

BELL SYSTEM PRACTICES
Outside Plant Construction
and Maintenance

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PRESSURE TESTING

MAINTAINING CABLES UNDER PRESSURE

MAINTAINING PRESSURE

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1. GENERAL

1.01 This section replaces the information in Section G73.230, Issue 1 covering procedures for maintaining adequate pressure in cables under continuous pressure.

2. LOSS OF PRESSURE

2.01 Gas escapes from cables through leaks which can be divided into two classifications.

(a) Leaks of sufficient size to be readily located. Such leaks become apparent as a result of contactor operation, an excessive monthly rate of gas pressure loss, or a failure of the pressure to equalize. They should be located and cleared by methods outlined in the sections on Location of Gas Leaks.

(b) Minute leaks that can not be found without excessive effort. Gradual loss of pressure due to distributed minute leaks can be expected in all gas sections and is called the normal pressure loss of the section. Gas lost from this cause is restored by periodic recharging of the section. Reasonable maintenance effort generally permits maintaining the average gas section with a normal loss in pressure within the limits given in Part 6 of this section.

3. CHARGING SECTION TO REPLACE GAS LOST

3.01 Gas which has escaped through the normal pressure loss of a section should be replaced on a planned basis at a time just previous to that when the contactors would be expected to operate. This procedure will eliminate special trips to investigate contactor operation except when the contactor has operated as a result of a change in condition of the gas section, such as a new leak or the enlargement of an existing leak.

3.02 The methods to be followed in charging a gas section to replace gas lost either through leaks which have been cleared or through normal pressure loss are described in another section on charging cables with gas.

4. DETERMINING NORMAL LOSS IN PRESSURE

4.01 The normal loss in pressure of a gas section is determined as follows:

- (1) Take two sets of readings at the routine reading valves one or more months apart and determine the average pressure at 60°F. and normal atmospheric pressure for each set.
- (2) Subtract the second average pressure from the first to obtain the loss in pressure.
- (3) Compute the elapsed time between readings in months, considering each month to consist of 30 days. Show fractions of months as decimals.
- (4) Divide the difference in average pressures by the elapsed time in months. The result will be the loss in pressure per month.

4.02 If desired, the B Pressure Testing Rule may be used to determine the pressure loss per month. Instructions for the use of the rule are printed on its face.

5. DETERMINING DATE TO RECHARGE

5.01 Gas sections should be recharged when the average pressure reaches a value one pound above the normal contactor operating pressure. The approximate date of recharging is determined as follows:

- (1) Subtract the recharging pressure value from the average pressure existing in the section.
- (2) Divide this difference in pressure by the monthly pressure loss. The result will be the number of whole and parts of months that will elapse before the recharging value will be reached.

(3) Convert parts of months to days and add the number of months and days to the date that the average pressure was taken. Consider each 0.1 month as three days.

(4) The actual charging date should be scheduled within about a week of the date determined above.

5.02 If desired, the B Pressure Testing Rule may be used to determine the interval which will elapse before recharging becomes necessary. Instructions for the use of the rule are printed on its face.

5.03 Whenever practicable, the recharging of a cable should be combined with scheduled routine readings or programmed inspections so as to avoid duplication of effort. The recharging date may be advanced or the routine pressure readings advanced or deferred in order to combine trips over the cable route for these purposes.

5.04 An increase in the normal loss in pressure in a gas section indicates a new leak or an increase in size of an existing leak. Sufficient pressure measurements should be taken at the regular valve points to determine if the leak is of sufficient size to be readily located. If the leak can not be located and cleared promptly, a new normal loss in pressure should be determined and used to establish recharging dates.

5.05 When it is expected that the clearance of a leak has materially reduced the normal loss in pressure, a new loss in pressure should be obtained as soon as conditions permit.

5.06 When a leak of obviously recent origin, such as a bullet hole or split seam, is cleared, the previously determined normal loss in pressure should be used for recharging schedules.

6. ALLOWABLE NORMAL LOSS IN PRESSURE

6.01 In general, a gas section is considered satisfactory if the normal loss in pressure is within the limits given in the following table, subject to the considerations given in Paragraph 6.02.

Length of Section Feet	Normal Loss in Pressure Pounds per Month	
	Aerial Cable	Underground or Buried Cable
35,000 (or less)	3.0	1.5
50,000	2.0	1.0
75,000	1.5	.75
100,000 (and over)	1.0	.5

In combination aerial and underground or buried gas sections, use the allowable loss for an aerial cable if 50 per cent or more of the cable is aerial. If less than 50 per cent of the cable is aerial, use the allowable loss for an underground or buried cable.

6.02 The allowable limits for normal loss in pressure given in Paragraph 6.01 are intended as a guide for judging the condition of a gas section and should not be applied without consideration of the appearance of the pressure gradient for the section. A gas section may be considered satisfactory even though its normal loss is above these limits if the pressure gradient shows that it contains no leaks that can be located readily. Conversely, a gas section whose loss is within the allowable limits should not be considered satisfactory if its pressure gradient indicates that it contains a leak which can be located readily.

6.03 In gas sections, particularly shorter sections, where the normal loss is high and the pressure gradient indicates that the section does not contain a leak which can be located readily, a supplementary reservoir may be necessary to maintain pressure and eliminate the need for frequent charging operations; such conditions should be reviewed with the engineer.