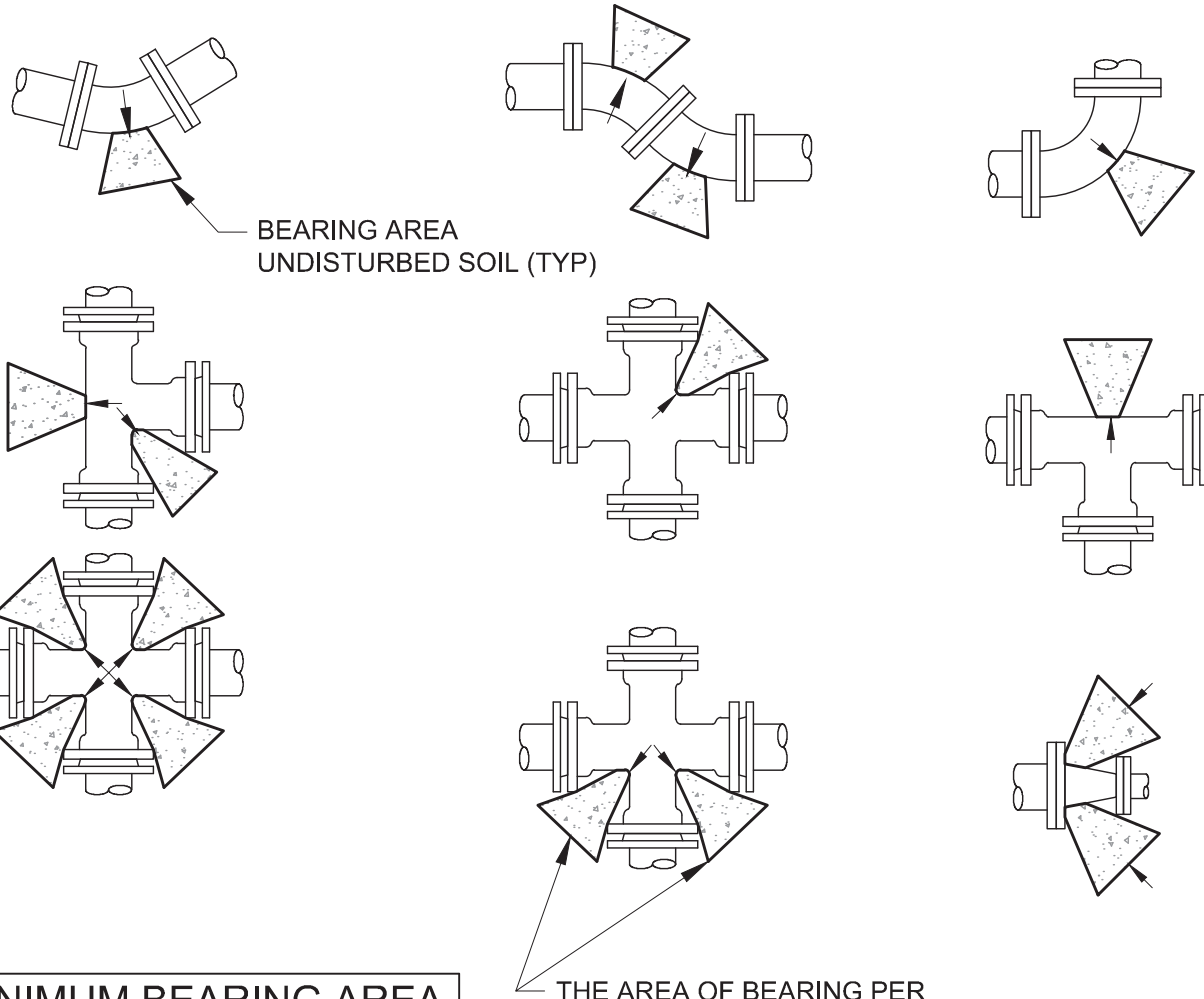


| MINIMUM BEARING AREA IN SQ. FT. | | | | | |
|---|---|---|---|---|---|
| SIZE OF PIPE | TEES, VALVES, DEAD ENDS | 90° BENDS | 45° BENDS | 22 ½° BENDS | 11 ¼° BENDS |
| 4" | 3.5 | 5 | 3 | 1.5 | 1 |
| 6" | 7 | 10 | 5.5 | 3 | 1.5 |
| 8" | 12.5 | 17 | 9.5 | 5 | 2.5 |
| 10" | 18.5 | 26 | 14 | 7.5 | 3.8 |
| 12" | 26 | 37 | 20 | 10 | 5 |
| 14" | 35 | 49 | 26.5 | 13.5 | 7 |
| 16" | 45 | 63 | 34 | 17.5 | 9 |

NOTE:

1. RESTRAINT SIZING IS BASED UPON A MAXIMUM OPERATING PRESSURE OF 150 PSI AND A TEST PRESSURE OF 250 PSI, AND A MINIMUM SOIL BEARING STRENGTH OF 2,000 PSF. OPERATING PRESSURES IN EXCESS OF 150 PSI OR SOILS WITH LESS THAN 2,000 POUND BEARING STRENGTH WILL REQUIRE SPECIAL DESIGN.
2. PIPE SIZE EXCEEDING 16" REQUIRES SPECIAL DESIGN.
3. SIDE WALLS OF THRUST BLOCK SHALL BE FORMED WITH VERTICAL SIDES.
4. DO NOT ENCASE ADJACENT FITTINGS AND BOLTS.
5. DO NOT THRUST AGAINST ADJACENT PIPES.
6. PLACE PE WRAP PRIOR TO INSTALLING BLOCKING.

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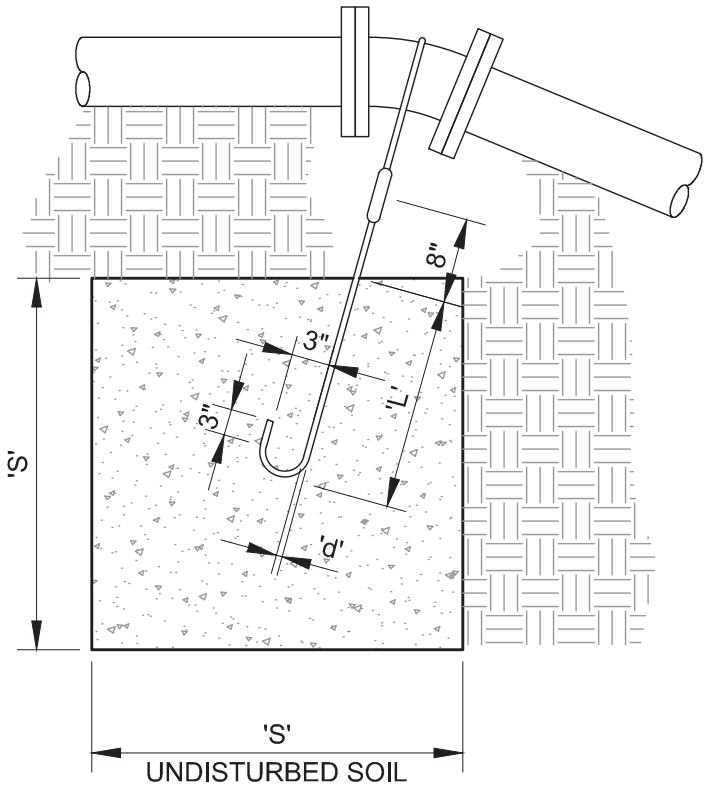
# DIRECT BEARING THRUST BLOCK

**561**




## TABLE OF DIMENSIONS

| SIZE OF PIPE (NOMINAL DIAMETER) | VERTICAL BEND IN DEGREES | CONCRETE BLOCKING IN CUBIC FEET | 'S' SIDE OF CUBE - FEET | 'd' DIAMETER OF SHANK OR REBAR RODS - INCH | 'L' DEPTH OF ROD IN CONCRETE - FEET |
|---|---|---|---|---|---|
| 4" | 11 1/4 | 9.5 | 2.2 | 5/8" | 1.5 |
| | 22 1/2 | 19.0 | 2.7 | 5/8" | 2.0 |
| 6" | 11 1/4 | 20 | 2.7 | 5/8" | 2.0 |
| | 22 1/2 | 40 | 3.4 | 5/8" | 2.0 |
| 8" | 11 1/4 | 34 | 3.3 | 5/8" | 2.0 |
| | 22 1/2 | 68 | 4.1 | 5/8" | 2.0 |
| 10" | 11 1/4 | 51 | 3.8 | 5/8" | 2.0 |
| | 22 1/2 | 102 | 4.7 | 3/4" | 3.0 |
| 12" | 11 1/4 | 72 | 4.2 | 5/8" | 2.0 |
| | 22 1/2 | 143 | 5.3 | 3/4" | 3.0 |
| 14" | 11 1/4 | 97 | 4.6 | 7/8" | 3.0 |
| | 22 1/2 | 193 | 5.8 | 7/8" | 3.0 |
| 16" | 11 1/4 | 125 | 5.0 | 7/8" | 3.0 |
| | 22 1/2 | 249 | 6.3 | 7/8" | 4.0 |

## TYPE A RESTRAINT

FOR 11 ¼° - 22 ½° VERTICAL BENDS

NOTE:

1. RESTRAINT SIZING IS BASED UPON A MAXIMUM OPERATING PRESSURE OF 150 PSI AND A TEST PRESSURE OF 250 PSI, AND A MINIMUM SOIL BEARING STRENGTH OF 2,000 PSF. OPERATING PRESSURES IN EXCESS OF 150 PSI OR SOILS WITH LESS THAN 2,000 POUND BEARING STRENGTH WILL REQUIRE SPECIAL DESIGN.
2. PIPE SIZE EXCEEDING 16" REQUIRES SPECIAL DESIGN.
3. SIDE WALLS OF THRUST BLOCK SHALL BE FORMED WITH VERTICAL SIDES.
4. DO NOT ENCASE ADJACENT FITTINGS AND BOLTS.
5. DO NOT THRUST AGAINST ADJACENT PIPES.
6. APPLY WAX TAP COATING SYSTEM TO EXPOSED SHANK AND REBAR RODS, AWWA C217. SYSTEM TO INCLUDE FILLER MATERIAL, TAPE COATING, AND PROTECTIVE OUTER WRAP. DENSO N.A., TRENTON, OR APPROVED EQUAL.
7. SHANK AND REBAR MATERIALS SHALL BE EPOXY COATED AT LEAST 15 MILS THICK.
8. REINFORCEMENT SHALL BE DEFORMED STEEL, ASTM A 615. MINIMUM STRESS YIELD STRENGTH OF STEEL TIE-DOWN BARS IS 70,000 KSI.

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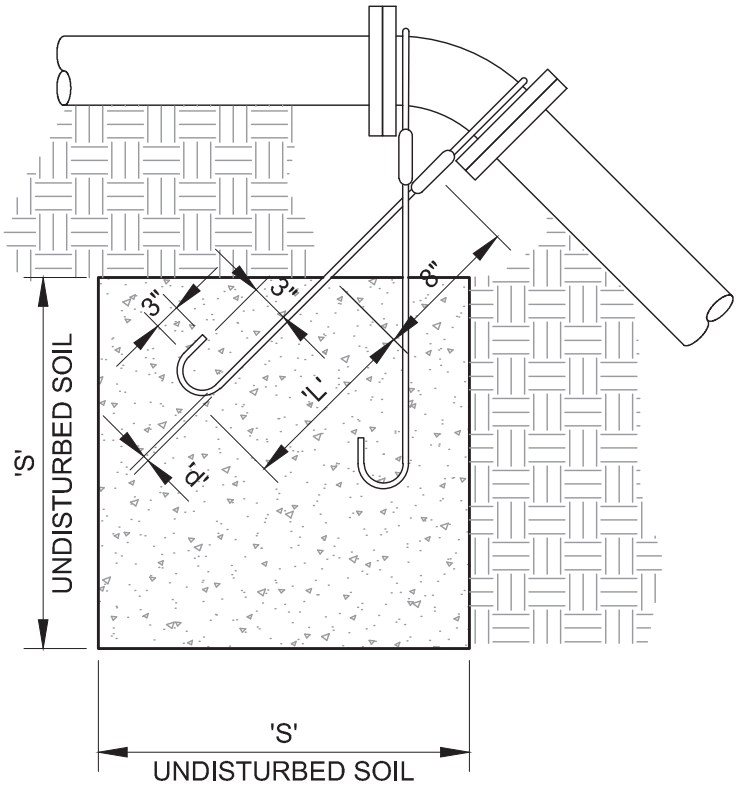


## TYPE B RESTRAINT

FOR 45° VERTICAL BENDS

| TABLE OF DIMENSIONS | | | | | |
|---|---|---|---|---|---|
| | | | 'S' | 'd' | 'L' |
| SIZE OF PIPE (NOMINAL DIAMETER) | VERTICAL BEND IN DEGREES | CONCRETE BLOCKING IN CUBIC YARDS | SIDE OF CUBE - FEET | DIAMETER OF SHANK OR REBAR RODS - INCH | DEPTH OF ROD IN CONCRETE - FEET |
| 4" | 45 | 1.4 | 3.4 | 5/8"<br>5/8" | 2.0 |
| 6" | 45 | 2.8 | 4.3 | 5/8"<br>5/8" | 2.5 |
| 8" | 45 | 4.9 | 5.1 | 5/8"<br>5/8" | 3.0 |
| 10" | 45 | 7.3 | 5.9 | 5/8"<br>5/8" | 4.0 |
| 12" | 45 | 10.4 | 6.8 | 3/4"<br>3/4" | 4.0 |
| 14" | 45 | 14.0 | 7.3 | 3/4"<br>3/4" | 4.0 |
| 16" | 45 | 18.1 | 7.9 | 3/4"<br>3/4" | 4.0 |

NOTE:

1. RESTRAINT SIZING IS BASED UPON A MAXIMUM OPERATING PRESSURE OF 150 PSI AND A TEST PRESSURE OF 250 PSI, AND A MINIMUM SOIL BEARING STRENGTH OF 2,000 PSF. OPERATING PRESSURES IN EXCESS OF 150 PSI OR SOILS WITH LESS THAN 2,000 POUND BEARING STRENGTH WILL REQUIRE SPECIAL DESIGN.
2. PIPE SIZE EXCEEDING 16" REQUIRES SPECIAL DESIGN.
3. SIDE WALLS OF THRUST BLOCK SHALL BE FORMED WITH VERTICAL SIDES.
4. DO NOT ENCASE ADJACENT FITTINGS AND BOLTS.
5. DO NOT THRUST AGAINST ADJACENT PIPES.
6. APPLY WAX TAP COATING SYSTEM TO EXPOSED SHANK AND REBAR RODS, AWWA C217. SYSTEM TO INCLUDE FILLER MATERIAL, TAPE COATING, AND PROTECTIVE OUTER WRAP. DENSO N.A., TRENTON, OR APPROVED EQUAL.
7. SHANK AND REBAR MATERIALS SHALL BE EPOXY COATED AT LEAST 15 MILS THICK.
8. REINFORCEMENT SHALL BE DEFORMED STEEL, ASTM A 615. MINIMUM STRESS YIELD STRENGTH OF STEEL TIE-DOWN BARS IS 70,000 KSI.

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| REV. | | |
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