

**WEST NAVARRE INTERMEDIATE SCHOOL**  
**5 CLASSROOM ADDITION**

**SECTION 15140 - DOMESTIC WATER PIPING**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. SECTION INCLUDES UNDER-BUILDING-SLAB AND ABOVEGROUND DOMESTIC WATER PIPES, TUBES, AND FITTINGS INSIDE BUILDINGS.

**1.2 ACTION SUBMITTALS**

- A. PRODUCT DATA: FOR TRANSITION FITTINGS AND DIELECTRIC FITTINGS.

**1.3 INFORMATIONAL SUBMITTALS**

- A. SYSTEM PURGING AND DISINFECTING ACTIVITIES REPORT.
- B. FIELD QUALITY-CONTROL REPORTS.

**PART 2 - PRODUCTS**

**2.1 PIPING MATERIALS**

- A. COMPLY WITH REQUIREMENTS IN "PIPING SCHEDULE" ARTICLE FOR APPLICATIONS OF PIPE, TUBE, FITTING MATERIALS, AND JOINING METHODS FOR SPECIFIC SERVICES, SERVICE LOCATIONS, AND PIPE SIZES.
- B. POTABLE-WATER PIPING AND COMPONENTS SHALL COMPLY WITH NSF 14 AND NSF 61. PLASTIC PIPING COMPONENTS SHALL BE MARKED WITH "NSF-PW."

**2.2 COPPER TUBE AND FITTINGS**

- A. HARD COPPER TUBE: ASTM B 88, TYPE L WATER TUBE, DRAWN TEMPER.
- B. SOFT COPPER TUBE: ASTM B 88, TYPE L WATER TUBE, ANNEALED TEMPER.
- C. CAST-COPPER, SOLDER-JOINT FITTINGS: ASME B16.18, PRESSURE FITTINGS.
- D. WROUGHT-COPPER, SOLDER-JOINT FITTINGS: ASME B16.22, WROUGHT-COPPER PRESSURE FITTINGS.
- E. BRONZE FLANGES: ASME B16.24, CLASS 150, WITH SOLDER-JOINT ENDS.
- F. COPPER UNIONS:
  - 1. MSS SP-123.

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2. CAST-COPPER-ALLOY, HEXAGONAL-STOCK BODY.
3. BALL-AND-SOCKET, METAL-TO-METAL SEATING SURFACES.
4. SOLDER-JOINT OR THREADED ENDS.

2.3 PIPING JOINING MATERIALS

- A. SOLDER FILLER METALS: ASTM B 32, LEAD-FREE ALLOYS.
- B. FLUX: ASTM B 813, WATER FLUSHABLE.
- C. BRAZING FILLER METALS: AWS A5.8/A5.8M, BCUP SERIES, COPPER-PHOSPHORUS ALLOYS FOR GENERAL-DUTY BRAZING UNLESS OTHERWISE INDICATED.

2.4 TRANSITION FITTINGS

- A. GENERAL REQUIREMENTS:
  1. SAME SIZE AS PIPES TO BE JOINED.
  2. PRESSURE RATING AT LEAST EQUAL TO PIPES TO BE JOINED.
  3. END CONNECTIONS COMPATIBLE WITH PIPES TO BE JOINED.
- B. FITTING-TYPE TRANSITION COUPLINGS: MANUFACTURED PIPING COUPLING OR SPECIFIED PIPING SYSTEM FITTING.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. COMPLY WITH REQUIREMENTS IN CIVIL SPECIFICATIONS FOR EXCAVATING, TRENCHING, AND BACKFILLING.

3.2 PIPING INSTALLATION

- A. DRAWING PLANS, SCHEMATICS, AND DIAGRAMS INDICATE GENERAL LOCATION AND ARRANGEMENT OF DOMESTIC WATER PIPING. INDICATED LOCATIONS AND ARRANGEMENTS ARE USED TO SIZE PIPE AND CALCULATE FRICTION LOSS, EXPANSION, AND OTHER DESIGN CONSIDERATIONS. INSTALL PIPING AS INDICATED UNLESS DEVIATIONS TO LAYOUT ARE APPROVED ON COORDINATION DRAWINGS.
- B. INSTALL COPPER TUBING UNDER BUILDING SLAB ACCORDING TO CDA'S "COPPER TUBE HANDBOOK."
- C. INSTALL SHUTOFF VALVE, HOSE-END DRAIN VALVE, STRAINER, PRESSURE GAGE, AND TEST TEE WITH VALVE INSIDE THE BUILDING AT EACH DOMESTIC WATER-SERVICE ENTRANCE. COMPLY WITH REQUIREMENTS FOR PRESSURE GAGES IN SECTION 15126 "METERS AND GAGES FOR PLUMBING PIPING" AND WITH REQUIREMENTS FOR DRAIN VALVES AND STRAINERS IN SECTION 15145 "DOMESTIC WATER PIPING SPECIALTIES."
- D. INSTALL DOMESTIC WATER PIPING LEVEL WITHOUT PITCH AND PLUMB.

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- E. INSTALL PIPING CONCEALED FROM VIEW AND PROTECTED FROM PHYSICAL CONTACT BY BUILDING OCCUPANTS UNLESS OTHERWISE INDICATED AND EXCEPT IN EQUIPMENT ROOMS AND SERVICE AREAS.
- F. INSTALL PIPING INDICATED TO BE EXPOSED AND PIPING IN EQUIPMENT ROOMS AND SERVICE AREAS AT RIGHT ANGLES OR PARALLEL TO BUILDING WALLS. DIAGONAL RUNS ARE PROHIBITED UNLESS SPECIFICALLY INDICATED OTHERWISE.
- G. INSTALL PIPING ABOVE ACCESSIBLE CEILINGS TO ALLOW SUFFICIENT SPACE FOR CEILING PANEL REMOVAL, AND COORDINATE WITH OTHER SERVICES OCCUPYING THAT SPACE.
- H. INSTALL PIPING TO PERMIT VALVE SERVICING.
- I. INSTALL NIPPLES, UNIONS, SPECIAL FITTINGS, AND VALVES WITH PRESSURE RATINGS THE SAME AS OR HIGHER THAN THE SYSTEM PRESSURE RATING USED IN APPLICATIONS BELOW UNLESS OTHERWISE INDICATED.
- J. INSTALL PIPING FREE OF SAGS AND BENDS.
- K. INSTALL FITTINGS FOR CHANGES IN DIRECTION AND BRANCH CONNECTIONS.
- L. INSTALL UNIONS IN COPPER TUBING AT FINAL CONNECTION TO EACH PIECE OF EQUIPMENT, MACHINE, AND SPECIALTY.
- M. INSTALL SLEEVES FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS.
- N. INSTALL ESCUTCHEONS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS.

**3.3 JOINT CONSTRUCTION**

- A. REAM ENDS OF PIPES AND TUBES AND REMOVE BURRS. BEVEL PLAIN ENDS OF STEEL PIPE.
- B. REMOVE SCALE, SLAG, DIRT, AND DEBRIS FROM INSIDE AND OUTSIDE OF PIPES, TUBES, AND FITTINGS BEFORE ASSEMBLY.
- C. THREADED JOINTS: THREAD PIPE WITH TAPERED PIPE THREADS ACCORDING TO ASME B1.20.1. CUT THREADS FULL AND CLEAN USING SHARP DIES. REAM THREADED PIPE ENDS TO REMOVE BURRS AND RESTORE FULL ID. JOIN PIPE FITTINGS AND VALVES AS FOLLOWS:
  - 1. APPLY APPROPRIATE TAPE OR THREAD COMPOUND TO EXTERNAL PIPE THREADS.
  - 2. DAMAGED THREADS: DO NOT USE PIPE OR PIPE FITTINGS WITH THREADS THAT ARE CORRODED OR DAMAGED.
- D. BRAZED JOINTS FOR COPPER TUBING: COMPLY WITH CDA'S "COPPER TUBE HANDBOOK," "BRAZED JOINTS" CHAPTER.
- E. SOLDERED JOINTS FOR COPPER TUBING: APPLY ASTM B 813, WATER-FLUSHABLE FLUX TO END OF TUBE. JOIN COPPER TUBE AND FITTINGS ACCORDING TO ASTM B 828 OR CDA'S "COPPER TUBE HANDBOOK."

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- F. JOINTS FOR DISSIMILAR-MATERIAL PIPING: MAKE JOINTS USING ADAPTERS COMPATIBLE WITH MATERIALS OF BOTH PIPING SYSTEMS.

3.4 HANGER AND SUPPORT INSTALLATION

- A. COMPLY WITH REQUIREMENTS FOR PIPE HANGER, SUPPORT PRODUCTS, AND INSTALLATION IN SECTION 15061 "HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT."
  - 1. VERTICAL PIPING: MSS TYPE 8 OR 42, CLAMPS.
  - 2. INDIVIDUAL, STRAIGHT, HORIZONTAL PIPING RUNS:
    - A. 100 FEET AND LESS: MSS TYPE 1, ADJUSTABLE, STEEL CLEVIS HANGERS.
    - B. LONGER THAN 100 FEET: MSS TYPE 43, ADJUSTABLE ROLLER HANGERS.
    - C. LONGER THAN 100 FEET IF INDICATED: MSS TYPE 49, SPRING CUSHION ROLLS.
  - 3. MULTIPLE, STRAIGHT, HORIZONTAL PIPING RUNS 100 FEET OR LONGER: MSS TYPE 44, PIPE ROLLS. SUPPORT PIPE ROLLS ON TRAPEZE.
  - 4. BASE OF VERTICAL PIPING: MSS TYPE 52, SPRING HANGERS.
- B. SUPPORT VERTICAL PIPING AND TUBING AT BASE AND AT EACH FLOOR.
- C. ROD DIAMETER MAY BE REDUCED ONE SIZE FOR DOUBLE-ROD HANGERS, TO A MINIMUM OF 3/8 INCH.
- D. INSTALL HANGERS FOR COPPER TUBING WITH THE FOLLOWING MAXIMUM HORIZONTAL SPACING AND MINIMUM ROD DIAMETERS:
  - 1. NPS 3/4 AND SMALLER: 60 INCHES WITH 3/8-INCH ROD.
  - 2. NPS 1 AND NPS 1-1/4: 72 INCHES WITH 3/8-INCH ROD.
  - 3. NPS 1-1/2 AND NPS 2: 96 INCHES WITH 3/8-INCH ROD.
  - 4. NPS 2-1/2: 108 INCHES WITH 1/2-INCH ROD.
  - 5. NPS 3 TO NPS 5: 10 FEET WITH 1/2-INCH ROD.
  - 6. NPS 6: 10 FEET WITH 5/8-INCH ROD.
  - 7. NPS 8: 10 FEET WITH 3/4-INCH ROD.
- E. INSTALL SUPPORTS FOR VERTICAL COPPER TUBING EVERY 10 FEET.
- F. SUPPORT PIPING AND TUBING NOT LISTED IN THIS ARTICLE ACCORDING TO MSS SP-69 AND MANUFACTURER'S WRITTEN INSTRUCTIONS.

3.5 CONNECTIONS

- A. DRAWINGS INDICATE GENERAL ARRANGEMENT OF PIPING, FITTINGS, AND SPECIALTIES.
- B. WHEN INSTALLING PIPING ADJACENT TO EQUIPMENT AND MACHINES, ALLOW SPACE FOR SERVICE AND MAINTENANCE.
- C. CONNECT DOMESTIC WATER PIPING TO EXTERIOR WATER-SERVICE PIPING. USE TRANSITION FITTING TO JOIN DISSIMILAR PIPING MATERIALS.

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- D. CONNECT DOMESTIC WATER PIPING TO WATER-SERVICE PIPING WITH SHUTOFF VALVE; EXTEND AND CONNECT TO THE FOLLOWING:

1. WATER HEATERS: COLD-WATER INLET AND HOT-WATER OUTLET PIPING IN SIZES INDICATED, BUT NOT SMALLER THAN SIZES OF WATER HEATER CONNECTIONS.
2. PLUMBING FIXTURES: COLD- AND HOT-WATER-SUPPLY PIPING IN SIZES INDICATED, BUT NOT SMALLER THAN THAT REQUIRED BY PLUMBING CODE.

3.6 IDENTIFICATION

- A. IDENTIFY SYSTEM COMPONENTS. COMPLY WITH REQUIREMENTS FOR IDENTIFICATION MATERIALS AND INSTALLATION IN SECTION 15076 "IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT."

3.7 FIELD QUALITY CONTROL

- A. PERFORM THE FOLLOWING TESTS AND INSPECTIONS:

1. PIPING INSPECTIONS:

- A. DO NOT ENCLOSE, COVER, OR PUT PIPING INTO OPERATION UNTIL IT HAS BEEN INSPECTED AND APPROVED BY AUTHORITIES HAVING JURISDICTION.
- B. DURING INSTALLATION, NOTIFY AUTHORITIES HAVING JURISDICTION AT LEAST ONE DAY BEFORE INSPECTION MUST BE MADE. PERFORM TESTS SPECIFIED BELOW IN PRESENCE OF AUTHORITIES HAVING JURISDICTION:
  - 1) ROUGHING-IN INSPECTION: ARRANGE FOR INSPECTION OF PIPING BEFORE CONCEALING OR CLOSING IN AFTER ROUGHING IN AND BEFORE SETTING FIXTURES.
  - 2) FINAL INSPECTION: ARRANGE FOR AUTHORITIES HAVING JURISDICTION TO OBSERVE TESTS SPECIFIED IN "PIPING TESTS" SUBPARAGRAPH BELOW AND TO ENSURE COMPLIANCE WITH REQUIREMENTS.
- C. REINSPECTION: IF AUTHORITIES HAVING JURISDICTION FIND THAT PIPING WILL NOT PASS TESTS OR INSPECTIONS, MAKE REQUIRED CORRECTIONS AND ARRANGE FOR REINSPECTION.
- D. REPORTS: PREPARE INSPECTION REPORTS AND HAVE THEM SIGNED BY AUTHORITIES HAVING JURISDICTION.

2. PIPING TESTS:

- A. FILL DOMESTIC WATER PIPING. CHECK COMPONENTS TO DETERMINE THAT THEY ARE NOT AIR BOUND AND THAT PIPING IS FULL OF WATER.
- B. TEST FOR LEAKS AND DEFECTS IN NEW PIPING AND PARTS OF EXISTING PIPING THAT HAVE BEEN ALTERED, EXTENDED, OR REPAIRED. IF TESTING IS PERFORMED IN SEGMENTS, SUBMIT A SEPARATE REPORT FOR EACH TEST, COMPLETE WITH DIAGRAM OF PORTION OF PIPING TESTED.
- C. LEAVE NEW, ALTERED, EXTENDED, OR REPLACED DOMESTIC WATER PIPING UNCOVERED AND UNCONCEALED UNTIL IT HAS BEEN TESTED AND APPROVED. EXPOSE WORK THAT WAS COVERED OR CONCEALED BEFORE IT WAS TESTED.

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- D. CAP AND SUBJECT PIPING TO STATIC WATER PRESSURE OF 50 PSIG ABOVE OPERATING PRESSURE, WITHOUT EXCEEDING PRESSURE RATING OF PIPING SYSTEM MATERIALS. ISOLATE TEST SOURCE AND ALLOW IT TO STAND FOR FOUR HOURS. LEAKS AND LOSS IN TEST PRESSURE CONSTITUTE DEFECTS THAT MUST BE REPAIRED.
  - E. REPAIR LEAKS AND DEFECTS WITH NEW MATERIALS, AND RETEST PIPING OR PORTION THEREOF UNTIL SATISFACTORY RESULTS ARE OBTAINED.
  - F. PREPARE REPORTS FOR TESTS AND FOR CORRECTIVE ACTION REQUIRED.
- B. DOMESTIC WATER PIPING WILL BE CONSIDERED DEFECTIVE IF IT DOES NOT PASS TESTS AND INSPECTIONS.
- C. PREPARE TEST AND INSPECTION REPORTS.

3.8 ADJUSTING

- A. PERFORM THE FOLLOWING ADJUSTMENTS BEFORE OPERATION:
- 1. CLOSE DRAIN VALVES, HYDRANTS, AND HOSE BIBBS.
  - 2. OPEN SHUTOFF VALVES TO FULLY OPEN POSITION.
  - 3. OPEN THROTTLING VALVES TO PROPER SETTING.
  - 4. ADJUST BALANCING VALVES IN HOT-WATER-CIRCULATION RETURN PIPING TO PROVIDE ADEQUATE FLOW.
    - A. MANUALLY ADJUST BALL-TYPE BALANCING VALVES IN HOT-WATER-CIRCULATION RETURN PIPING TO PROVIDE HOT-WATER FLOW IN EACH BRANCH.
    - B. ADJUST CALIBRATED BALANCING VALVES TO FLOWS INDICATED.
  - 5. REMOVE PLUGS USED DURING TESTING OF PIPING AND FOR TEMPORARY SEALING OF PIPING DURING INSTALLATION.
  - 6. REMOVE AND CLEAN STRAINER SCREENS. CLOSE DRAIN VALVES AND REPLACE DRAIN PLUGS.
  - 7. REMOVE FILTER CARTRIDGES FROM HOUSINGS AND VERIFY THAT CARTRIDGES ARE AS SPECIFIED FOR APPLICATION WHERE USED AND ARE CLEAN AND READY FOR USE.
  - 8. CHECK PLUMBING SPECIALTIES AND VERIFY PROPER SETTINGS, ADJUSTMENTS, AND OPERATION.

3.9 CLEANING

- A. CLEAN AND DISINFECT POTABLE DOMESTIC WATER PIPING AS FOLLOWS:
- 1. PURGE NEW PIPING AND PARTS OF EXISTING PIPING THAT HAVE BEEN ALTERED, EXTENDED, OR REPAIRED BEFORE USING.
  - 2. USE PURGING AND DISINFECTING PROCEDURES PRESCRIBED BY AUTHORITIES HAVING JURISDICTION; IF METHODS ARE NOT PRESCRIBED, USE PROCEDURES DESCRIBED IN EITHER AWWA C651 OR AWWA C652 OR FOLLOW PROCEDURES DESCRIBED BELOW:
    - A. FLUSH PIPING SYSTEM WITH CLEAN, POTABLE WATER UNTIL DIRTY WATER DOES NOT APPEAR AT OUTLETS.
    - B. FILL AND ISOLATE SYSTEM ACCORDING TO EITHER OF THE FOLLOWING:

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- 1) FILL SYSTEM OR PART THEREOF WITH WATER/CHLORINE SOLUTION WITH AT LEAST 50 PPM OF CHLORINE. ISOLATE WITH VALVES AND ALLOW TO STAND FOR 24 HOURS.
  - 2) FILL SYSTEM OR PART THEREOF WITH WATER/CHLORINE SOLUTION WITH AT LEAST 200 PPM OF CHLORINE. ISOLATE AND ALLOW TO STAND FOR THREE HOURS.
- C. FLUSH SYSTEM WITH CLEAN, POTABLE WATER UNTIL NO CHLORINE IS IN WATER COMING FROM SYSTEM AFTER THE STANDING TIME.
  - D. REPEAT PROCEDURES IF BIOLOGICAL EXAMINATION SHOWS CONTAMINATION.
  - E. SUBMIT WATER SAMPLES IN STERILE BOTTLES TO AUTHORITIES HAVING JURISDICTION.
- B. PREPARE AND SUBMIT REPORTS OF PURGING AND DISINFECTING ACTIVITIES. INCLUDE COPIES OF WATER-SAMPLE APPROVALS FROM AUTHORITIES HAVING JURISDICTION.
  - C. CLEAN INTERIOR OF DOMESTIC WATER PIPING SYSTEM. REMOVE DIRT AND DEBRIS AS WORK PROGRESSES.
- 3.10 PIPING SCHEDULE
- A. TRANSITION AND SPECIAL FITTINGS WITH PRESSURE RATINGS AT LEAST EQUAL TO PIPING RATING MAY BE USED IN APPLICATIONS BELOW UNLESS OTHERWISE INDICATED.
  - B. UNDER-BUILDING-SLAB, DOMESTIC WATER PIPING, NPS 2 AND SMALLER, SHALL BE THE FOLLOWING:
    1. SOFT COPPER TUBE, ASTM B 88, TYPE L; WROUGHT-COPPER. JOINTS ARE NOT ALLOWED UNDER BUILDING SLAB.
  - C. ABOVEGROUND DOMESTIC WATER PIPING, NPS 2 AND SMALLER, SHALL BE THE FOLLOWING:
    1. HARD COPPER TUBE, ASTM B 88, TYPE L; CAST- OR WROUGHT-COPPER, SOLDER-JOINT FITTINGS; AND SOLDERED JOINTS.

END OF SECTION 15140