Restrained length of bend, tee and Valve

【Conditions】

Calculation method	**JDPA (Japan Ductile Iron Pipe Association)**
Backfill	**Slurry Backfill (Unconfined compression strength: 100 lb/in^2)**
Earth covering	**30" or more for pipe size 3" to 8"**
	36" or more for pipe size 12"
Polyethylene encasement	**Covered**

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		
	～250psi	~200psi	～250psi	～150psi	~200psi	～250psi	～150psi	~200psi	～250psi	～150psi	~200psi	～250psi
6"	**4ft**	**4ft**	**4ft**	**9ft**	**15ft**	**21ft**	**4ft**	**4ft**	**8ft**	**23ft**	**30ft**	**38ft**
8"	**4ft**	**4ft**	**18ft**	**14ft**	**22ft**	**30ft**	**4ft**	**8ft**	**16ft**	**29ft**	**38ft**	**48ft**
12"	**4ft**	**4ft**	**20ft**	**17ft**	**26ft**	**35ft**	**4ft**	**4ft**	**13ft**	**34ft**	**44ft**	**57ft**

*) 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 60ft, it is recommended to use thrust block to shorten the restrained length.