

Restrained length for bend, tee and valve

【Conditions】

Calculation method

JDPA (Japan Ductile Iron Pipe Association)

Backfill

Good sand

Earth covering

30" or more for pipe size 3" to 8"

36" or more for pipe size 12" and 16"

Polyethylene encasement

Covered

Coefficient of subgrade reaction

14000 kN/m3

≒89100 lbf/ft3

Unit: ft

Pipe Size (inch)	Bend portion*)							Tee portion **)			Valve and dead end		
	≤22.5°	≤45°			≤90°			Design pressure			Design pressure		
	Design pressure	Design pressure			Design pressure			Design pressure			Design pressure		
	~250psi	~150psi	~200psi	~250psi	~150psi	~200psi	~250psi	~150psi	~200psi	~250psi	~150psi	~200psi	~250psi
3"	4 ft	4 ft	4 ft	9 ft	10 ft	17 ft	24 ft	4 ft	5 ft	12 ft	26 ft	35 ft	43 ft
4"	4 ft	4 ft	4 ft	13 ft	14 ft	22 ft	31 ft	4 ft	6 ft	15 ft	32 ft	43 ft	54 ft
6"	4 ft	4 ft	4 ft	21 ft	20 ft	32 ft	44 ft	4 ft	5 ft	17 ft	45 ft	60 ft	74 ft
8"	4 ft	4 ft	25 ft	40 ft	31 ft	46 ft	61 ft	4 ft	16 ft	31 ft	56 ft	75 ft	94 ft
12"	4 ft	4 ft	4 ft	47 ft	36 ft	54 ft	72 ft	4 ft	16 ft	33 ft	67 ft	89 ft	111 ft
16"	4 ft	4 ft	38 ft	60 ft	46 ft	68 ft	90 ft	14 ft	36 ft	58 ft	84 ft	112 ft	140 ft

*) The restrained length on this table is ensured on each side of the bend.

**) The restrained length on this table is ensured on the branch. Also, the restrained length of 4 ft is ensured on each side of the tee on the main.

■ *If a continuous restrained length exceeds 120ft, it is recommended to use thrust block to shorten the restrained length.*