

BELL SYSTEM PRACTICES
Outside Plant Construction
and Maintenance

SECTION G73.225.1
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AT&T Co Standard

PRESSURE TESTING

CONSTRUCTION TESTS

GENERAL

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1. GENERAL

1.01 This section covers information of a general nature concerning pressure tests which may be made on a cable and associated apparatus during construction to ensure satisfactory performance of a gas section upon completion.

1.02 This section and Sections G73.225.2 to G73.225.4 have been issued to revise and expand the information formerly contained in Section G73.225, Issue 1, which is cancelled.

1.03 The construction tests described in this group of sections should be applied to all cables which are to be maintained under continuous gas pressure. The extent to which the various tests should be applied to other cables will be covered by supplementary instructions pertaining to the particular job.

2. CORRECTION OF PRESSURE MEASUREMENTS

2.01 Pressure measurements are affected by temperature, barometric pressure and altitude. Corrections for these effects must be applied when comparison of readings is to be made with those taken previously in order to determine if a leak exists in a length of cable, loading coil case or other item of material. For comparison purposes, all pressure readings should be corrected to standard conditions of 60° F., 30-inch barometric pressure, and 0-foot altitude.

2.02 The following generalized rules may be applied when using the 3-1/2-inch gauge for making the construction pressure tests described in this group of sections.

(a) **Temperature**

Rule: 5° F. Change = .2 pound

All readings should be corrected to 60° F.

Add correction to pressure reading if observed temperature is below 60° F. If observed temperature is above 60° F. subtract correction from pressure reading.

Example: Assume a pressure reading of 7.5 lbs. was obtained on a reel of cable at 35° F.

The corrected reading will be:

$$60^{\circ} - 35^{\circ} = 25^{\circ} \text{ or}$$

$$\frac{25}{5} \times .2 = 1.0 \text{ lb. correction}$$

Since observed temperature is below 60°, correction is added to reading. 7.5 lbs. + 1.0 lb. = 8.5 lbs. corrected reading.

(b) **Barometer**

Rule: 2" of Barometric Pressure = 1.0 lb.

All readings should be corrected to 30" Barometric Pressure.

When reading is made at barometric pressure above 30 inches, add correction to gas pressure reading. When reading is made at barometric pressures below 30 inches, subtract the correction from the gas pressure reading.

Example: Assume a corrected gas pressure reading, see (a) above, of 8.5 lbs. at a barometric pressure of 29.40 inches. Correction will be $30.00 - 29.40 = .60$ inch or $.6/2 = .3$ lb. Since pressure is below 30 inches, correction is subtracted, 8.5 lbs. - .3 lb. = 8.2 lbs. the corrected reading.

(c) **Altitude**

Rule: 2000 feet = 1.0 pound

Readings at an elevation above sea level should be corrected to sea level by subtracting the correction. Omit correction for altitudes less than 200 feet above sea level.

Example: Assume a corrected pressure reading, see (b) above, of 8.2 lbs. at an altitude of 3,400 feet. The correction will be $3,400/2,000 = 1.7$ lbs. Therefore, the corrected reading at sea level will be $8.2 - 1.7$ or 6.5 lbs.

3. GAS PRESSURE HISTORY RECORD

3.01 A record of all pressure readings and associated data should be kept of each length of cable, load coil case or other item of material under pressure in order to facilitate comparison of readings with those taken previously during the course of the placing and splicing work. In addition, this will provide a pressure data record of the condition and gastightness of the various items for use during future gas pressure maintenance work on the cable.

3.02 Following is an illustration of Form E3975 for use in maintaining a gas pressure data record. Data on this form should be entered as follows:

Column (1) List the item such as reel, etc., and its serial number.

Column (2) Show length of cable on reel.

Column (3) Show date reading was made.

Column (4) Show location where reading was made. If reading is recorded from tag on reel indicate as shown.

Column (5) Show temperature to nearest 5 degrees.

Column (6) Show barometer reading in inches of mercury to nearest .2 inch, as secured from weather bureau, testboard or other source within 50 or 75 miles. The barometer reading obtained should be reduced to sea level base. Weather bureau offices are prepared to furnish either the true barometric reading or the reading reduced to the equivalent at sea level base.

Column (7) Show elevation of locality in feet above sea level as obtained from topographical maps, highway maps, or other sources, to the nearest 200 feet.

Column (8) Show pressure reading on tag or at location indicated in Column (4).

Column (9) Show temperature correction in pounds, plus or minus, as determined in accordance with Paragraph 2.02 (a) or as indicated at bottom of form.

Column (10) Show barometric correction in pounds, plus or minus, as determined in accordance with Paragraph 2.02 (b) or as indicated at bottom of form.

Column (11) Show correction due to altitude in pounds, minus, as determined in accordance with Paragraph 2.02 (c) or as indicated at bottom of form.

Column (12) Show the summary of corrections, plus or minus, of Columns (9), (10), and (11), taking into consideration whether individual corrections are minus or plus.

Column (13) Show corrected pressure reading. If Column (12) is plus, add the correction to reading recorded in Column (8). If correction is minus subtract correction from reading recorded in Column (8).

Column (14) Remarks: List miscellaneous data of item recorded, such as additional information as to location, manhole, pole and station or marker numbers.

**PRESSURE DATA ON ITEMS
UNDER GAS PRESSURE**

Cable ALPHA BETA A
Estimate 7563

Item & Serial Number	Length Feet	Date	Location	Temp. F.	Bar. In.	Elevation	Press. Read	Corrections				Corrected Press.	Remarks
								Temp.	Bar.	Elev.	Tot.		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
<i>REEL</i>													
987654	1540	6-19-45	W.E. Co. TAG	60	30.6	0	9.7	0	+ .3	0	+ .3	10.0	
987654	1540	8-14-45	ALPHA FRT STN.	80	29.6	3400	12.5	- .8	- .2	- 1.7	- 2.7	9.8	LOSS .2 LB.
987654	1540	8-21-45	ON JOB	65	30.4	3400	11.5	- .2	+ .2	- 1.7	- 1.7	9.8	SPOTTED ON JOB
987654	1540	8-28-45	ON FLOW TRAIN	80			12.4						BEFORE PLOWING (STATIONS 16 + 100 TO 17 + 635)
987654	1540	9-3-45	IN GROUND	82			12.3						AFTER PLOWING
<i>REEL</i>													
967853	1480	6-26-45	W.E. CO. TAG	60	29.4	0	10.3	0	- .3	0	- .3	10.0	
967853	1480	8-14-45	ALPHA FRT STN.	80	29.6	3400	9.7	- .8	- .2	- 1.7	- 2.7	7.0	LOSS 3 LB.
967853	1480	8-21-45	ON JOB	65	30.4	3400	9.5	- .2	+ .2	- 1.7	- 1.7	7.8	AFTER CLEARING LEAK ON END SEAL AND RE- CHARGING REEL ON JOB
967853	1480	8-28-45	ON FLOW TRAIN	80	29.8	3400	10.4	- .8	- .1	- 1.7	- 2.6	7.8	BEFORE PLOWING (STATIONS 17 + 635 TO 19 + 110)
967853	1480	9-3-45	IN GROUND	82			10.3						AFTER PLOWING

- (9) If Column (5) is Above 60°, Subtract Correction; If Below 60°, add Correction. Correction is .2 lb. for 5° F. Read Temperature to Nearest 5°
- (10) If Column (6) is Above 30", add Correction; If Below, Subtract Correction. Correction is 1 lb. for 2" of Barometric Pressure. Read Barometer to Nearest .2 Inch.
- (11) Column (7) Divided by 2,000 - Subtract Correction - No Correction for Elevation Below 200'. Record Elevation to Nearest 200 Feet
- (12) Summary of Corrections - Columns 9, 10, 11, Either Plus or Minus.
- (13) If Column 12 is Plus, add to Column 8. If Column 12 is Minus, Subtract From Column 8.

3.03 The importance of correcting pressure readings is shown for example on the first reel indicated on the illustration. Between the first and second readings there was an apparent gain in pressure of 2.8 lbs.; actually a loss of .2 lb. occurred in the interval between the two readings. On the third reading there was an apparent loss of pressure of 1 lb. when compared with the second reading; actually no loss occurred. On the second reel the difference between the first and second readings indicates a loss of only .5 lb., actually a loss of about 3.0 lbs. occurred in transit.

3.04 The gas pressure data record should be retained for the cable, load coil cases or other material until the particular items are spliced in. Then the record should be turned over to the forces who will handle gas completion tests on the section. When gas completion tests are completed, the records should be forwarded to the office responsible for maintenance of the cable. Leak location work during completion tests may be facilitated by reference to these forms, particularly where the records indicate that a certain length of cable or other item contained a small leak, but met the construction test limits outlined in this group of sections.