, downstream of shut-off valves, at peaks along the pipeline and at peaks relative to hydraulic gradient and at end lines. For best performance and line protection, the Combination Air Vents should be placed after pumps, on long constant-sloped pipeline segments, on strainers, filters and before water meters.

The 1/2" Combination Air Vent be Netafim Model Number AV-COMBO-050

The 3/4" Combination Air Vent shall be Netafim Model Number AV-COMBO-075

The 1" Combination Air Vent shall be Netafim Model Number 65ARIB1-150.

## **AUTOMATIC FLUSH VALVE**

### **Description**

Automatic Flush Valves are used to reduce sediment build-up in Techline®/8mm Techlite and to pass sediment or debris that has not been captured by the disc filter.

### **Construction**

The Automatic Flush Valve shall be constructed of brown molded plastic with one of the following end configurations:

1/2" MPT

Insert inlet w/collar

## Operation

The Automatic Flush Valve shall automatically operate at the beginning of the irrigation cycle as the system begins to pressurize, and flush approximately one gallon of water at 57 psi maximum, or 1.5 psi minimum. *Note:* Permanent damage could occur to the Automatic Flush Valve if incoming pressure exceeds 57 psi. Netafim Pressure Regulators are recommended even when using pressure regulating remote control valves, since these valves may allow full line pressure into the piping network for a brief period of time before pressure regulation occurs.

Automatic Flush Valves are to be installed below grade, as detailed, in a valve box to allow for periodic inspection and are to be installed in one of two ways:

Vertically: Dome portion facing upward, installed on a 90 degree elbow.

Horizontally: Dome portion facing sideways.

One (1) Automatic Flush Valve shall be installed for every fifteen (15) GPM of zone flow, and shall be installed at a point farthest away from the source (typically on an exhaust header) as possible.

Automatic Flush Valves shall not be required on zones of Techline HCVXR or CV dripline; however, some accommodation must be made for manual flushing by the installation of a ball valve or a figure-eight end closure fitting at a point farthest from the source. Use TLISOV or TLFIG8.

The Automatic Flush Valve shall be Netafim Model Number TL\_\_\_\_\_.

## ***IN-LINE CHECK VALVE***

### **Description**

In-Line Check Valves are designed to hold water back in dripline to help prevent low drainage. When used in every 4½' elevation change in Techline HCVXR or CV zones, it allows all emitters in the dripline to begin operating at the same time by helping keep the dripline full of water.

### **Construction**

The In-Line Check Valve shall be constructed of molded plastic with an insert inlet and discharge w/collar.

### **Operation**

The In-Line Check Valve shall have an opening pressure of 7.3 psi (5m) and a closing pressure of 5.7 psi (4m). It shall have a flow range of 0.9-4.4 GPM (200 - 1,000l/h).

The In-Line Check Valve shall be Netafim Model Number TLCV050M1.

## **OPERATION/PRESSURE INDICATOR STAKE**

### **Description**

The Pressure Indicator Stake provides a visual confirmation of a Techline DL or RW system operation.

### **Construction**

The Pressure Indicator Stake shall be constructed of molded black plastic stake, with a pre-assembled yellow/orange indicator flag, flexible tubing and barb adapter.

### **Operation**

When visual confirmation of a subsurface Techline® system operation is desirable, the operation/pressure indicator stake should be installed. When the zone is on, pressure causes the flag to rise. At a pressure of 10 psi and higher, it is at a 90-degree angle. When the pressure drops below 4.5 psi or the system is off the flag is in a down position.

The Operation/Pressure Indicator Stake shall be Netafim Model Number 10-F-01.