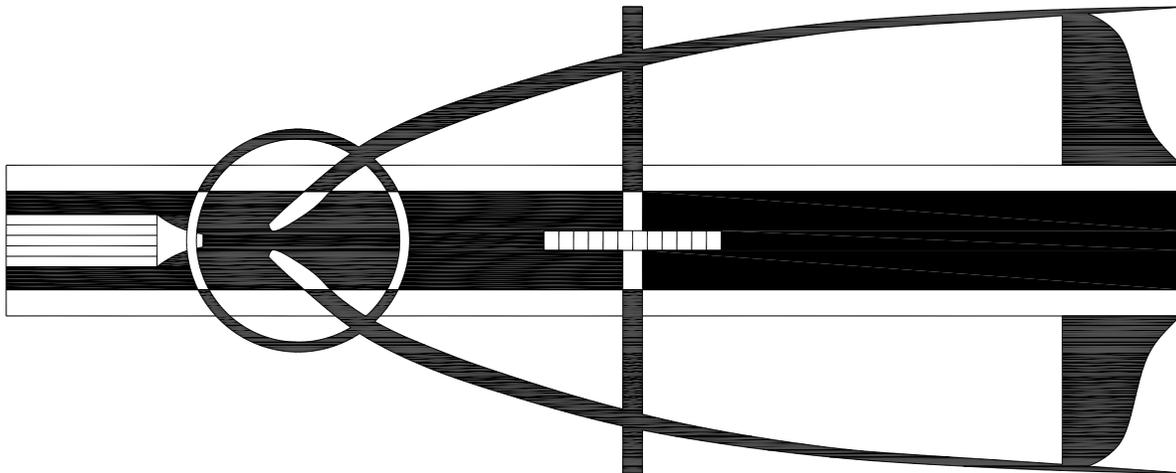


# ***norweco***<sup>®</sup> **BIO-DYNAMIC**<sup>®</sup> **TABLET FEEDER**

## **GENERAL SPECIFICATIONS**

The contractor shall furnish and install one Bio-Dynamic tablet feeder with all applicable equipment as described in the following specifications. It shall be a flow rated proportional feeder that allows for long-term unattended operation while providing a stable, adjustable chemical dose. Treatment of the water or wastewater flow shall be accomplished by immersion of feed tubes containing vertically stacked chemical tablets. Chemical agents shall be released as the liquid erodes the tablets. The tablet feeder shall be equipped with a self-draining flow channel to allow complete dry down of the chemical tablets during low and/or no flow conditions and to insure long-term tablet integrity.

Principal items of equipment and components of the tablet feeder shall include an integral one-piece molded inlet hub, inlet baffle, tiered flow deck including inert drainage tier, intermediate flow tier and upper flow tier, stationary feed tube insert, feed tubes (2 or 4), outlet weir with optional sluice, hydrodynamic mixing chamber and integral one-piece molded outlet hub. Liquid or gaseous systems requiring extensive handling and safety procedures or dry chemical feeders requiring separate drop boxes, or manholes for in-line mounting shall not be considered for this application.



## **EQUIPMENT MANUFACTURER**

The equipment specified herein shall be the product of a manufacturer having a minimum of seven years experience in the construction of water and/or wastewater treatment systems and equipment. Bids shall be prepared on the basis of the equipment and material specified herein for purposes of determining the low bid. This is not done, however, to eliminate other products or equipment of equal quality and efficiency. If equipment is to be substituted, approval of such substitution must be made prior to execution of any order. It is assumed that substitution will result in a reduction of cost to the contractor and that if accepted, these savings will be passed along by a reduction in the base bid.

**SPECIFICATIONS**

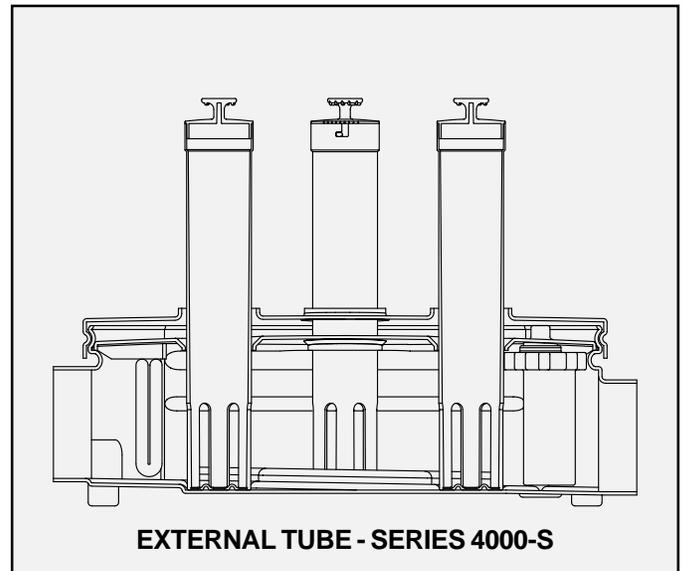
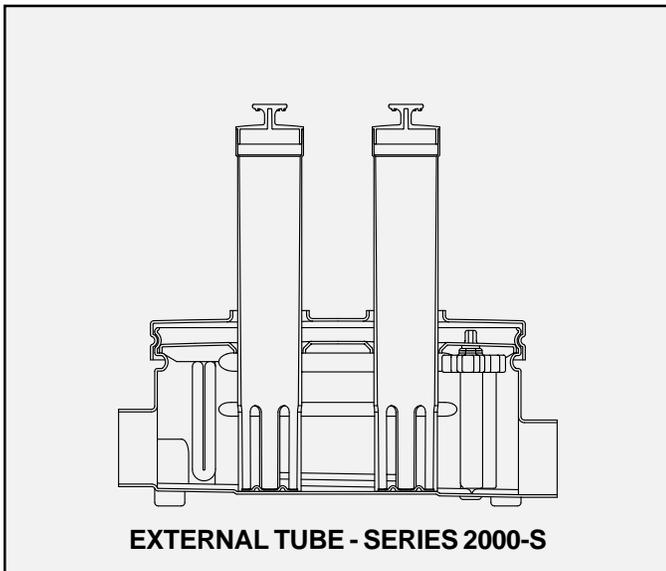
# BIO-DYNAMIC<sup>®</sup>

## CONSTRUCTION AND OPERATING CONDITIONS

The Bio-Dynamic tablet feeder shall be constructed of heavy duty, UV rated, rotationally molded polyethylene for maximum strength and durability. The feeder shall be a complete dry chemical dosing system that allows dosage capability ranging from 1 to 50 mg/L, according to the operational flow rating (GPD) of the system. A peak flow factor of four shall be used for non-flow equalized wastewater applications to insure proper dosage. The tablet feeder shall be elliptical in shape to utilize the velocity and energy of the liquid for consistent chemical application. The system shall be supplied as a self-enclosed unit suitable for direct burial without the need for a secondary manhole or enclosure.

The integral one-piece molded inlet and outlet hubs shall allow direct in-line connection to standard treatment system piping without the need for special adapters or mounting fixtures. Four reinforced mounting feet shall be molded into the body of the tablet feeder to allow the unit to be directly bolted to tankage or mounting brackets. All feeders shall be equipped with molded in place trim lines located at six inch vertical increments. The trim lines shall accommodate installation of the feeder and risers at the proper operational depth and yet allow field adjustment of the lid location to accommodate landscaping or other functional considerations.

Each translucent ClearCheck feed tube shall contain a vertical stack of tablets which dispense chemical agents into the liquid flow as the tablets are eroded. The chemical feed tubes shall be secured by retaining rings molded into the bottom of the flow deck and with a stationary insert. The retaining rings and stationary insert shall be designed to eliminate the possibility of tube displacement during high flow periods. Direct burial systems utilizing one or more 24" riser assembly shall include extension handles permanently installed on each feed tube. The tablet feeder shall be designed with an internal slope for self-drainage during low and/or no flow conditions to allow complete dry down of chemical tablets. Fall through the tablet feeder from inlet to outlet shall be one inch.



## INLET HUB AND BAFFLE

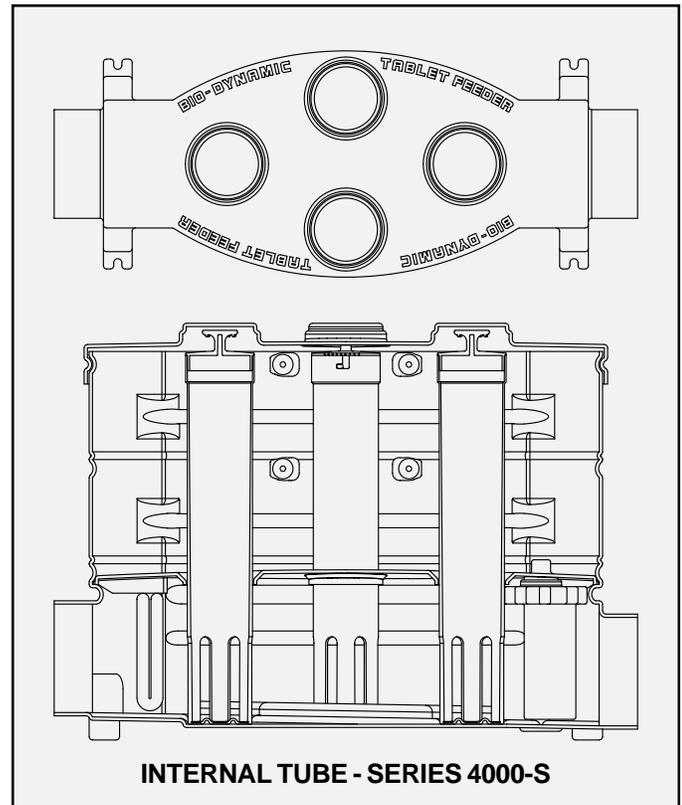
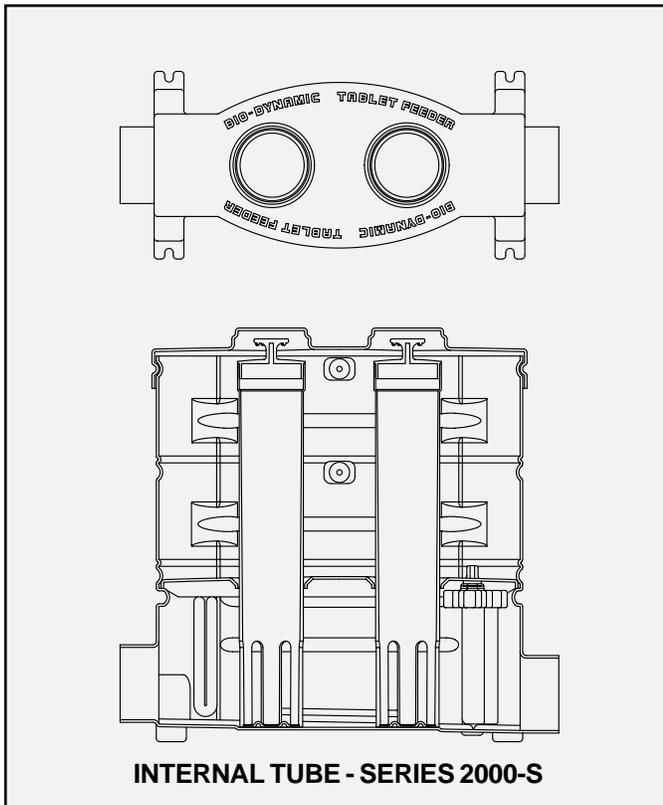
All flow entering the tablet feeder shall pass through the integral one-piece molded inlet hub and be channeled under an adjustable inlet baffle. The molded inlet hub shall allow direct acceptance of (4" or 6") Schedule 40 PVC piping. The inlet baffle shall be located so that the bottom of the baffle is positioned below the mean liquid level. The baffle shall be configured to minimize the effect of periodic flow surges and optimize the dissolution pattern of the chemical tablets. It shall be held in place by molded slots in the feeder sidewall. The baffle shall maintain chemical dosage during low flow periods, while regulating chemical dosage during high flow periods.

## FLOW DECK

The feeder shall contain a multi-tiered flow deck molded into the bottom of the system and configured to control liquid velocity within the unit. The configuration shall result in a stable chemical dose throughout the operating range of the unit and eliminate the potential for tablet degradation. The flow deck shall consist of three separate tiers designed to optimize the intrinsic energy of the liquid. The lowest tier functions as the inert drainage tier and shall encompass all chemical feed tubes and traverse the length of the feeder. This tier shall be employed during extremely low or no flow conditions to form a drainage channel for inert particles and eliminate tablet swelling. Feed tube retaining rings shall be molded into the inert drainage tier and shall securely locate each feed tube in position. When the flow rate increases up to three gallons per minute, the liquid level shall rise to the intermediate tier. This tier is hyperbolic in shape and traverses the length of the feeder. The intermediate channel shall increase flow velocity to insure accurate and consistent chemical delivery and to reduce or eliminate tablet wicking. At flow rates greater than three gallons per minute, the liquid level shall rise to the upper tier of the unit. This tier shall result in uniform flow velocity and provide adjustable tablet dissolution and consistent chemical dosage throughout the anticipated operating range.

## STATIONARY INSERT

Retaining ribs shall be molded into the system housing to support a stationary insert. The insert shall be installed above the solids drainage tier of the tablet feeder and traverse the area of the flow deck. Feed tubes and internal components shall be held in proper position by the insert. Tapered locating holes shall be incorporated into the insert for ease of feed tube installation and removal. For direct burial applications, drill points shall be provided in the feeder body and the stationary insert shall be permanently affixed to the feeder body with synthetic drive rivets.



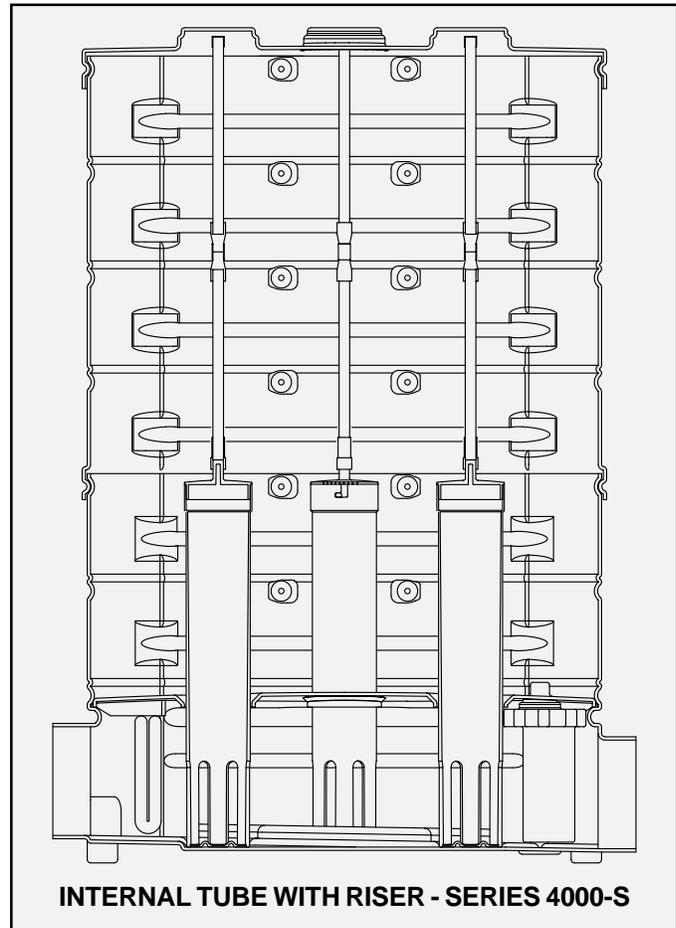
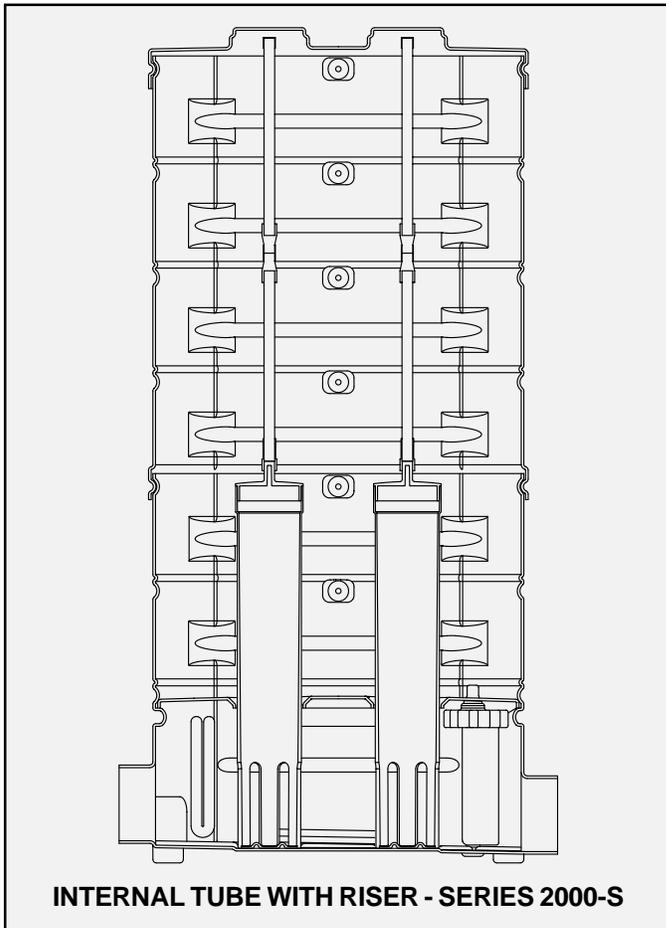
## CHEMICAL FEED TUBES

The tablet feeder shall be equipped with one-piece translucent ClearCheck feed tubes. Each feed tube shall be equipped with a twist lock cap for safety. Notches molded into the feed tube body shall prevent accidental cap removal. The feed tubes shall utilize tablets with the nominal weight and dimensions of 5 ounces,  $2\frac{5}{8}$ " diameter and  $\frac{13}{16}$ " height. The bottom of each feed tube shall be integrally molded with the tube body and contain two drainage ribs to allow the flow stream to purge inert particles and accomplish dry down of chemical tablets during no flow periods. The liquid shall flow through six equally spaced openings in each feed tube for contact with the chemical tablets.

# TABLET FEEDER

## ADJUSTABLE OUTLET SLUICE

The tablet feeder shall be equipped with an optional adjustable outlet sluice to allow regulation of the liquid static head within the unit and provide precise control over chemical dosage. The adjustable outlet sluice shall provide a one inch to three inch adjustable outlet width. Sluice operation shall permit precise adjustment of the chemical dosage throughout the operating range. Adjustment shall be made by rotating the molded plastic hex nut located at the top of each outlet sluice. The hex nut shall protrude through the stationary insert to allow for adjustment from grade with a standard socket. The right and left sections of the adjustable outlet sluice shall be synchronized by integrally molded gears. Each gear segment shall include adjustment limits to insure that the sluice will operate within the desired design range. Each adjustable sluice shall include a top mounted opening indicator. The indicator will provide the operator with a visual indication of the sluice position and the engraved scale on the stationary insert shall indicate the sluice opening in inches. To provide operational flexibility, the adjustable outlet sluice should always be used when an access riser is installed.



## FIXED WEIR

The tablet feeder shall have a fixed weir with interchangeable 1", 2" and 3" plates. The weir plates shall induce a static head within the feeder which regulates the quantity of tablets exposed to the liquid. The fixed weir plates shall be secured by molded slots located within the feeder that allow plates to be removed and exchanged without the need to take the system off-line or the need to make contact with the liquid stream. The molded slots facilitate interchangeability of weir plates and eliminate the need for adhesives or external fasteners. Alternating the fixed weir plates shall allow adjustment of the chemical feed dose in three separate 20% fixed adjustment increments.

# SPECIFICATIONS

## HYDRODYNAMIC MIXING CHAMBER AND OUTLET HUB

The tablet feeder shall be designed with a hydrodynamic mixing chamber downstream of the outlet weir to induce a turbulent flow prior to discharge. The hydrodynamic mixing chamber shall use the induced turbulence of the outlet weir or sluice to provide thorough mixing of the chemical. The chamber is designed to hydrodynamically eliminate the laminar flow induced upstream by the multi-tiered flow deck and prevent flow from short circuiting the treatment process. The integral one-piece molded outlet hub shall directly accept (4" or 6") Schedule 40 PVC piping. Systems that require separate drop boxes or outlet adapters increase installation costs and shall not be considered for this application.

## ACCESS RISERS

To provide maximum installation flexibility and eliminate the need for confined space entry equipment, optional riser assemblies shall be provided. Adjustable access risers will allow direct burial of the tablet feeder and will accommodate direct connection to existing system piping. Each riser shall be molded polyethylene with a nominal height of 24" and adjustable in 6" vertical increments via trim lines molded into each riser section. Risers shall utilize the same molded cover as the tablet feeder body. Each riser section shall contain transverse reinforcing struts and synthetic drive rivets at each joint to allow for direct burial. The reinforcing struts shall be constructed of fiberglass reinforced plastic with a 1" outside diameter and molded nylon couplings on each end. Each strut shall be held in position by an integrally molded retaining boss. Molded drill points shall be provided to locate the drive rivets in the riser assembly. One tube of Bio-Dynamic sealant shall be supplied with each riser section and shall be used to seal each riser joint internally and externally to insure watertight integrity.

## BIO-DYNAMIC® TABLET FEEDER DATA CHART

Model	Inlet/Outlet Diameter	Minimum Flow (GPD)	Design Flow (GPD)	Maximum Flow (GPD)	Number of Tubes	Fixed Weir	Adjustable Sluice	Drawing Number
XT 2000 (S)	4"	200	20,000	100,000	2	Standard	Optional	PC-5-9501
IT 2000 (S)	4"	200	20,000	100,000	2	Standard	Optional	PC-5-9500
ITR 2000-S	4"	200	20,000	100,000	2	Not Available	Standard	PC-5-9502
XT 4000 (S)	6"	20,000	50,000	200,000	4	Standard	Optional	PC-5-9503
IT 4000 (S)	6"	20,000	50,000	200,000	4	Standard	Optional	PC-5-9504
ITR 4000-S	6"	20,000	50,000	200,000	4	Not Available	Standard	PC-5-9505

## REMOTE FEED TUBE REMOVAL SYSTEM

For removal and reinstallation of feed tubes on systems utilizing riser assemblies, remote feed tube removal systems shall be provided. Each remote feed tube removal system shall be provided with twist lock cap and threaded top extension. A corrosion resistant extension tool shall be threaded to each feed tube cap. One corrosion resistant extension handle shall be provided with each riser section to permit access to each feed tube from grade. The remote feed tube removal system shall allow for the extension handle, attached feed tube and cap to be removed, recharged and reinstalled by the operator with no additional tools or equipment required. Once installed, the feed tube removal handles and caps shall remain in place.

## BIO-SANITIZER® CHLORINATION TABLETS

The Bio-Dynamic tablet feeder shall be furnished complete with a (10 lb., 25 lb., 45 lb. or 100 lb.) supply of Bio-Sanitizer disinfecting tablets. Bio-Sanitizer disinfecting tablets shall be manufactured and tested to insure efficient and dependable disinfection for wastewater treatment system effluent and other applications where a predictable long-term source of chlorine is desirable. The dissolve rate of the tablets shall generally lower overall chemical use and provide for consistent control of chlorine residual. The tablets shall be manufactured from pure calcium hypochlorite and contain at least 70% available chlorine. The tablets shall incorporate beveled edges to enhance the chemical dissolution pattern and minimize wicking and jamming. Each tablet within the feed tube shall be 2<sup>5</sup>/<sub>8</sub>" diameter, compressed to a <sup>13</sup>/<sub>16</sub>" thickness, weigh approximately 5 ounces and be white in color for easy identification. All flow through the system shall contact the Bio-Sanitizer tablets. The tablets shall dissolve slowly, releasing controlled amounts of chlorine for water or wastewater disinfection. The chlorine dosage rate shall be automatic and flow dependent. Periods of high flow shall expose more tablets to the liquid passing through the system and during periods of low flow, fewer tablets shall be exposed. The chemical application rate of the tablets shall remain consistent at peak flow factors as high as four.

## BIO-NEUTRALIZER® DECHLORINATION TABLETS

The Bio-Dynamic tablet feeder shall be furnished complete with a (25 lb. or 45 lb.) supply of Bio-Neutralizer dechlorination tablets. The dechlorination tablets shall contain active ingredients specially formulated to chemically neutralize both free and combined chlorine. The tablets shall incorporate beveled edges to enhance the chemical dissolution pattern and minimize wicking and jamming. Each tablet within the feed tube shall be 2<sup>5</sup>/<sub>8</sub>" diameter, compressed to a <sup>13</sup>/<sub>16</sub>" thickness, weigh approximately 5 ounces and be green in color for easy identification. All flow through the system shall contact the Bio-Neutralizer tablets prior to discharge. The tablets shall dissolve slowly, releasing controlled amounts of chemical for the instantaneous removal of residual chlorine from the water or wastewater flow. The tablets shall provide a dechlorination rate that is automatic and flow dependent. The chemical application rate of the tablets shall remain consistent at peak flow factors as high as four. The tablets shall generally lower chemical consumption and provide reliable reduction of chlorine residual in a more thorough manner than simple, compressed sodium sulfite.

## LIMITED WARRANTY

The manufacturer shall provide a limited warranty against defects in material and workmanship under normal use and service for a period of ten years. The distributor shall provide a detailed copy of the warranty to the regulatory agency, contractor and customer as required.

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