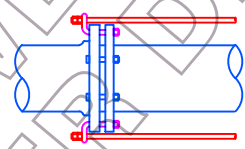


TIE ROD SELECTION TABLES

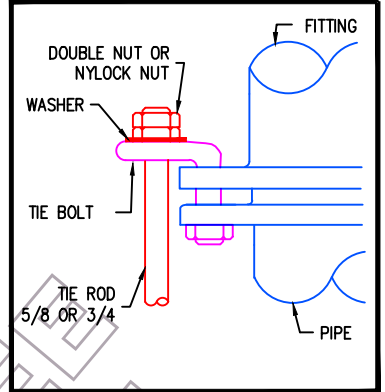
ASTM A242 (COR-TEN® OR EQUAL) STEEL										ROD DIAMETER: 5/8" OR (3/4")	
PIPE DIAMETER	NUMBER OF TIE RODS PER JOINT				MAXIMUM TIE ROD LENGTH, FEET						
	TEE DEAD END VALVE 90° BEND	45° BEND	22.5° BEND	11.25° BEND	TEE DEAD END VALVE	45° BEND	22.5° BEND	11.25° BEND			
3	2 -	2 -	2 -	2 -	100 --	100 --	100 --	100 --			
4	2 (2)	2 (2)	2 (2)	2 (2)	100 (100)	100 (100)	100 (100)	100 (100)			
6	2 (2)	2 (2)	2 (2)	2 (2)	60 (90)	80 (100)	100 (100)	100 (100)			
8	4 (3)	2 (2)	2 (2)	2 (2)	50 (50)	50 (70)	90 (100)	100 (100)			
10	6 (4)	4 (2)	2 (2)	2 (2)	40 (60)	60 (50)	60 (80)	100 (100)			
12	8 (6)	4 (4)	2 (2)	2 (2)	60 (60)	60 (80)	50 (80)	100 (100)			
14	10 (5)	6 (4)	4 (2)	2 (2)	60 (70)	60 (60)	80 (60)	80 (100)			
16	12 (8)	8 (6)	4 (3)	2 (2)	60 (50)	60 (70)	60 (70)	60 (90)			
18	16 (12)	8 (6)	6 (3)	3 (2)	50 (50)	50 (60)	70 (50)	70 (70)			
304SS OR OTHER STEELS										ROD DIAMETER: 5/8" OR (3/4")	
3	2 -	2 -	2 -	2 -	100 --	100 --	100 --	100 --			
4	2 (2)	2 (2)	2 (2)	2 (2)	100 (100)	100 (100)	100 (100)	100 (100)			
6	2 (2)	2 (2)	2 (2)	2 (2)	60 (90)	80 (100)	100 (100)	100 (100)			
8	4 (3)	3 (2)	2 (2)	2 (2)	50 (50)	70 (70)	90 (100)	100 (100)			
10	6 (4)	4 (4)	2 (2)	2 (2)	70 (60)	60 (90)	60 (80)	100 (100)			
12	8 (6)	6 (4)	4 (2)	2 (2)	80 (90)	80 (80)	100 (80)	100 (100)			
14	12 (8)	8 (6)	4 (4)	2 (2)	70 (90)	80 (90)	80 (100)	80 (100)			
16	16 (10)	10 (6)	4 (4)	3 (2)	70 (80)	80 (70)	90 (90)	90 (90)			
18	- (14)	12 (8)	6 (4)	3 (2)	-- (80)	80 (80)	70 (70)	70 (70)			



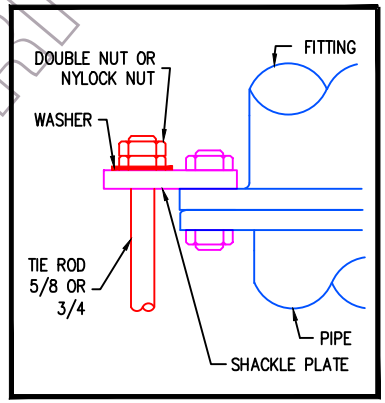
TIE BOLT

STAR SUPPLY CORPORATION OR APPROVED EQUAL

TIE BOLT DETAIL



SHACKLE PLATE DETAIL



GENERAL NOTES

- 1) TIE RODS SHALL BE "ALL THREAD" ROD OF ONE OF THE APPROVED MATERIALS:
 - ASTM A242 (COR-TEN)
 - 304 STAINLESS STEEL
 - ASTM F3125 A325 TYPE 3
 - ASTM A588
 - ASTM A709 GR 50W
 MILD STEEL WILL NOT BE ALLOWED. ASTM A307 GRADE A OR B ROD IS ALLOWED, BUT MUST BE FIELD COATED AFTER ASSEMBLY WITH EPOXY, COAL-TAR OR RUBBER.
- 2) TIE RODS SHALL HAVE "NATIONAL-COARSE" THREAD WITH EITHER TWO NUTS OR ONE SELF-LOCKING NUT AT EACH END. NUTS ARE TO BE STAR NATIONAL TIENUT OR NUT OF EQUIVALENT OR GREATER OUTER DIAMETER.
- 3) NUMBER OF TIE RODS PER JOINT SHALL BE IN ACCORDANCE WITH TIE ROD SELECTION TABLES ABOVE UNLESS OTHERWISE SHOWN ON APPROVED DESIGN PLANS.
- 5) TIE RODS SHALL BE ASSEMBLED SYMMETRICALLY ABOUT EACH JOINT (IF AN EVEN NUMBER OF RODS ARE USED THEN EACH ROD SHALL HAVE A ROD LOCATED ON THE DIRECT OPPOSITE SIDE OF JOINT. IF 3 OR 6 RODS ARE USED THEN AN EQUAL NUMBER OF UNSHACKLED BOLT HOLES SHALL BE LEFT BETWEEN ANY TWO TIE RODS.)
- 6) TIE ROD NUTS SHALL BE TIGHTENED UNIFORMLY AT EACH JOINT.
- 7) TIE ROD LENGTHS SHALL NOT EXCEED THOSE LISTED IN ABOVE TABLES, UNLESS SPECIFICALLY SHOWN ON APPROVED PLANS.
- 8) TIE ROD COUPLINGS SHALL BE GALVANIZED "STAR NATIONAL PRODUCTS TIECOUPLING" OR APPROVED EQUAL.
- 9) TIE RODS SHALL BE ATTACHED TO JOINTS WITH TIE BOLTS, EXCEPT FOR FIRE HYDRANT INSTALLATIONS WHICH SHALL USE TIE BOLTS ON LUGS. TIE BOLTS SHALL BE GALVANIZED "STAR NATIONAL PRODUCTS TIEBOLT" OR APPROVED EQUAL. "DUC-LUGS" ARE NOT ALLOWED.
- 10) 20" FITTINGS AND LARGER SHALL HAVE TIE ROD DESIGN INCLUDED ON DESIGN PLANS.

**East Wenatchee
Water District**



WATER SYSTEM STANDARD DETAIL

TIE RODS