PRESSURE TESTING
LOCATION OF GAS LEAKS
COMPUTING LEAK LOCATION

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1. GENERAL

1.01 This section replaces Issue 1 and has been reissued to⌐
correct an error in the formula in Paragraph 2.01.
This section describes a method of computing the indicated⌐
location of a gas leak in order to eliminate errors which may be
introduced by inaccuracies in plotting the pressure gradient.

1.02 The method of computing outlined in this section deter-
mines by arithmetical means the point of intersection
of the extensions of the two straight lines connecting the plotted
pressure readings on each side of the leak. This eliminates
plotting errors but does not compensate for errors in pressure
readings or disturbances other than the leak on the pressure
gradient.

1.03 Computation of the location of small and medium
leaks is often helpful on buried and underground cables
when the leak is to be cleared by excavating and exposing the
cable sheath. Computation of a leak location should not be made
without first plotting and analyzing the pressure gradient to
determine the reliability of the pressure readings and the
possible existence of disturbances or irregularities which may
have distorted the leak gradient.

2. DATA USED IN COMPUTING LEAK LOCATION

2.01 The following data and formula are used in computing the leak location.
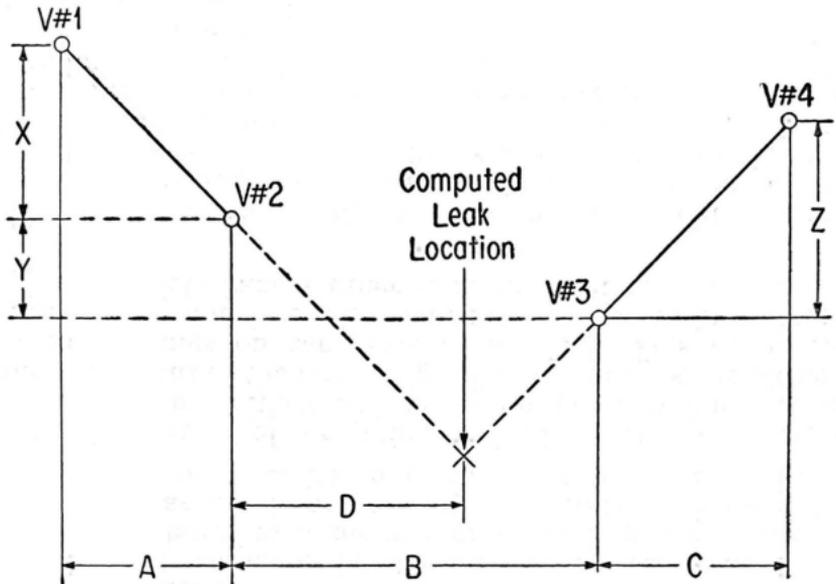
Distances
(in feet)

Valve #1 to Valve #2 = A
Valve #2 to Valve #3 = B
Valve #3 to Valve #4 = C

Pressure Readings	Pressure Differences
(in pounds)	(in pounds)
Valve #1 = V1	Valve #1 to Valve #2 = X
Valve #2 = V2	Valve #2 to Valve #3 = Y
Valve #3 = V3	Valve #3 to Valve #4 = Z
Valve #4 = V4	

The formula used in computing the location is:

$$D = \frac{A\,(BZ \pm CY)}{CX + AZ}$$

where D is the distance from Valve #2 to the leak.

Note: The term "CY" is plus when the pressure at Valve #2 is greater than at Valve #3; the term is minus when the pressure at Valve #2 is less than at Valve #3.

3. FORM FOR COMPUTING LEAK LOCATION

3.01 The use of the formula will be facilitated by setting up the data in the following form.

BZ	=	(B) times	....	(Z) =	....	(1)
CY	=	(C) times	....	(Y) =	—————	(2)
BZ $\pm$ CY		(1) plus/minus		(2) =	....	(3)
A(BZ$\pm$CY) =	....	(A) times	....	(3) =	....	(4)
CX	=	(C) times	....	(X) =	....	(5)
AZ	=	(A) times	....	(Z) =	—————	(6)
CX + AZ		(5) plus		(6) =	....	(7)
D	=	(4) divided by	....	(7) =	....	

4. EXAMPLE

4.01 Following is an example in the computation of the location of a small leak.

Data

Distances

(in feet)

Valve #1 to Valve #2 = 610 = A
Valve #2 to Valve #3 = 622 = B
Valve #3 to Valve #4 = 594 = C

Pressure Readings	**Pressure Differences**
(in pounds)	(in pounds)
Valve #1 = 8.39 = V1	Valve #1 to Valve #2 = .20 = X
Valve #2 = 8.19 = V2	Valve #2 to Valve #3 = .05 = Y
Valve #3 = 8.14 = V3	Valve #3 to Valve #4 = .19 = Z
Valve #4 = 8.33 = V4	

Computation

BZ	=	622	(B) times	.19	(Z) =	118.2	(1)
CY	=	594	(C) times	.05	(Y) =	29.7	(2)
BZ $\pm$ CY			(1) plus/~~minus~~		(2) =	147.9	(3)
A(BZ$\pm$CY) =		610	(A) times	147.9	(3) =	90,219.0	(4)
CX	=	594	(C) times	.20	(X) =	118.8	(5)
AZ	=	610	(A) times	.19	(Z) =	115.9	(6)
CX + AZ			(5) plus		(6) =	234.7	(7)
D	= 90,219.0		(4) divided by 234.7		(7) =	384	

The computed leak location is at Valve #2 plus 384 feet.

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