BELL SYSTEM PRACTICES
Outside Plant Construction and Maintenance

SECTION G73.415.2
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AT&T Co Standard

PRESSURE TESTING
LOCATION OF GAS LEAKS
MAKING PRESSURE READINGS

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1. GENERAL

1.01 This is a new section which describes the procedures to be followed and the precautions which should be observed in making pressure readings in leak locating tests on cables under pressure.

1.02 Pressure readings for leak location purposes are usually made with a mercury manometer or an instrument of comparable accuracy. The hose on the instrument should be kept as short as practicable in order that the gas withdrawn from the cable to charge the instrument and make the readings will not seriously affect the pressure gradient.

1.03 Pressure readings for a leak location test should be taken by one person using one instrument, to eliminate possible differences in reading methods and instrument characteristics.

2. PRECAUTIONS

2.01 Since the leak under investigation may be due to a loose or defective valve core and cap, all valves should be solution tested before the cap is removed to make a reading. Unless the loss of gas at a valve is so great that it must obviously be the leak in question, it is generally not desirable to disturb the established gradient by tightening or removing the

valve cap. Instead, the measurement at this point should be postponed until after the readings have been taken at the other valve points. The plotted gradient will then indicate the possibilities of leaks other than that at the leaky valve. At any time that a leaky valve core and cap are repaired, further leak locating measurements should be deferred until it is certain that the gradient has again become stabilized.

2.02 All valve cores should be solution tested after the cap is removed and again after the reading has been taken before the cap is replaced. Leaky valve cores should be repaired by tightening if practicable. Replacement of the core should be postponed until after the leak locating measurements have been completed in order to avoid serious disturbance of the pressure gradient.

2.03 Whenever a pressure testing chuck is placed on a valve for leak locating tests, the connection should be thoroughly solution tested. A very small leak in a connection will decrease the measured pressure at the valve and result in errors in plotting the gradient.

3. PRELIMINARY INVESTIGATIONS

3.01 Leak locating measurements should not be undertaken without a thorough knowledge of the physical arrangement of the cable plant in question. This information should include types of cable and locations of junctions of different types, location of plugs and by-pass connections, branch cables, gas filled load cases, etc.

3.02 In addition, the workman should be familiar with the general condition of the gas section and the history of the cable such as, electrolysis conditions, damage by outside parties, location and cause of previously cleared leaks, etc. Such knowledge is necessary to determine the over-all pressure conditions in the section, the possibility of other leaks or restrictions or of other work activity on the cable such as open splices and charging operations by other workmen. This information is of value in selecting the valves to be used in the leak locating tests and the most advantageous method to be followed in making the pressure readings.

3.03 Any known restrictions or stoppages in the cable should be cleared or by-passed before the start of leak locating tests.

4. SELECTION OF READING VALVES

4.01 Pressure readings for leak location purposes should be made over a continuous length of cable that includes at least three uniformly spaced valve points on each side of the

leak. Three readings on each side are necessary to verify the measurements and check the reliability of the graph by noting whether the points are aligned in accordance with the expected shape of the gradient. Uniformity of valve spacing is desirable in order to minimize errors in leak location introduced by the substitution of straight lines for the true curve of a leak gradient when plotting pressure graphs.

4.02 Where the leak is near a plug, a reading should be obtained at the plug and, if practicable, at one or more valve points between the leak and the plug. Readings should be obtained at three uniformly spaced valve points on the side of the leak away from the plug.

4.03 When the section of cable under test includes two or more types of cable having different pneumatic resistances, one of the reading valves should be located at the junction splice between the two types. In addition, at least one reading point will be required between the junction and the leak in order to establish the shape of the gradient in that portion.

4.04 Similarly, when the section of cable under test includes a junction with a branch cable, one of the reading valves should be located at the junction splice. Also, at least one reading point will be required between the junction and the leak in order to establish the shape of the gradient in that portion.

5. TEMPORARY SHORT SPACED VALVES

5.01 Leak locating tests made at regular valve points which are about 3000 feet apart may not reveal the true shape of the gradient adjacent to the leak nor the existence of more than one leak, or of restrictions or minor variation in pneumatic resistance in the cable. This may lead to considerable error in leak location, particularly where small leaks are involved.

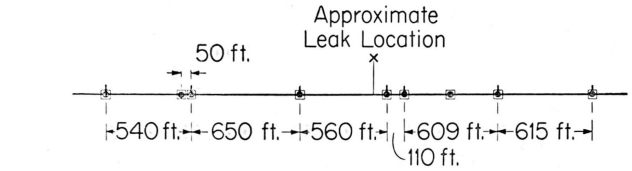
5.02 The shape of the critical portion of the gradient can be more accurately determined by installing temporary valves with a uniform spacing of 500 to 1000 feet in the vicinity of the leak. The distance between the valves must be sufficient to ensure readable differences in pressure between adjacent valves when small leaks are involved.

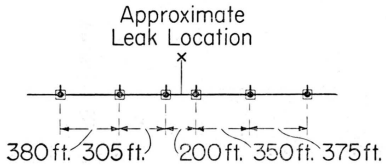
5.03 A suitable spacing can be determined by inspection of a gradient plotted from measurements at the regular 3000-foot valve points. Since mercury manometers can be read only to about .01 pound there is no advantage in spacing temporary valves any closer than is necessary to obtain a difference of .02 to .03 pound between adjacent valves. For leaks of this

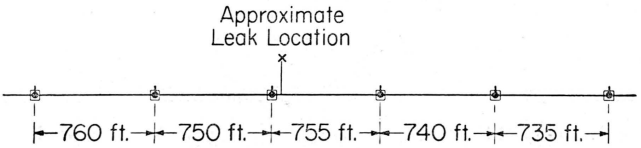
size and smaller, consideration should be given to the use of a precision measuring instrument and precision leak locating procedures described in another section.

5.04 Typical valve arrangements are illustrated below:

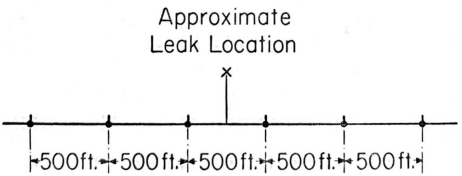
(a) Underground cable.





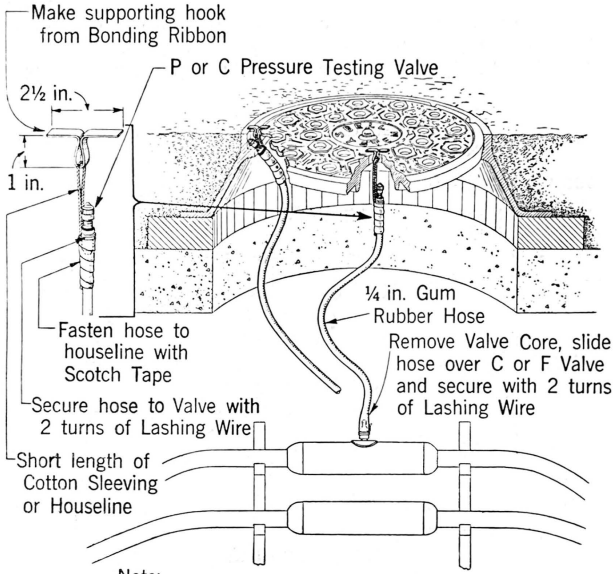


(b) Buried cable.



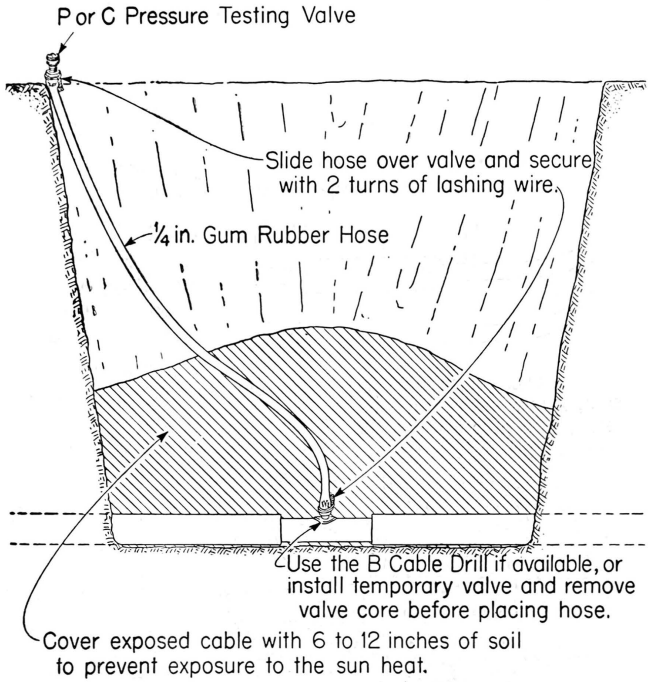
5.05 For convenience in making readings and to minimize the effects of temperature changes of the cable, temporary valves can be extended to street level at manholes, and to ground level on buried cable, by means of a length of rubber hose as illustrated below.

(a) Underground cable.



Note:-
Where there is no valve in the manhole, use the B Cable Drill if available.

(b) Buried cable.



5.06 Sufficient time, one or two days, should be allowed after the installation of the temporary valves to allow the gradient to stabilize before the leak location measurements are made.