

CHAPTER 8

CULINARY AND IRRIGATION WATER LINES

SECTION 8.01 GENERAL

This section covers the requirements for piping materials and installation in the Lehi City Culinary and Secondary Irrigation/Fire Water Distribution Systems.

- A. All materials and workmanship shall strictly comply with the Utah State Rules for Public Drinking Water Systems (USRPDWS) and the International Plumbing Code (IPC). In the event of conflict between this section, USRPDWS and the IPC, they shall rank in the following order of precedence: 1) this Code Section; 2) USRPDWS; 3) IPC. The end of water lines shall have a water tight plug when work is not in progress to prevent debris, animals, ground/surface water, etc., from entering the line. During construction no debris, animals, ground/surface water, etc., shall be allowed to enter the line.
- B. Water lines shall be located on the north and east side of all roads unless approved by the Water Superintendent as shown in the Standard Drawing Details.

SECTION 8.02 CONCRETE THRUST BLOCKING

- A. All fittings at bends and branches in water pipe lines shall be provided with concrete thrust blocking as shown on the Standard Drawings. Blocking shall be of 5-bag mix concrete, poured in place and shall bear against solid undisturbed earth at the sides and bottom of the trench excavation and shall be shaped so as to not obstruct access to the joints of the pipe or fitting. All fittings shall be covered with plastic or other approved materials prior to pouring the thrust block. FM Grade grease shall be used for all bolted fittings.

SECTION 8.03 PIPE LAYING

- A. Install pipe with bell ends facing the direction of laying. Where pipe is laid on a grade of 10 percent or greater, proceed uphill with the installation with the bell ends facing upgrade. Make gradual pipe elevation changes as practicable to clear existing obstructions.
- B. The pipeline shall be installed so that a positive or negative grade is maintained between high and low points to avoid air pockets. Provide air vents as required. If permanent air vents are not required, record location of all high points so they may be readily located. 2 inch and smaller solvent welded pipe shall have an expansion joint every 100 lineal feet or be "snaked" in the trench per manufacturers' recommendations.

SECTION 8.04 DUCTILE IRON PIPE

- A. GENERAL. Ductile Iron Pipe shall be Class 50 for slip-on or mechanical joint piping (Class 51 for 4-inch size) and Class 53 for flanged joint piping unless otherwise required by the City Engineer due to loadings, site conditions, etc.

- B. MATERIALS. Ductile Iron Pipe for the transmission and distribution of water shall be manufactured in accordance with AWWA C151 "American Standard for Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids". All pipe shall be made of good quality Ductile Iron and of such chemical composition and structure as is required to meet the physical and mechanical property requirements of the Standard. The metal for the Ductile Cast Iron Pipe shall be made by any suitable melting process.

- C. JOINTS. Ductile-Iron Pipe shall be of the following types, as indicated on the approved plans.
 - 1. Mechanical joints and the rubber gaskets and lubricant therefore, for Ductile Iron Pipe, shall comply with the requirements and be dimensioned in accordance with AWWA C-151 and C-111. Bolts and rubber gaskets shall be furnished with mechanical joint pipe in sufficient quantity for the amount of pipe ordered.

 - 2. Rubber gasket slip-on joints, and the rubber gaskets and lubricant therefore, for Ductile Iron Pipe shall comply with the general requirements of AWWA C-111 of latest revision.
 - a. Rubber gasket slip-on joints shall be designed for assembly by prepositioning of a single continuous molded rubber ring gasket in an annular recess in the pipe socket, and forcing the plain end of the entering pipe into the receiving socket, thereby compressing the gasket radially to the pipe to form a positive seal. The plain end of the pipe shall be suitably beveled to facilitate assembly.

 - b. The design and shape of the gasket, and the annular recess therefore, shall be such that the gasket is locked in place against displacement as the joint is assembled. The gasket shall provide adequate compressive force between the plain pipe end and the socket after assembly to affect a positive seal under all combinations of joint and gasket tolerances.

 - c. The recess in the pipe socket for the rubber ring shall be free of all coating materials and sand pits. Rubber gaskets and lubricant shall be furnished with rubber gasket joint pipe in sufficient quantity to make each joint for the pipe ordered.

 - 3. Cast Iron pipe flanges, and bolts and nuts therefore, shall be dimensioned in accordance with ASA B16.2 for Class 150. Threads for screwed on flange pipe

shall comply with ASA B-2.1. Flange nuts and bolts shall be furnished with flange joint pipe in sufficient quantity to make each joint for the pipe ordered.

4. CONTRACTOR is to ensure and verify that all materials which may contact drinking water comply with R309-550-6 of the Administrative Rules for Public Drinking Water Systems, which states:

“All materials which may contact drinking water, including pipes, gaskets, lubricants and O-Rings, shall be ANSI-certified as meeting the requirements of NSF Standard 61, Drinking Water System Components – Health Effects. To permit field verification, all such components shall be appropriately stamped with the NSF logo.”

D. LINING AND COATING.

1. The waterway surfaces of all Ductile-Iron Water Pipe and fittings shall be completely covered with a uniform thickness of cement-mortar which shall be further covered with a bituminous seal coat, all in accordance with AWWA C-104. Ductile-Iron Pipe or fittings lined in the field will not be accepted as conforming to AWWA C-104.
2. The outside surface of all "buried" Ductile-Iron Pipe shall be coated with a bituminous coating in accordance with AWWA C151 requirements.
3. Contractor is to ensure and verify that all materials which may contact drinking water comply with R309-550-6 of the Administrative Rules for Public Drinking Water Systems, which states:

“All materials which may contact drinking water, including pipes, gaskets, lubricants and O-Rings, shall be ANSI-certified as meeting the requirements of NSF Standard 61, Drinking Water System Components – Health Effects. To permit field verification, all such components shall be appropriately stamped with the NSF logo.”

E. POLYETHYLENE ENCASEMENT. The outside surface of all Ductile-Iron Pipe shall be encased with polyethylene film in tube or sheet form unless otherwise approved by the City Engineer.

1. The polyethylene film shall be manufactured of virgin polyethylene material conforming to the requirements of ASTM Standard Specification D-1248-68 Polyethylene Plastics Molding and Extrusion Materials. The film shall have a minimum nominal thickness of 0.008 inches (8 mils) with a minus tolerance not exceeding 10 percent of the nominal thickness.

2. The polyethylene encasement shall prevent contact between the pipe and the surrounding backfill and bedding material but is not intended to be a completely air and watertight enclosure. Overlaps shall be secured by the use of adhesive tape, plastic string, or any other material capable of holding the polyethylene encasement in place until backfilling operations are completed.
3. Repair any rips, punctures, or other damage to the polyethylene with adhesive tape or with a short length of polyethylene tube cut open, wrapped around the pipe, and secured in place.
4. Cover bends, reducers, offsets, and other pipe-shaped appurtenances with polyethylene in the same manner as the pipe.
5. When valves, tees, crosses, and other odd-shaped pieces cannot be wrapped practically in a tube, wrap with a flat sheet or split length of polyethylene tube by passing the sheet under the appurtenance and bringing it up around the body. Make seams by bringing the edges together, folding over twice, and taping down. Tape polyethylene securely in place at valve stem and other penetrations.
6. Provide openings for branches, service taps, blow-offs, air valves, and similar appurtenances by making an X-shaped cut in the polyethylene and temporarily folding back the film. After the appurtenance is installed, tape the slack securely to the appurtenance and repair the cut, as well as any other damaged areas in the polyethylene, with tape.
7. Where polyethylene-wrapped pipe joins an adjacent pipe that is not wrapped, extend the polyethylene wrap to cover the adjacent pipe for a distance of at least 2 feet. Secure the end with circumferential turns of tape.

SECTION 8.05 POLYVINYL CHLORIDE PIPE

- A. GENERAL. This specification provides the requirements for Polyvinyl Chloride (PVC) Pressure Pipe with rubber gasket couplings and fittings for water supply and distribution systems.
- B. CONFORMANCE. PVC pipe shall meet the following requirements.
- C. IRRIGATION/FIRE PRESSURE PIPE AND COUPLINGS.

| | |
|----------------|--|
| Service | Buried |
| Color | Purple |
| Conformance | AWWA C900, AWWA C905 |
| Fittings | Ductile or Cast Iron, Mechanical or Push-on Joints |
| Wall Thickness | DR-18 |

Joints Gasketed, Push-on

D. CULINARY PRESSURE PIPE AND COUPLINGS.

| | |
|-----------------------|---|
| Service | Buried |
| Conformance | Materials ASTM D1784 Manufacturing ASTM D2241, ASTM 1785, AWWA C905 |
| Fittings | |
| 3 inches and larger | Ductile or cast iron mechanical or push on joint with transition gasket. |
| 2 inches and smaller | Solvent cement ASTM D2564, Schedule 40 PVC |
| Wall Thickness | |
| 14 inches - 16 inches | DR 25 |
| 4 inches - 12 inches | SDR 21 (Class 200) |
| 2 inch & 3 inch | Schedule 40 |

All PVC culinary pipe shall also conform to the latest revisions of the National Sanitation Foundation Testing Laboratories (NSF) specifications. Rubber gasketing shall conform to ASTM 1869.

E. JOINTS.

Contractor is to ensure and verify that all materials which may contact drinking water comply with R309-550-6 of the Administrative Rules for Public Drinking Water Systems, which states:

“All materials which may contact drinking water, including pipes, gaskets, lubricants and O-Rings, shall be ANSI-certified as meeting the requirements of NSF Standard 61, Drinking Water System Components – Health Effects. To permit field verification, all such components shall be appropriately stamped with the NSF logo.”

F. MARKINGS. Pipe markings shall include the following, marked continuously down the length:

Manufacturer's name,
Nominal Size,
Class Pressure Rating,
PVC Standard,
NSF Logo (NSF-pw) for Culinary pipe, and
Identification code.

G. INSTALLATION. All PVC pipe should be installed as specified by the manufacturer.

- H. LUBRICATION. Lubrication shall be water soluble, non-toxic, be non-objectionable in taste and odor imparted to the fluid, be non-supporting of bacteria growth, and have no deteriorating effect on the PVC or rubber gaskets.
- I. WARNING / LOCATING TAPE AND WIRE. A brightly colored warning tape shall be placed in all trenches where PVC pipe is used. The tape shall be placed approximately 1 ½ feet above the top of the pipe. Tape for culinary pipe shall be blue and for irrigation purple with the word irrigation along the tape. A #14 gauge heavy insulated burial copper tracing wire shall also be attached to each main culinary water line and stubbed into all valves or valve boxes and meter boxes with sufficient length to allow wire to be extended 4 feet above ground surface for locating purposes.

SECTION 8.06 VALVES

- A. GENERAL
Culinary valves shall be flanged by MJ and attached to the tee at all intersections. Pressure irrigation valves shall be installed at property line at all intersections. See the City Standard Drawings for details.
- B. GATE VALVES. Gate valves shall conform to AWWA Specification C500. Unless otherwise shown or specified valves shall be of mechanical joint connection design for buried service. Buried valves shall have 2-inch operating nuts. Gate valves shall be used on 2 inch to 8 inch valves. Butterfly or wedge-style gate valves shall be used for 10 inch to 15 inch pipes as specified by the Water Department. Pipes 16 inches and larger (or valves on high pressure lines) may require valves with gear driven operating nuts as specified by the Water Department.
- C. BUTTERFLY VALVES. Butterfly valves shall conform to AWWA Specification C504 Class 150B. Both valved ends shall be mechanical joint per AWWA Specification C111, and accessories (bolts, glands, and gaskets) shall be included.
- D. VALVE BOXES. All buried valves shall be installed complete with a cast iron, 2 piece, slip top, 5-1/4 inch shaft valve box. The word "Water" shall be cast on the cover for all culinary valves and the word "Irrigation" shall be cast in the cover for all irrigation line valves. The inside and outside of cover and inside barrel of the valves shall be painted purple for irrigation valves and blue for culinary valves. All valve boxes located in streets shall be installed as nearly to street grade as possible.

SECTION 8.07 CULINARY BLOW OFFS

- A. Install a 4 inch blow off (for 8 inch and smaller pipe) or 6 inch blow off (for 10 inch and larger pipe) on dead ends and or one thousand (1000) foot spacing. See City Standard Drawings for details.

- B. A three (3) foot horizontal clearance must be maintained around the outside of all blow off appurtenances. Proposed blow off locations shall be approved by the Water Department.
- C. A four (4) foot wide by four (4) foot wide by six (6) inch thick concrete pat shall be placed around each blow off. See the Standard Drawings for details.

SECTION 8.08 FIRE HYDRANTS

- A. GENERAL. Fire Hydrants shall conform to AWWA C-502, "Fire Hydrants for Ordinary Water Works Service" and shall be designed for a working pressure of 150 psi. and a Waterous or Mueller Super Centurion.
 - 1. A three (3) foot horizontal clearance must be maintained around the outside of all fire hydrants. Proposed fire hydrant locations shall be approved by Fire Chief and the Water Department.
 - 2. A four (4) foot wide by four (4) foot wide by six (6) inch thick concrete pad shall be placed around each fire hydrant. See the Standard Drawings for details.
 - 3. The striping of fire lanes and/or associated fire lane signage may be required by the Fire Chief.
- B. HYDRANT DETAILS. The Hydrant shall be of the Dry Barrel Design. All hydrants shall be so designed as to allow the flanges at sidewalk level to separate without material damage to the main barrel section when struck by a large object, such as a car. All Hydrants shall be 6 inch barrel and be furnished with two 2-1/2 inch National Standard Thread Hose Nozzles and one 4-1/2 inch National Standard Thread Pumper Nozzle. All Nozzles shall be furnished with a cap and gasket with attaching chain. (See City Standard Drawings for details.)
 - 1. Bury length shall be 5 feet.
 - 2. Bottom of steamer nozzle should be 18 inches above top of sidewalk or curb.
 - 3. Hydrants shall be painted red.
 - 4. The seat must be made of molded non-swelling rubber.
 - 5. The drip valve shall be located near the bottom of the hydrant. It shall be positive in operation and shall work directly from the main stem. It must be so designed that all water will drain away from the working parts when the hydrant is closed.
 - 6. Hydrant cover must be designed so as to be weather proof as possible. Provisions must be made for oiling, both for lubrication and to prevent corrosion. A

reasonably tight fit should be made around the stem. On the cover an arrow and the word "OPEN" shall be placed in raised characters to indicate direction to turn to open the hydrant.

7. The hydrant must be marked with the name or particular mark of the manufacturer. The size of the hydrant shall also be cast in the barrel. All lettering shall be above the ground or sidewalk flange. The hydrant shall be on the side of the street where the water main is located, unless approved otherwise by the Water Department.
8. When a hydrant and a blow off are installed at the same location, a 3 foot horizontal separation must be provided between them.

SECTION 8.09 POST INDICATOR VALVE

- A. Shall be installed on all buildings with inside sprinklers per NFPA (National Fire Protection Association) Code. (See City Standard Drawings for additional Details)

SECTION 8.10 SERVICE LATERALS

- A. Pipe for water services shall be either 200 psi SDR7 polyethylene conforming to ASTM Standard Specification D-2239 with Ford or equal brass compression type fittings or PVC conforming to culinary pressure pipe specification for 2 inch and larger.
- B. Connections to main lines shall be through a corporation type stop. See Detail in Section 12 for Saddles.
- C. Connections of polyethylene water services to main lines shall be through a corporation type stop and the pipe shall be snaked in the trench to allow for thermal contraction.
- D. In high ground water areas, the City Engineer may require polyethylene pipe due to the deteriorating effect of the native soils.
- E. All fire line service laterals used under or through the foundation shall be Class 50 Ductile Iron or stainless steel. Fire line service lateral piping from the culinary mainline to the foundation line shall be SDR21 Class 200 PVC.

SECTION 8.11 IRRIGATION SERVICE VALVES AND BOXES

- A. CITY-OWNED IRRIGATION VALVES 2 inch or smaller shall be Ford brass ball valves or approved equal (supplied by Lehi City Water Department). City curb box shall be Tyler cast iron with stationary rod as produced by D & L Supply Co. or approved equal. Larger valves shall comply with "Valves" section of these specifications.

- B. PROPERTY-OWNER IRRIGATION VALVES 2 inch or smaller shall be a Mueller stop and waste valve or approved equal (supplied by Lehi City Water Department). Boxes shall be the same as the City owned except that a standard hex nut shall be used for the valve box lid.

SECTION 8.12 CULINARY WATER LINE CONSTRUCTION NEAR SEWER OR WASTEWATER LINES (APPLICABLE PUBLIC HEALTH DEPARTMENT CRITERIA)

- A. WATER/SEWER LINE HORIZONTAL SEPARATION. A culinary water main must be laid at least ten feet horizontally from any existing or proposed sewer or wastewater leach line. Separation distances shall be measured pipe edge to pipe edge.
- B. Should local conditions prevent a lateral separation of ten feet, a culinary water main may be laid closer than ten feet to sewer lines (but not leach lines) provided:
 - 1. The main is laid in a separate trench, or
 - 2. The main is laid on an undisturbed earth shelf on one side of the sewer line trench, or
 - 3. The main is laid in a sewer or drain line trench which has been backfilled and compacted not less than 95% of maximum laboratory density. (The density shall be determined in accordance with the procedures given by ASTM Standard D-690).

In cases A and B above, the bottom of the culinary water line shall be at least 18 inches above the top of the sewer line. At the same time, the culinary water line must be sufficiently buried to prevent freezing.

- C. EXCEPTION TO HORIZONTAL SEPARATION. When it is impossible to obtain the proper horizontal and vertical separation as stipulated above, both the water main and sewer line shall be constructed of cast iron, ductile iron, galvanized steel or protected steel pipe having mechanical joints. Such exceptions must be obtained by the Executive Secretary to the Drinking Water Board in writing prior to installation as required by R309-550-7(2) of the Administrative Rules for Public Drinking Water Systems. Other types of joints of equal or greater integrity may be used at the discretion of the Executive Secretary and the City Water Superintendent. Thermoplastic pipe may be used provided mechanical or solvent weld pipe joints are used. These shall be pressure-tested to assure water tightness before backfilling. Such alternatives must also be approved in writing before installation by the Executive Secretary and the City Water Superintendent.
- D. CULINARY WATER/SEWER LINE CROSSINGS. Whenever culinary water mains must cross sanitary sewers, as required by R309-550-7(2) of the Administrative Rules for

Public Drinking Water Systems, the water main shall be laid at such an elevation that the bottom of the water main is 18 inches above the top of the sewer. This vertical separation should be maintained for the portion of the water main located within ten feet horizontally of any sewer it crosses. The ten feet is to be measured from edge of pipe to edge of pipe as the perpendicular distance from the sewer line to the water line. Any exceptions to these standards shall be applied for as dictated within R309-550-7(2) of the Administrative Rules for Public Drinking Water Systems.

E. INABILITY TO PROVIDE VERTICAL SEPARATION.

1. Where conditions prevent the minimum vertical separation as set forth above from being maintained, or when it is necessary for the culinary water main to pass under a sewer, both the culinary water main and the sewer line shall be constructed of cast iron, ductile iron, galvanized steel or protected steel pipe, having mechanical joints. Thermoplastic pipe may be used provided mechanical or solvent weld type joints are used. The mechanical joint pipe shall extend on each side of the crossing until the perpendicular distance from the sewer line to the culinary water line is at least ten feet. In making such crossings, it is preferable to center a length of culinary water main so that the joints will be equidistant from the sewer and as remote there from as possible.
2. Where a culinary water main must cross under a sewer, a vertical separation of at least 18 inches between the bottom of the sewer and the top of the culinary water main shall be maintained with adequate support for the larger sized sewer lines to prevent them from settling on and breaking the culinary water main.
3. In the case where a new culinary water line must be routed under an existing sewer line and it is desired not to disturb the sewer line, the Executive Secretary to the Drinking Water Board may grant an exception to the above requirements. Such exception must be obtained from the Executive Secretary to the Drinking Water Board in writing prior to installation as required by R309-550-7(2) of the Administrative Rules for Public Drinking Water Systems. The designer must then propose a method for protecting the culinary line. Such a proposal must be deemed acceptable by the Executive Secretary and the City Water Superintendent.

SECTION 8.13 TESTING & FLUSHING WATERLINES

- A. GENERAL. All water lines shall be tested and flushed as outlined in this Section.
- B. FLUSHING. Flushing shall be accomplished through hydrants for the pressure irrigation system and a blow-off on the culinary system, or if a hydrant does not exist at the end of the line, the Contractor shall install a tap of sufficient size to provide for a 2.5 foot per second flushing velocity in the line. The following is the flow quantity required to provide a 2.5 foot per second flushing velocity:

| <u>Pipe Size</u> <u>(inches)</u> | <u>Flow</u> <u>(gpm)</u> |
|-------------------------------------|-----------------------------|
| 2 | 25 |
| 4 | 100 |
| 6 | 220 |
| 8 | 390 |
| 10 | 610 |
| 12 | 880 |
| 16 | 1567 |

C. TESTING.

1. Tests shall be made upon completion of system installation or any valved portion thereof. All tests shall be made at the expense of the Contractor and in the presence of the City Engineer, City Water Superintendent or Designee. Pressure testing can only be accomplished after the line has been flushed and disinfected.
2. During testing lines shall be slowly filled with water venting off all air. If required, taps shall be provided at line high points to bleed off the air and after testing these shall be plugged. A minimum pressure 50% in excess of the maximum line operating pressure shall be maintained on the portion being tested for a minimum period of two hours, using hydraulic means to maintain the pressure. Maximum leakage during the test shall not exceed one half (1/2) gallon per inch of diameter per 1000 feet of pipe. Suitable means shall be provided by the Contractor for determining the quantity of water lost by leakage under the test pressure. No pipe installation will be accepted until the leakage is less than the allowable.

SECTION 8.14 DISINFECTION OF CULINARY WATERLINES.

A. GENERAL. All culinary water lines shall be disinfected by chlorination prior to use in accordance with AWWA Standard C-651.

B. CHLORINATION.

1. After flushing, all culinary water lines shall be disinfected by chlorination. Chlorination shall provide a minimum of 25 ppm residual after 24 hours contact in the pipeline. This may be expected with an application of 50 ppm although some conditions may require more. Chlorine, in the form of 1% slurry of high test calcium hypochlorite (HTH, Perchloron, Pittchlor, etc.) shall be fed into the pipeline in such a manner as to mix with the water flowing in the pipeline. A 1% slurry results from mixing 1-pound of the calcium hypochlorite with 7.50 gallons of water.)

2. The following table provides information as to the required quantity of slurry to be used per 100 feet of pipe to provide a chlorine concentration of 50 ppm:

| Pipe Size (in.) | Vol. of 100 ft. Length (gal) | Req'd. Amount of Slurry (gal) |
|--------------------|---------------------------------|-------------------------------------|
| 4 | 65 | 0.33 |
| 6 | 147 | 0.74 |
| 8 | 261 | 1.3 |
| 10 | 408 | 2.0 |
| 12 | 588 | 3.0 |
| 16 | 44 | 5.2 |

3. During the process of chlorinating the pipeline all valves and other pipeline appurtenances shall be operated several times to provide sufficient contact with the chlorinating agent. Following chlorination, the water line shall be thoroughly flushed and the water in the main held for 16 hours before the sample for the bacteriological test is taken. A second sample shall be taken a minimum of 24 hours after the first sample. If necessary, the process (rechlorination, etc.), shall be repeated until satisfactory bacteriological tests have been obtained.

SECTION 8.15 GENERAL CONTRACTOR GUIDELINES TO MEET THE ABOVE STANDARD

- A. PURPOSE:
To assist contractors installing culinary water lines, valves, fittings, etc., to meet bacteriologic testing requirements.
- B. INFORMATION SOURCES
1. Manufacture pipe installation guidelines
 2. AWWA Standards
 3. USDW Standards
 4. Lehi City Design Standards and Public Improvement Specifications
- C. LIMITATIONS
These are only excerpts from the above Information Sources. Each contractor should become familiar with all the codes, standards and guidelines applicable to their

profession. No guarantees are implied, only that following these guidelines may help in resolving bacteriologic contamination issues.

D. DELIVERY

Do not drop during unloading, etc.; No cracks, hairline fractures, etc.; New materials must be clean as much as possible; Cover during storage to prevent dust, dirt, etc., accumulation; and examine pipe for defects, extraneous material, dirt, dust, oils, grease, etc. before installing.

E. INSTALLATION

Place pipe in trenches carefully (do not drop). Use AWWA lubrication (NSF approved). During the application of the lubricant:

1. Must be kept clean from dirt, bacteria, etc.
2. If the lubricant on the pipe or in the container becomes dirty or contaminated, thoroughly clean the pipe gasket and use a new container of lubricant.
3. Install per manufacturer's recommendation and limit any excess that could trap dirt, bacteria, etc.
4. During construction no debris, animals, ground/surface water, etc. shall be allowed to enter the line.
5. When work is not in progress, the ends of the lines shall have a water tight plug to prevent debris, animals, ground/surface water, etc.

F. DISINFECTION

1. Flush per specification. Pipe sections should be phased so only short sections are flushed and tested at one time.
2. Disinfect per specification. Should have at least 25 ppm free chlorine residual after 24 hours throughout the system.
3. City will take two consecutive samples (24 hours apart) for bacteria compliance. Each sample must have "0" coliform and less than 20 miscellaneous bacteria.
4. Reflush/Disinfect as needed to meet bacteria requirements.

SECTION 8.16 CROSS CONNECTION CONTROL AND BACK FLOW PREVENTION

A. GENERAL

An approved back flow prevention assembly may be required at the customer's culinary water service connection for the safety of the culinary water system to reduce the potential contamination that may be caused by a cross connection, chemical use, etc. Generally applies to all commercial, manufacturing, industrial, institutional, etc., but may also apply to residential type if it appears that a potential contamination issue may occur. The Water Department (culinary water) shall have the right to inspect a customer's internal culinary water system to determine if a back flow device will be needed and/or required. (See Lehi City Municipal Code for further details.)

B. BACK FLOW INSTALLATION GUIDELINES

1. All back flow specialty devices shall be installed in accordance with state, federal and City requirements and the manufacturer's instructions, and located per the Lehi Water Department. Each device must be tested by the owner 10 days after installation and every year thereafter. The test results must be supplied to Lehi Water Department. Any remedial action must be performed by a certified back flow technician at the owner's expense.
2. Types of backflow devices will be evaluated and required by Lehi Water Department. Site review and inspection will determine the degree of hazard to the water system.
3. Above-ground devices will require a heated "hot box" installed and inspected by the Lehi Water Department. Hot box installation and maintenance will be the responsibility of the owner.
4. Failure to comply with installation and testing requirements will result in a discontinuance of culinary water service to the property.