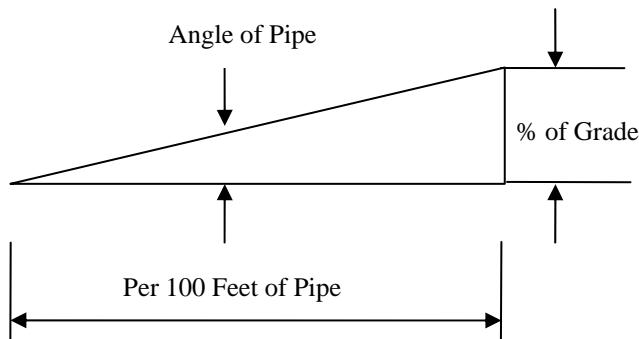


How Percent of Grade Relates to Pipe Deflection for A-LOK X-CEL/Premium Compression Connectors and Z-LOK Cast in Boot Connectors

PERCENT OF GRADE CHART



Example:

5% of Grade/100 Feet of Pipe = 2.86 Pipe Angle/Deflection

Compression Connectors

Slope Grade	Pipe Angle
1%	.57
2%	1.15
3%	1.72
4%	2.29
5%	2.86
6%	3.43
7%	4.00
8%	4.57
9%	5.14
10%	5.71
11%	6.28
12%	6.84
13%	7.41
14%	7.97
15%	8.53
16%	9.09
*17%	*9.65

**This is the point, 17.65% of the slope, where standard deflection of the pipe in A-LOK X-CEL and Premium Connectors can no longer be enough and must be helped by skiving the mandrels.
(See Figure 2)**

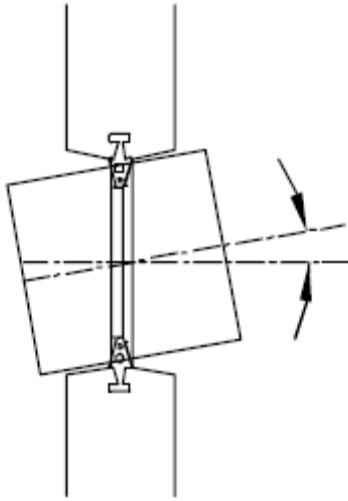
Z-LOK Cast in Boot Connectors

Slope Grade	Pipe Angle	Slope Grade	Pipe Angle
1%	.57	26%	14.57
2%	1.15	27%	15.11
3%	1.72	28%	15.64
4%	2.29	29%	16.17
5%	2.86	30%	16.70
6%	3.43	31%	17.22
7%	4.00	32%	17.74
8%	4.57	33%	18.26
9%	5.14	34%	18.79
10%	5.71	35%	19.29
11%	6.28	36%	19.80
12%	6.84	37%	20.30
13%	7.41	38%	20.81
14%	7.97	39%	21.31
15%	8.53	40%	21.80
16%	9.09	41%	22.29
17%	9.65	42%	22.78
18%	10.20	43%	23.27
19%	10.76	44%	23.75
20%	11.31	45%	24.23
21%	11.86	*46%	*24.70
22%	12.41		
23%	12.95		
24%	13.50		
25%	14.04		

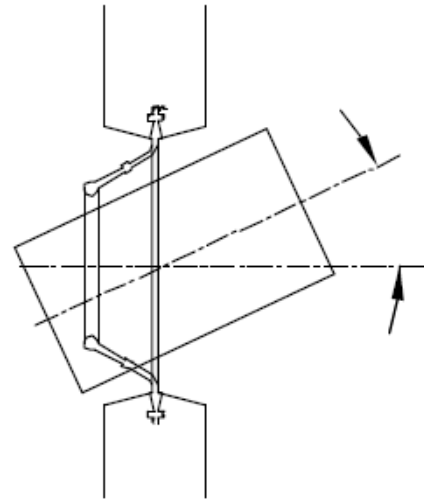
**Using 8" PVC pipe, this is the point, 46.50% of the slope, where standard deflection of the pipe in a Z-LOK Cast in Boot Connectors can no longer be enough and must be helped by skiving the mandrels.
(See Figure 2)**



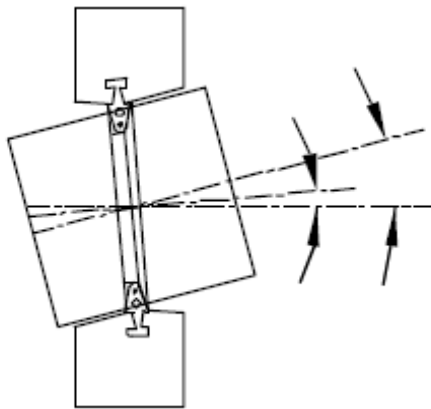
Fig. 2: How Skiving a Mandrel can Increase the Pipe Deflection



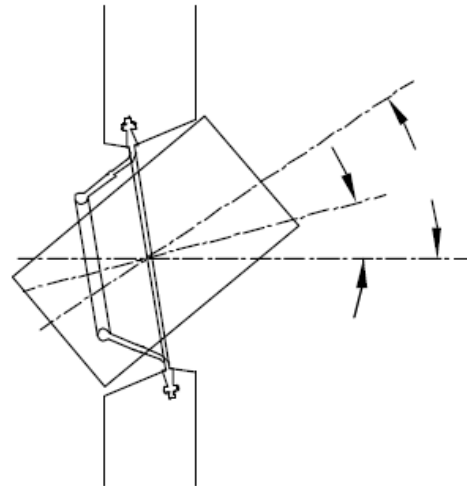
**Standard A-LOK Connector Installation
Pipe Pitched 10° (17.65% Slope)**



**Standard Z-LOK Connector Installation with
8" PVC Pipe Pitched 24.70° (46% Slope)**



**A-LOK Connector Skived 5°
Pipe Pitched 15° (26.75% Slope)**



**Z-LOK Connector Skived 15° using
8" PVC Pipe Pitched 40° (84% Slope)**



MAXIMUM PARALLEL PIPE LAYOUT FOR STANDARD Z•LOK MANDRELS

		MANHOLE DIAMETER							
CONNECTOR	PIPE	48"	60"	72"	84"	96"	108"	120"	144"
C107-01	PVC	27.0	30.5	33.0	36.0	38.5	41.5	44.0	49.5
C107-02	PVC	23.5	27.5	31.0	33.5	36.5	39.0	42.5	47.5
C107-03	PVC	23.5	27.5	31.0	33.5	36.5	39.0	42.5	47.5
C107-04	PVC	23.5	27.0	30.5	34.5	37.5	40.5	43.5	46.5
	D.I.	21.5	25.0	28.5	31.5	34.5	37.0	39.5	45.0
	VC	19.5	23.5	26.0	28.5	30.5	34.0	37.5	43.0
C107-06	PVC	21.5	25.0	27.0	32.5	36.0	39.5	43.0	46.5
	D.I.	19.5	23.5	25.0	30.5	34.0	37.5	39.5	45.0
	VC	18.0	21.5	23.5	28.5	32.5	36.0	37.5	43.0
F208-08	PVC	18.0	19.5	21.5	23.5	25.0	27.0	30.5	36.0
	D.I.	14.5	16.0	18.0	19.5	21.5	23.5	27.0	32.5
C107-08	PVC	23.5	25.0	27.0	30.5	34.0	37.5	41.5	46.5
	D.I.	21.5	23.5	25.0	28.5	32.5	36.0	39.5	45.0
	VC	19.5	21.5	23.5	27.0	30.5	34.0	37.5	43.0
C107-10	PVC	21.5	23.5	25.0	28.5	34.0	37.5	43.0	46.5
	D.I.	19.5	21.5	23.5	27.0	32.5	36.0	41.5	45.0
	VC	18.0	19.5	21.5	25.0	30.5	34.0	39.5	43.0
C107-12	PVC	19.5	23.5	28.5	34.0	39.5	45.0	46.5	48.5
	D.I.	19.5	21.5	27.0	32.5	36.0	41.5	43.0	45.0
	VC	NA	20.5	25.0	28.5	32.5	34.0	39.5	41.5
C107-15	PVC	NA	21.5	24.5	27.0	32.5	36.0	37.5	45.0
C107-16	D.I.	NA	NA	27.0	30.5	34.0	37.5	41.5	45.0
	VC	NA	NA	25.0	27.0	30.5	34.0	37.5	41.5
C107-18	PVC	NA	NA	NA	23.5	27.0	28.5	32.5	36.0
	D.I.	NA	NA	NA	21.5	25.0	27.0	30.5	34.0

NOTE:

Skived mandrels are available where greater center to center are required.

