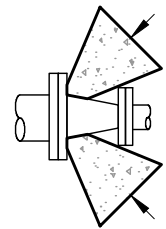
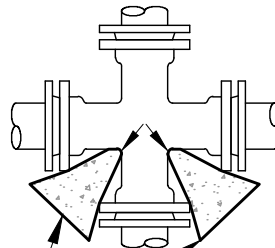
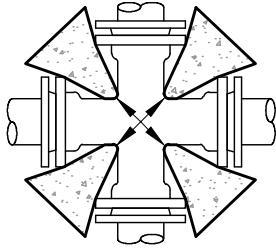
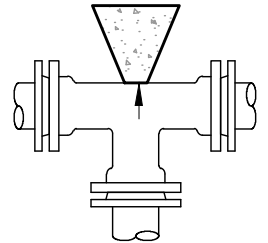
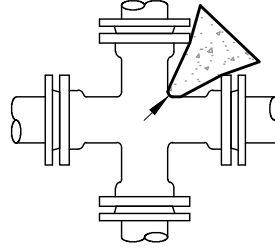
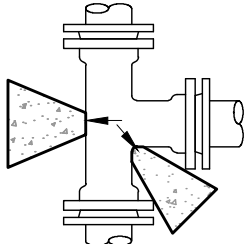
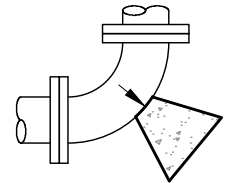
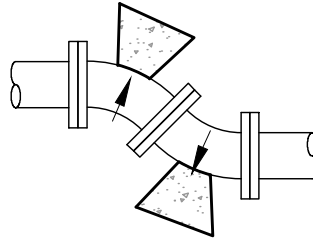


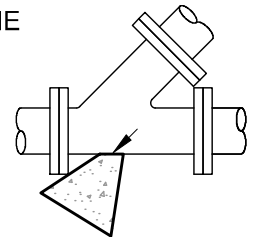
BEARING AREA
UNDISTURBED SOIL (TYP)



**MINIMUM BEARING AREA
IN SQ. FT.**

SIZE OF PIPE	TEES, VALVES, DEAD ENDS	90° BENDS	45° BENDS	22 1/2° BENDS	11 1/4° 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

THE AREA OF BEARING PER
THRUST BLOCK TO EQUAL 1/2 THE
AREA SPECIFIED FOR THE
LARGEST PIPE OR FITTING SIZE



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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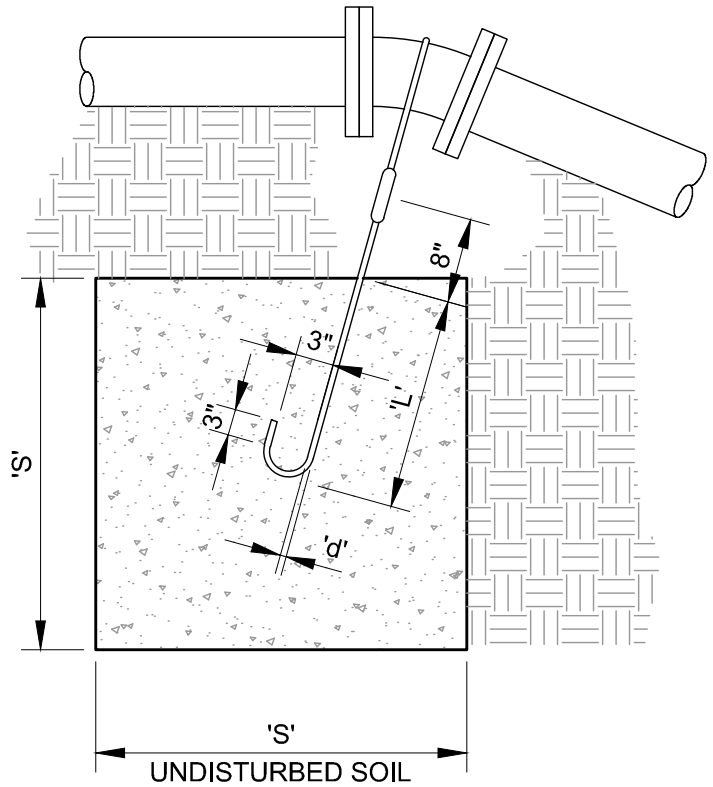
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**DIRECT BEARING
THRUST BLOCK**

STD. PLAN

561

TABLE OF DIMENSIONS					
SIZE OF PIPE (NOMINAL DIAMETER)	VERTICAL BEND IN DEGREES	CONCRETE BLOCKING IN CUBIC FEET	'S'	'd'	'L'
			SIDE OF CUBE - FEET	DIAMETER OF SHANK OR REBAR RODS - INCH	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 1/4° - 22 1/2° 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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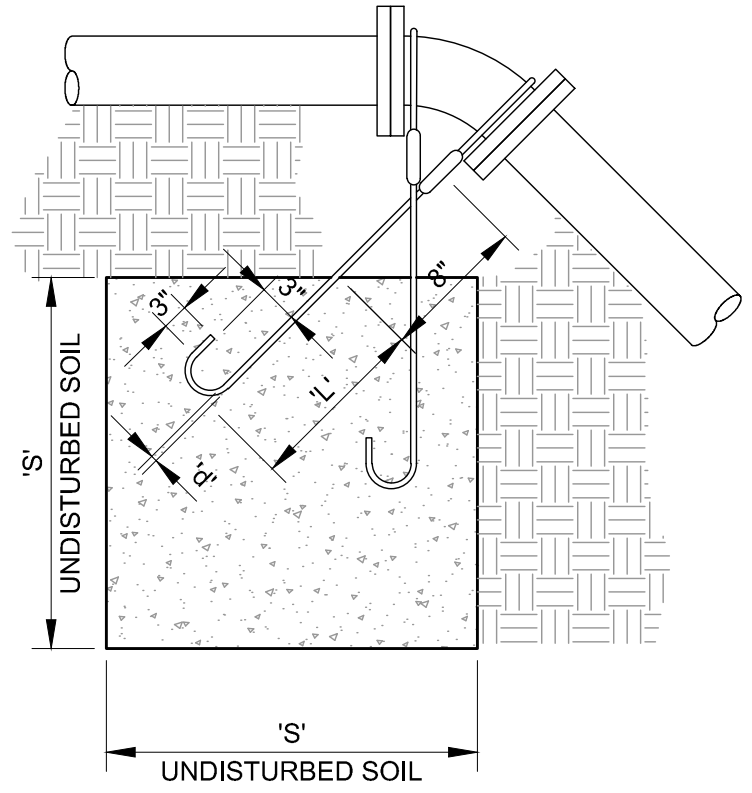
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TIE-DOWN THRUST RESTRAINTS

STD. PLAN

562-A



TYPE B RESTRAINT
FOR 45° 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.

TABLE OF DIMENSIONS

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



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**TIE-DOWN
THRUST RESTRAINTS**

STD. PLAN
562-B