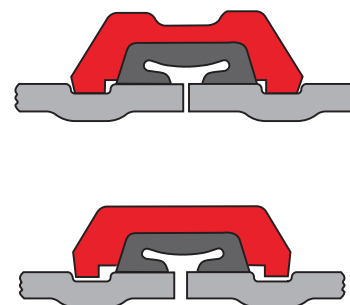


Design

Tech Data Sheets: TFP1800, G820, G830

Rigid Joints

GRINNELL Rigid Couplings provide rigid gripping of the pipe. They are designed to bring the pipe ends close together and to ensure the coupling clamps firmly onto the pipe OD and the bottom of the grooves. Because rigid couplings clamp around the entire pipe surface, they provide resistance to flexural and torsional loads and therefore permit longer spacing to ASME/ANSI B31.1 (Power Piping) and ASME/ANSI B39.1 (Building Services) requirements.

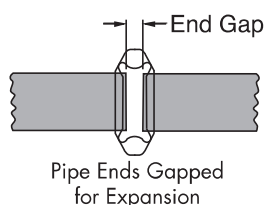


Flexible Joints

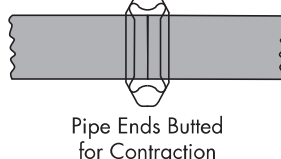
GRINNELL Flexible Couplings act as an "expansion joint", allowing linear and angular movement of the pipe. They are designed with the coupling keys engaging the pipe without gripping on the bottom of the grooves, while still providing for a restrained mechanical joint. This is particularly useful to allow for pipe expansion/contraction and piping misalignment.

Linear Movement (Flexible Couplings)

For thermal expansion with flexible couplings, the pipe ends at each joint should be fully gapped to the maximum amount. This can be accomplished by pressurising the system and then anchoring the system.

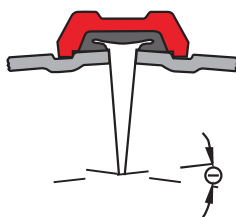


For thermal contraction with flexible couplings, the pipe ends at each joint should be fully butted. The system can then be anchored in place to prevent the pipe ends from opening up to the maximum end gap when pressurised.



Angular Deflection

GRINNELL Flexible Couplings are capable of accommodating angular deflection.



Expansion/Contraction

GRINNELL Flexible Couplings are capable of accommodating pipe thermal movements provided they are properly gapped and a sufficient quantity of flexible couplings are used. Note that flexible couplings will not accommodate both full maximum linear movement and the maximum available angular deflection concurrently at the same joint.

If it is desired to have both deflection and linear movement available, then the system should have sufficient flexible joints to accommodate the requirement.



For design purposes, the maximum pipe end gap should be reduced to account for field practises as follows:

End Gap Reduction	
Pipe Size mm Inches	Maximum Pipe End Gap
42.4 – 88.9 1½ – 3	50%
114.3 – 610.0 4 – 24	25%

The following values should be used as available pipe end movements for GRINNELL Figure 705, 707, and 716 Flexible Couplings:

Pipe End Movements		
Pipe Size mm Inches	Cut Grooved mm Inches	Roll Grooved mm Inches
42.4 – 88.9 1½ – 3	0 – 1.6 0 – 0.063	0 – 0.8 0 – 0.031
114.3 – 610.0 4 – 24	0 – 2.4 0 – 0.188	0 – 2.4 0 – 0.094

* Roll grooved joints provide half the available movement of cut grooved joints.

The deflection published is a maximum value. For design purposes the maximum deflection should be reduced to account for field practises as shown:

Deflection	
Pipe Size mm Inches	Maximum Pipe Deflection Reduction
42.4 – 88.9 1½ – 3	50%
114.3 – 610.0 4 – 24	25%

Misalignment and Deflection

Tech Data Sheets: TFP1800, G820, G830

GRINNELL Flexible Couplings provide for restrained joints and allow for deflection to aid where the pipe or equipment is misaligned.

Note that flexible couplings will not accommodate both full maximum linear movement and the maximum available angular deflection concurrently at the same joint.



If it is desired to have both deflection and linear movement available, then the system should have sufficient flexible joints to accommodate the requirement.



Flexible couplings are also useful in laying out curved piping systems.

$$R = \frac{L}{(2) \left(\sin \frac{\Theta}{2} \right)}$$

$$L = (2) (R) \left(\sin \frac{\Theta}{2} \right)$$

$$N = \frac{T}{\Theta}$$

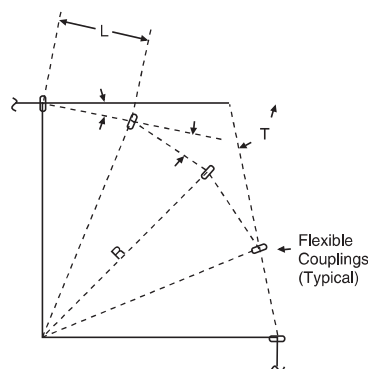
R = Radius of curve

L = Pipe length

Θ = Deflection from centreline, in degrees, for each coupling (see table)

N = Number of flexible couplings needed

T = Total deflection, in degrees, required



Design Deflection for Roll Grooved Pipe

Deflection Θ (Roll Grooved Pipe)	
Pipe Size Inches mm	Figures 705 & 707
42.4 1-1/4	1.08°
48.3 1-1/2	0.94°
60.3 2	0.75°
73.0 2-1/2	0.62°
76.1mm —	0.60°
88.9 3	0.51°
114.3 4	1.19°
141.3 5	0.97°
165.1mm —	0.83°
168.3 6	0.81°
219.1 8	0.63°
273.0 10	0.50°
323.9 12	0.42°
Incorporates the recommended safety factor reduction for field practises (50% for sizes 32mm - 80mm (1¼ - 3") and 25% for sizes 100mm - 300mm (4 - 12")).	