

## SECTION 15

### AIR RELEASE VALVE ASSEMBLIES

#### 15-1 General

##### 15-1.01 Scope

This section describes the requirements for furnishing and installing Air Release Valve Assemblies of the size and type shown on the plans, as an appurtenance to domestic water mains. These requirements include the types of valves and materials to be used, methods and requirements for installation, and measurement for payment.

This section does not include air valves that are an integral part of other major installations such as pumping and pressure reducing stations, and other in-plant air valves. If required, items such as these have been shown on the plans and have been described elsewhere in these specifications.

##### 15-1.02 Description of Work

Work under this section shall include, but not be limited to, excavation (regardless of surface and subsurface conditions), installing the connection to the main, shutoff valve and valve operator extension shaft, air valve lateral, air valve, vent pipe, completing all joints and corrosion protection, installing and testing the locating wire, installing the shutoff valve box and air valve box along with lids and extensions, painting the lid, core drilling the air valve box, installing the vent pipe, forming and pouring the concrete valve box foundation (if required) and pads, placing of stone slope protection, restoration of the surface area around the Air Release Valve Assembly, and installing a post and guide marker.

##### 15-1.03 Location

Location stationing shown on the plans for Air Release Valve Assemblies is approximate and intended as a general location only. The final location of the connection to the water main for air valves shall be at the high point as determined in the field. The lateral location of the Air Release Valve Assemblies shall be as shown on the plans, or as designated by the District Engineer. The Air Release Valve Assemblies shall not be located in areas subject to standing or running water. Air Release Valve Assemblies shall be located at all high points, whether or not shown on the plans.

If an Air Release Valve Assembly is installed at the Contractor's convenience, such as raising the water main grade to avoid an overly deep trench, the assembly shall be installed at the Contractor's expense. Such deviations from the plans shall be subject to approval of the District Engineer prior to starting the work.

##### 15-1.04 Design

Air Release Valve Assemblies shall be designed to withstand the working pressures shown on the plans or to a design working pressure of 250 psi, whichever is greater.

##### 15-1.05 Submittals

Submittals supplied by the Contractor shall include: catalog data for air release valves, shutoff valves, and air valve boxes, lids, and extensions; Affidavit of Compliance and catalog data for traffic boxes and lids for H2O loading. All other materials shall be furnished with submittals, as

described elsewhere in these specifications. The Contractor's attention is directed to the General Conditions of this Contract under "Submittals".

#### 15-1.06 Inspection

The Contractor shall make all air valves, shutoff valves, pipe and fittings, and valve boxes available for inspection by the District Engineer prior to installation. The Contractor shall provide men and equipment necessary for the Inspector to examine all materials thoroughly. Each phase of the work shall pass inspection by the District Engineer before commencing with work on the next phase. The phases of work shall consist of, but not be limited to, excavation for the lateral, tapping of the main, installation of the shutoff valve, pouring the box foundation (if required), installing the air valve lateral and vent pipe, applying corrosion protection, backfilling, raising shutoff valve and air valve boxes to final grade, forming and pouring the valve box pad, testing the locating wire, and completing surface restoration. After installation is complete, the shutoff valve and air valve will be inspected for leaks and proper operation.

### 15-2 Materials

#### 15-2.01 General

Materials furnished for Air Release Valve Assemblies shall include, but not be limited to, saddles or fittings used for the connection to the main, pipe and fittings used for the air valve lateral and vent pipe, shutoff valves; air valve boxes, lids, and extensions; drain rock, concrete for valve box pads, stone slope protection, posts and guide markers, and materials used for restoration of the area around the assemblies.

#### 15-2.02 Air Valves

The types of air valves described in this section include air and vacuum release valves, air release valves, and combination air release valves. Air valves shall conform to AWWA C512 and these specifications.

Air valves of the size and type shown on the plans shall be as manufactured by the Valve and Primer Corporation (APCO) or the Multiplex Manufacturing Company (Crispen). The valve manufacturer selected shall be used throughout the work except where specific types of valves are shown on the plans. Alternate valves may be furnished only after receiving written approval from the District Engineer. The District has limited the list of valves and manufacturers in order to reduce valve maintenance costs and spare parts inventory.

All air valves shall be furnished with a stainless steel float, rubber seats, and brass or stainless steel lever arms. Valve bodies and valve covers shall be cast iron.

All air valves shall be marked in raised letters on the outside of the body with the manufacturer's name or mark, model identification number, the valves nominal size, and the pressure rating.

#### 15-2.02-A Air and Vacuum Release Valves

These valves shall have a large venting orifice that will exhaust large volumes of air when the pipeline is being filled. When the pipeline is being drained, these valves will allow large volumes of air to enter the pipeline to prevent excessive vacuum pressures and to facilitate the draining process. Once the pipeline is filled and under pressure, the valves shall remain closed until the pressure in the pipe reaches atmospheric pressure.

#### 15-2.02-B Air Release Valves

Air release valves shall automatically release small amounts of air that accumulate at high points along a pipeline. This automatic operation shall take place while the pipeline is in service and under pressure. Air release valves ¾-inches and smaller may use a single lever action. Air release valves 1-inch and larger shall use a compound lever action.

#### 15-2.02-C Combination Air Release Valves

Combination air release valves shall have a large orifice, which will allow large quantities of air to escape from the pipeline when the line is being filled. Once the pipeline is filled and under pressure, the valve shall automatically release small quantities of air which become trapped at the high points of the pipeline through a smaller auxiliary orifice. When the pipeline is being drained, these valves will allow large volumes of air to enter the pipeline to prevent excessive vacuum pressures and to facilitate the draining process.

#### 15-2.03 Connection to the Water Main

Connections to the water mains for Air Release Valve Assemblies 2-inch nominal size and smaller, shall be as shown on the plans and as described for Water Main Taps elsewhere in these specifications.

Connections to water mains for Air Release Valve Assemblies larger than 2-inch nominal size shall be as shown in the plans and shall use fittings conforming to AWWA C110 or C153, all as shown on the plans and as described for fittings for Water Mains elsewhere in these specifications.

#### 15-2.04 Pipe and Fittings for Air Valve Laterals

Pipe and fittings for the lateral; i.e., the pipe between the water main and the air valve, shall be as shown on the plans and as specified herein.

For air valves 3-inches and smaller, the pipe and fittings shall be brass. Brass pipe shall conform in all respects to Section 34 Brass Pipe and Fittings and shall be standard weight. Pipe ends shall be finished with male iron pipe threads.

For air valves 4-inches and larger, the pipe and fittings shall be ductile iron, conforming in all respects to Water Mains described elsewhere in these specifications. Pipe and fitting end configurations shall be as shown on the plans.

#### 15-2.05 Pipe and Fittings for Vent Pipe

Pipe and fittings for the vent pipe shall be as shown on the plans and as specified herein.

For air valves 3-inches and smaller, the vent pipe shall be Schedule 40 galvanized steel pipe with ends finished with male iron pipe threads. The fittings shall also be banded galvanized steel, with dimensions and threads conforming to ASA B16.3 and B2.1.

For air valves 4-inches and larger, the vent pipe and fittings shall be ductile iron conforming in all respects to Water Mains described elsewhere in these specifications. Pipe and fitting end configurations shall be as shown on the plans.

#### 15-2.06 Vent Pipe Clamps

Clamps used to secure the vent pipe to the guide marker post for 3/4- and 1-inch valves shall be constructed entirely of stainless steel.

#### 15-2.07 Shutoff Valve

Shutoff valves for Air Release Valve Assemblies shall be as shown on the plans and as specified herein. Shutoff valves shall be of the same nominal size as the air valve. Shutoff valves for 1-inches and smaller Air Release Valve Assemblies shall be full port brass gate valves or full port brass ball valves with lever handle and of the proper pressure rating conforming to Section 34 Brass Pipe and Fittings. Shutoff valves 2-inches and larger shall conform in all respects to the requirements for Main Line Valve Assemblies.

#### 15-2.08 Drain Rock

Drain rock to be placed in the drain pit below the air valve box shall conform to the requirements for 1-inch size permeable backfill, as required for Water Mains designated elsewhere in these specifications.

#### 15-2.09 Locating Wire

Locating wire shall be bare No. 8 gauge, single strand soft drawn copper.

Connectors shall be brass split-bolt connectors or other type of mechanically tightened joint connector approved by the District Engineer. Wire nuts or twisted joints shall not be used.

#### 15-2.10 Box, Lid and Extensions

Air Release Valve Assemblies shall be placed in the locations shown on the plans, or as directed by the District Engineer. The locations may include traffic or non-traffic. Traffic areas shall be those areas that are routinely, or occasionally, subjected to traffic loads including, but not limited to roadways, driveways, parking areas, and sidewalks with rolled curbs.

##### 15-2.10-A Non-Traffic Locations

The box and extension for air release valve assemblies located in areas not subject to traffic shall be precast reinforced concrete as shown on the plans. The lid shall be a minimum of 1/4-inch steel checkered plate, primed and painted with two coats of asphalt varnish or coal-tar enamel; black in color. The box, lid and extensions shall all be supplied by the same manufacturer. They shall be as manufactured by Christy Concrete Products, Inc., or approved equal.

##### 15-2.10-B Traffic Locations

The box, lid, extensions, and slabs for air release valve assemblies located in traffic areas shall be as shown on the plans, as specified herein, and shall be rated for H20 loading. The box, extensions, and slab shall be precast reinforced concrete with inside dimensions, including depth, at least as large as those shown on the plans. The lid shall be fabricated of steel checker plate. The lid shall be segmented so that no segment weighs more than 80 pounds, or lid segments shall be spring assisted. The lid shall be held firmly in place with bolts or screws with recessed heads. The lid shall be primed and painted with two coats of asphalt varnish or coal-tar enamel; black in color. The box, lid and extensions shall all be supplied by the same manufacturer. They shall be as manufactured by Christy Concrete Products, Inc., or approved equal.

#### 15-2.11 Concrete for Foundations and Pads

Concrete used for the air valve box pad and shutoff valve box pad shall be 3,000 psi conforming in all respects to the requirements for Concrete Work.

#### 15-2.12 Stone Slope Protection

Stone slope protection shall meet all the requirements for No. 3 backing rock as designated in CALTRANS, Section 72.

#### 15-2.13 Replacement Pavement

Replacement pavement shall be asphaltic concrete pavement conforming to CALTRANS, Section 39, and meeting the aggregate grading requirement for ½-inch maximum, medium gradation, and using grade AR-4000 paving asphalt conforming to CALTRANS, Section 92.

#### 15-2.14 Guide Markers

Guide markers and posts shall conform to the plans and to CALTRANS, Section 82. Posts shall be metal, and target plates shall be Type M.

### 15-3 Installation

#### 15-3.01 General

Air Release Valve Assemblies shall be installed as shown on the plans and as designated in these specifications. Air valves shall be mounted as near vertical as possible to insure proper operation

#### 15-3.02 Storage and Handling

Air valves and shutoff valves shall be stored and handled in their original containers which shall not be unpackaged until 24 hours prior to installation except for inspection. Both valves shall be maintained free from dirt and foreign matter, and shall be stored on wooden pallets in their original containers. Air valves and shutoff valves and their valve boxes shall not be strung out on the job more than three days prior to installation.

#### 15-3.03 Excavation and Backfill

Excavation and backfill operations shall conform to all the requirements for Water Main Pipe Trench Excavation and Backfilling.

#### 15-3.04 Air Valve Lateral and Vent Pipe Installation

Pipe and fittings for air valve laterals and vent pipes shall be installed in conformance with all the requirements for Water Mains. In addition, the pipe and fittings for air valves 3-inches and smaller shall be installed by the cut and thread method. Threaded pipe joints shall be completed in a neat workmanlike manner and shall be assembled using joint sealant compound.

#### 15-3.05 Corrosion Protection

Corrosion protection for the connection to the main shall conform to Corrosion Protection for Water Main Taps described elsewhere in these specifications.

All brass and galvanized pipe and fittings to be buried shall be primed and wrapped with tape after assembly is complete. The tape shall be made of coal tar and/or synthetic resin compounds and shall be laminated to an outer film of vinyl for added strength. The tape, with the vinyl cover, shall have a total minimum thickness of 45 mils. The pipe and fittings shall be

cleaned of all loose scale and dirt, and all grease, oil and other foreign matter before applying the primer. The tape shall be spiral-wrapped with a ½-inch minimum overlap. The primer and tape shall both be supplied by the same manufacturer and applied in accordance with the manufacturer's recommendation. This corrosion protection tape shall be as manufactured by Protecto Wrap (Primer No. 1170 and Tape No. 200) or Polyguard (Primer No. 600 and Tape No. 610).

Air valve laterals and vent pipes constructed with ductile iron pipe shall have all bolts, glands, set screws and other metal fasteners protected from corrosion. These joints shall be wrapped with polyethylene film in conformance with corrosion protection for Water Main Joints as designated elsewhere in these specifications. If the water main to which the Air Release Valve Assembly is attached requires polyethylene encasement per AWWA C105, then the ductile iron lateral and vent pipes shall be encased accordingly.

#### 15-3.06 Shutoff Valve Box Installation

Shutoff valves not contained in the same box as the Air Release Valve Assembly, as shown on the plans, shall be installed complete with a valve box, lid and extensions. Installation of the shutoff valve box shall conform in all respects to that required for a valve box for Main Line Valve Assemblies.

#### 15-3.07 Air Valve Box Installation

Air Valve boxes shall be placed in the locations as shown on the plans, or as directed by the District Engineer.

Air Valve boxes placed outside of the traveled way and road shoulder areas, shall be raised slightly above the ground surface. All surrounding drainage shall be directed away from the box. A concrete pad conforming to the plans shall be formed to full depth with wood or other suitable materials and poured around the box. The concrete shall be finished in a workmanlike manner and so as to eliminate any sharp corners. All forms shall be removed after concrete has cured. All adjacent slopes shall be covered with stone slope protection as directed by the District Engineer.

Air valve boxes placed within the traveled way shall be placed on a concrete foundation as shown on the plans. The lid shall be depressed slightly below the road surface so as not to interfere with snow removal equipment. In paved areas, the proposed location of the air valve shall be referenced so that once paving operations are complete, the pavement may be cut to the proper dimensions and removed. A sufficient amount of aggregate and base material shall be removed to allow for final positioning of the box and for the pouring of the concrete pad. The top section of the valve box shall be rigidly supported in the proper position and the concrete pad poured up to the bottom side of the surrounding pavement. After the concrete has cured sufficiently, the supports may be removed and the paving replaced. If the paving is asphalt concrete, a tack coat shall be applied, and the hot mix shall be properly compacted.

#### 15-3.08 Locating Wire

The locating wire for the air valve lateral shall be extended into the air release valve box, all as shown on the plans and as described for Water Mains elsewhere in these specifications.

#### 15-3.09 Surface Restoration and Final Cleanup

After backfill and compaction is complete, the surface over the shutoff valve, air valve lateral and air release valve assembly, and all other surfaces disturbed by this work, shall be restored to an "equal to or better than" condition as it existed prior to the start of construction, all in

conformance with Trench Restoration and Final Cleanup for Water Mains, as described elsewhere in these specifications.

#### 15-4 Measurement and Payment

##### 15-4.01 Measurement

Work performed under this section shall be measured as the number of the various sizes and types of Air Release Valve Assemblies that have been completely installed.

##### 15-4.02 Payment

The Contract unit prices shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for doing all the work necessary for the installation of Air Release Valve Assemblies as shown on the plans or as designated in these specifications. A description of the work is included at the head of this section. Any work associated herewith, but not included in other bid items, shall be deemed as included in the work described in this section.