



- CS-2 PART 2 (2.1D) OF 2014 WVRDCS MANUAL:
1. Approved restrained joint pipe systems shall be installed according to the manufacturer's recommendations and include the following:
- a. Mechanical joint pipe with use of joint restraint gland such as EBAA Iron Mega-Lug, Ford Uni-Flange, Romac Industries 'Grip Ring', US Pipe 'M.J. Field Lok', Tyler Union 'Tuf Grip', or other restraint gland as approved by the Participating Utility.
- b. Ductile iron pipe push-on joint with use of U.S. Pipe 'Field Lok' gaskets, American Ductile Iron Pipe 'Fast Grip', or approved equal.
- c. Restrained joint ductile iron pipe such as U.S. Pipe 'TR FLEX' pipe, American Ductile Iron Pipe 'Flex Ring', or other restraint joint pipe as approved by the Participating Utility.
- d. Restrained joint C900 DR 14 PVC pipe such as Diamond Lok-21 or approved equal.
- e. Ductile iron, PE, or PVC pipe push-on joints, valves or hydrants with use of Mueller Company 'AquaGrip' system.

FACTOR OF SAFETY = 1.5

PIPE SIZE (INCHES)	PIPE MATL.	90° BEND	45° BEND	22½° BEND	11½° BEND	VALVE PLUS (NOTE 2)	TEE BRANCH (NOTE 3)	REDUCER (NOTE 4)	45° VERT.	22½° VERT.	11½° VERT.
6"	D.I.	28'	21'	6'	3'	50'	26'	26'	21'	10'	5'
8"	D.I.	36'	21'	8'	4'	65'	41'	27'	27'	13'	7'
10"	D.I.	43'	21'	9'	5'	77'	53'	28'	32'	16'	8'
12"	D.I.	51'	21'	10'	6'	91'	67'	27'	38'	18'	9'
6"	PVC	29'	21'	6'	3'	78'	25'	40'	32'	16'	8'
8"	PVC	37'	21'	8'	4'	102'	49'	43'	42'	21'	10'
10"	PVC	44'	21'	9'	5'	122'	68'	41'	51'	25'	12'
12"	PVC	51'	21'	11'	6'	143'	89'	42'	60'	29'	15'

1. ALL JOINTS SHALL BE RESTRAINED ON BOTH SIDES OF THE FITTING AND DOCUMENTED BY THE INSPECTOR FOR THE LENGTH SHOWN UNLESS OTHERWISE INDICATED.
2. RESTRAINED LENGTH SHOWN REFERS TO ANY DESIGNED OR POTENTIAL LINE STOP, INCLUDING ALL GATE VALVES.
3. RESTRAINED LENGTH SHOWN REFERS TO THE BRANCH LINE ONLY. THE CONTINUOUS PIPE LENGTH OF THE MAIN RUN SHALL BE A MINIMUM OF 10' ON EACH SIDE OF THE TEE.
4. RESTRAINED LENGTH SHOWN IS BASED ON REDUCING PIPE DIAMETER TO ONE SIZE SMALLER THAN PIPE LISTED (ANY OTHER DIAMETER REDUCTION WILL REQUIRE ADDITIONAL CALCULATIONS BEFORE INSTALLATION). RESTRAINED LENGTH SHOWN IS UPSTREAM ON THE LARGE SIDE OF THE REDUCER.
5. 12" AND SMALLER DIAMETER: IF UNDER 150 PSI WORKING PRESSURE, RESTRAINED JOINT(S) ARE TO BE USED. IF EQUAL TO OR OVER 150 PSI WORKING PRESSURE, BOTH THRUST BLOCK(S) AND RESTRAINED JOINT(S) SHALL BE USED.
- LARGER THAN 12" DIAMETER: IF UNDER 100 PSI WORKING PRESSURE, RESTRAINED JOINT(S) ARE TO BE USED. IF EQUAL TO OR OVER 100 PSI WORKING PRESSURE, BOTH THRUST BLOCK(S) AND RESTRAINED JOINT(S) SHALL BE USED (UNLESS OTHERWISE APPROVED BY THE PARTICIPATING UTILITY).
6. FOR RESTRAINED JOINT PIPING REQUIREMENTS AT FITTING R.J. PVC AND R.J. DIP MAY BE USED INTERCHANGEABLY WITH APPROVAL FROM PARTICIPATING UTILITY. CONTRACTOR MUST PLAN ACCORDINGLY FOR THE DIFFERENCE IN PVC AND DIP BELL AND SPIGOT DIMENSIONS.

WESTERN VIRGINIA REGIONAL - CONSTRUCTION DETAIL

MINIMUM THRUST RESTRAINT OF PIPE JOINTS DESIGN LENGTHS

W-19

02/10/15

