

California Environmental Protection Agency



Vapor Recovery Test Procedure

TP-201.2G

**Bend Radius Determination for
Underground Storage Tank Vapor Return Piping**

Adopted: October 8, 2003

Amended: May 25, 2006

**California Environmental Protection Agency
Air Resources Board**

TP-201.2G

**Bend Radius Determination for
Underground Storage Tank Vapor Return Piping**

Definitions common to all certification and test procedures are in:

D-200 Definitions for Vapor Recovery Procedures

For the purpose of this procedure, the term "CARB" refers to the California Air Resources Board, and the term "Executive Officer" refers to the CARB Executive Officer or his or her authorized representative or designate.

1. APPLICABILITY AND PURPOSE

This procedure applies to gasoline compatible piping used as vapor return piping to underground storage tanks of gasoline dispensing facilities (GDFs). The purpose is to determine whether vapor recovery piping complies with rigid piping as specified in CP-201 and D-200. This procedure can be used for certification and compliance testing.

2. PRINCIPLE AND SUMMARY OF TEST PROCEDURE

This test procedure measures the bend radius of a ten-foot length of pipe that is supported at two points and has a weight suspended from the center of the pipe for a given length of time. Piping with a bend radius less than or equal to the allowable limit is acceptable for use as vapor return piping in gasoline dispensing facilities utilizing buried vapor return piping.

3. BIASES AND INTERFERENCES

Testing should be performed within +/- 5 degrees of standard temperature (72 degrees Fahrenheit +/- 5 degrees) to avoid thermal effects.

4. SENSITIVITY, RANGE AND PRECISION

Section reserved.

5. EQUIPMENT

5.1 Roller Stands (2) (See Figure 1)

- 5.2 Three (3) foot minimum measuring tape or ruler. (1/8" minimum increments)
- 5.3 Forty (40) lb. Weight +/- 2 oz (See Figure 2)
- 5.4 One to two inch wide support strap. (See Figure 3)
- 5.5 Ten foot (10) +/- 1/4" length of vapor piping
- 5.6 Felt tipped marker

6. TEST PROCEDURE

Record test measurements on Form 1. Alternate forms may be used as long as they contain the same information

- 6.1 Place roller stands on flat level surface with the rollers aligned parallel with each other and adjust the height of the top of each roller to three feet (3') +/- 1/8" measured from the ground up.
- 6.2 Measure the distance between the centerlines of each roller and adjust the distance between the roller centers until they are six (6) feet +/- 1/4" apart.
- 6.3 Using the felt tipped marker, mark lengths two (2) ft from each end of the 10 foot pipe length and the center of the pipe, five (5) ft from either end.
- 6.4 Place the nylon support strap over the end of the pipe and slide it into position at the pipe center.
- 6.5 Place the pipe on the roller stands such that the two (2) ft marks are on top of the rollers.
- 6.6 Measure and record the distance from the bottom of the pipe to the ground at the center of the pipe.
- 6.7 Suspend the forty pounds (40) from the strap support at the center of the pipe.
- 6.8 Wait five (5) minutes and record the distance from the bottom of the pipe center to the ground.

7. CALCULATING RESULTS

- 7.1 Subtract the measured distance of the weighted pipe center from the ground from the measured distance of the straight pipe length from the ground.
- 7.2 Convert the deflection distance to a bend radius.
- 7.3 Compare this distance to the allowable deflection limit as specified in Section 4 of CP-201. If this deflection distance is less than or equal to the allowable deflection limit, then the piping meets the rigidity requirement for vapor piping.

8. REPORTING RESULTS

Report results on Form 1.

9. ALTERNATE PROCEDURE

This procedure shall be conducted as specified. Modifications to this procedure shall not be used to determine compliance unless prior written approval has been obtained from the Executive Officer, pursuant to Section 14 of Certification Procedure CP-201.

TP-201.2G Form 1

Pipe Specifications	
Pipe Manufacturer	
Piping Material (FRP, HDPE, etc)	
Outside Pipe Diameter (inches)	
Section 6 Test Measurements:	
6.2 Distance from top of roller stands to ground (inches)	
6.3 Horizontal distance between centerline of each roller stand (inches)	
6.4 Distance from bottom of non-weighted pipe center to ground (inches)	
6.5 Distance from bottom of weighted pipe length center to ground after 5 minutes (inches)	
Section 7 Calculations	
7.1 Difference between measurements obtained from Step 6.4 and Step 6.5 (inches)	
7.2 Is the measurement less than or equal to the allowable deflection limit as called out in CP-201? (Yes or No)	
If the answer to 7.2 is yes, then the piping meets the minimum bend radius requirements for vapor return piping.	

TP-201.2G Figures

Figure 1
Roller Stands



Figure 2
Strap Assembly



Figure 3
Example of 40 Pound Weight

