

**BELL SYSTEM PRACTICES**  
**Outside Plant Construction**  
**and Maintenance**

**SECTION G73.225.4**  
**Issue 1, December, 1952**  
**AT&T Co Standard**

**PRESSURE TESTING**  
**CONSTRUCTION TESTS**  
**THREE-SECTION METHOD OF**  
**LEAK LOCATION**

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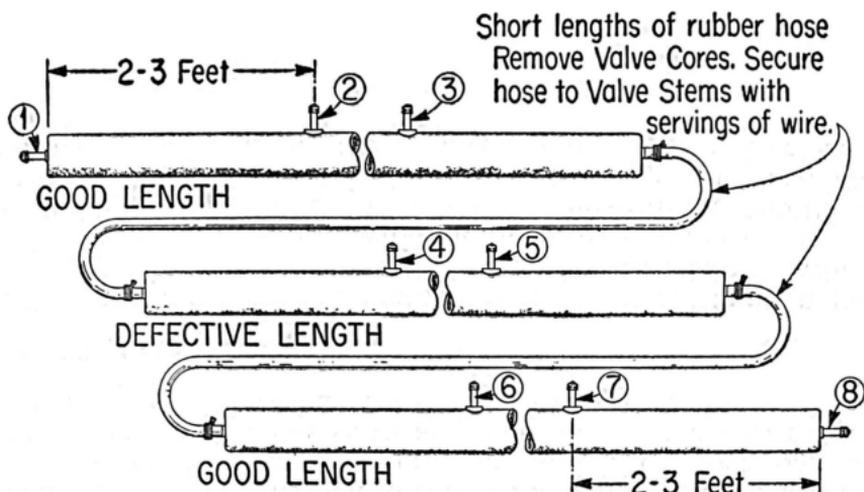
**1. GENERAL**

1.01 This is a new section which describes the three-section method of leak location. This method can be applied during construction to locate a leak in an individual length of cable on a cable reel or after placing before the cable has been spliced.

1.02 The tests described in this section should be made with a mercury manometer. The length of hose on the manometer should be as short as practicable in order to reduce the amount of gas withdrawn during pressure readings.

**2. SETUP FOR TEST**

2.01 The three-section method requires establishing a gas section composed of three reel lengths, two of which are known to be gastight, with the defective section located in the middle as shown in the following illustration. Additional C valves should be installed on the sheath at the locations shown to permit making the required connections and pressure readings.



Solution Test all connections.

2.02 The three cable lengths may consist of three individual reels of cable in the store yard or three consecutive lengths of buried cable or underground cable in conduit.

### 3. MAKING ONE CYLINDER TEST

3.01 Connect a gas cylinder at Valve No. 1 with the regulator adjusted under a no flow condition to about 9 pounds and admit gas to the cable. Continue admitting gas until pressure has stabilized in the gas section. A stabilized condition will be indicated when the pressures at Valves No. 5 and No. 7 remain constant for 15 minutes or more and are approximately equal. This stabilization will require several hours, and in some cases overnight. Do not change or adjust the regulator setting during this period as this would upset the pressure gradient and require additional time for stabilization.

3.02 During the period that the section is stabilizing, make a pressure reading at Valves No. 3 and No. 4 to determine if there is any restriction in the flow of gas between cable ends. If the pressures differ materially it is an indication that there is a restriction in the gas flow between these valves which must be cleared before proceeding with the test. Repeat the restriction test at Valves No. 5 and No. 6.

3.03 When the gas section has stabilized, read and record pressures at Valves Nos. 2, 4, 5 and 7.

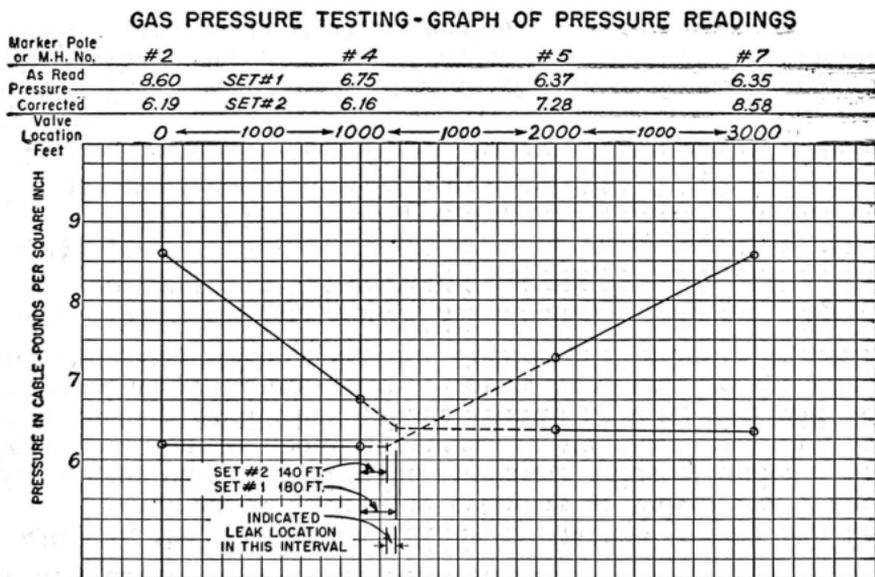
3.04 Disconnect the gas cylinder from Valve No. 1 and reconnect at Valve No. 8 and again admit gas at about the same regulator setting used previously.

3.05 Continue admitting gas until the cable has again stabilized as indicated by constant and approximately equal pressures at Valves No. 2 and No. 4. Then read and record the pressures at Valves Nos. 2, 4, 5 and 7.

3.06 Plot pressure gradient curves for the two sets of readings obtained in Paragraphs 3.03 and 3.05. The two curves should give about the same relative location for the leak. A large variation in the indicated location between the two curves is an indication of errors in pressure readings, restrictions in flow between cable lengths, or of taking pressure readings before stabilization. In this case the test should be repeated.

3.07 The method of plotting this type of pressure graph is shown in the following illustration. First plot the readings for Set No. 1. Connect the plotted readings at Valves No. 2 and No. 4 with a straight line. Also connect the plotted readings at Valves No. 5 and No. 7 with a straight line. The indicated leak location will be at the point of intersection of extensions of these two straight lines.

3.08 Plot the readings for Set No. 2 on the same graph in the same manner and obtain an indicated leak location for this set. In the case illustrated the indicated location for the first set was Valve No. 4 plus 180 feet, and for the second Valve No. 4 plus 140 feet. The leak should be located in this interval.



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#### 4. MAKING TWO CYLINDER TEST

4.01 In the case of large leaks satisfactory results can be obtained by connecting cylinders at Valves No. 1 and No. 8 simultaneously with the regulators adjusted under a no flow condition to about 9 pounds. A stabilized condition is more quickly established (about 4 times as fast) and will be indicated when the pressures at Valves No. 4 and No. 5 remain constant (may not be equal) for a period of 15 minutes or more.

4.02 When the gas section has stabilized, read and record pressures at Valves Nos. 2, 4, 5 and 7.

4.03 Plot a pressure gradient from these readings. The indicated leak location will be at the point of intersection of extensions of straight lines connecting the plotted pressure readings at Valves No. 2 and No. 4 and Valves No. 5 and No. 7.

4.04 Following is an illustration of a pressure gradient of a single set of readings when gas was admitted simultaneously at both ends of the section.

GAS PRESSURE TESTING - GRAPH OF PRESSURE READINGS

