

maximum and a decay time (t_d) of 10 μ s minimum and shall have a short circuit current waveshape in accordance with Figure 68.302(c) with a front time (t_r) of 2 μ s maximum and a decay time (t_d) of 10 μ s minimum. The peak voltage shall be at least 2500 volts and the peak short circuit current shall be at least 1000 amperes. Surges are applied:

(i) With the equipment in all states that can affect compliance with the requirements of this part 68. If an equipment state cannot be achieved by normal means of power, it may be achieved artificially;

(ii) With equipment leads not being surged (including telephone connections, auxiliary leads, and terminals for connection to non-registered/non-certified equipment) terminated in a manner which occurs in normal use.

(2) Failure Modes resulting from application of power line surge. Registered terminal equipment and registered protective circuitry shall comply with all the criteria contained in the rules and regulations in this subpart, both prior to and after the application of the power line surge specified in paragraph (d) of this section, not withstanding that this surge may result in partial or total destruction of the equipment under test.

[62 FR 61664, Nov. 19, 1997; 63 FR 25173, May 7, 1998]

§ 68.304 Leakage current limitations.

Registered terminal equipment and registered protective circuitry shall have a voltage applied to the combination of points listed in the table below. The test voltage shall be ac of 50 or 60 Hz rms.

- (a) All telephone connections;
- (b) All power connections;
- (c) All possible combinations of exposed conductive surfaces on the exterior of such equipment or circuitry including grounding connection points, but excluding terminals for connection to other terminal equipment;
- (d) All terminals for connection to registered protective circuitry or non-registered equipment;
- (e) All auxiliary lead terminals;
- (f) All E&M lead terminals, and
- (g) All PR, PC, CY1 and CY2 leads.

TABLE 68.304(a).—VOLTAGE APPLIED FOR VARIOUS COMBINATIONS OF ELECTRICAL CONNECTIONS

Voltage source connected between:	ac value ¹
(a) and (b) (see NOTES 1, 2, 3)	1500
(a) and (c) (see NOTES 1, 2)	1000
(a) and (d) (see NOTES 1, 2)	1000
(a) and (e) (see NOTES 1, 2)	1000
(a) and (f) (see NOTES 1, 2)	1000
(a) and (g) (see NOTES 1, 2)	1000
(b) and (c) (see NOTE 3)	1500
(b) and (d) (see NOTE 3)	1500
(b) and (e) (see NOTE 3)	1500
(b) and (f) (see NOTE 3)	1500
(b) and (g) (see NOTE 3)	1500
(c) and (e) (see NOTES 1, 2)	1000
(c) and (f) (see NOTES 1, 2)	1000
(d) and (e) (see NOTE 2)	1000
(d) and (f) (see NOTE 2)	1000
(e) and (f) (see NOTE 2)	1000

¹ Value to which test voltage is gradually increased.

NOTES TO TABLE 68.304(a): (1) Gradually increase the voltage from zero to the values listed in Table 68.304(a) over a 30-second time period, then maintain the voltage for one minute. The current in the mesh formed by the voltage source and these points shall not exceed 10 mA peak at any time during this 90-second interval.

(2) Equipment states necessary for compliance with the requirements of this section that cannot be achieved by normal means of power shall be achieved artificially by appropriate means.

(3) A telephone connection, auxiliary lead, or E&M lead that has an intentional dc conducting path to earth ground at operational voltages (such as a ground start lead), may be excluded from the leakage current test in that operational state. Leads or connections excluded for this reason shall comply with the requirements of § 68.306(e)(1).

(4) A telephone connection, auxiliary lead, or E&M lead that has an intentional dc conducting path to earth ground for protection purposes at the leakage current test voltage (such as through a surge suppressor), may have the component providing the conducting path removed from the equipment for the leakage current test in that operational state. Components removed for this reason shall comply with the requirements of § 68.306(e)(2).

(5) Filter paths, such as capacitors used in EMI filters, are left in place during leakage current testing, since these components can be a path for excessive leakage.

(6) For multi-unit equipment interconnected by cables, that is evaluated and registered as an interconnected combination or assembly, the specified 10 mA peak maximum leakage current limitation other than between power connection points and other points, may be increased as described here to

§ 68.306

47 CFR Ch. I (10–1–00 Edition)

accommodate cable capacitance. The leakage current limitation may be increased to $(10N+0.13L)$ mA peak where L is the length of interconnecting cable in the leakage path in meters and N is the number of equipment units that the combination or assembly will place in parallel across a telephone connection.

(7) RF filters and surge protectors on the line side of power supplies may be disconnected before making §68.304 leakage measurements. As an alternative to disconnecting these filters and surge protectors, this measurement may be made using a dc voltage equal to the peak ac test voltage.

[62 FR 61667, Nov. 19, 1997]

§ 68.306 Hazardous voltage limitations.

(a) *General.* Under no condition of failure of registered terminal equipment or registered protective circuitry

that can be conceived to occur in the handling, operation or repair of such equipment or circuitry, shall the open circuit voltage on telephone connections exceed 70 volts peak after one second, except for voltages for network control signalling, alerting and supervision.

(1) *Type I E&M Leads.* Registered terminal equipment shall comply with the following requirements for terminal equipment on the "A" or "B" side of the interface as shown in Figures 68.3(e)(i):

(i) The dc current on the E lead shall not exceed 100 mA.

(ii) The maximum dc potentials to ground shall not exceed the following when measured across a resistor of 20 kohms $\pm 10\%$:

TABLE 68.306(a)—TYPE I E&M, DC POTENTIALS

	E lead	M lead
TE on "B" side originates signals to network on E lead.	± 5 V	± 5 V.
TE on "A" side originates signals to network on M lead.	-56.5 V; no positive potential with respect to ground.	-56.5 V; no positive potential with respect to ground.

(iii) The maximum ac potential between E&M leads and ground reference shall not exceed 5V peak.

(iv) M lead protection shall be provided so that voltages to ground do not exceed 60 volts. For relay contact implementation, a power dissipation capability of 0.5 watt shall be provided in the shunt path.

(v) If the registered terminal equipment contains an inductive component in the E lead, it must assure that the transient voltage across the contact as a result of a relay contact opening does not exceed the following voltage and duration limitations:

- (A) 300 volts peak,
- (B) A rate of change of one volt per microsecond, and
- (C) A 60-volt level after 20 milliseconds.

(2) *Type II E&M Leads.* Registered terminal equipment shall comply with the following requirements:

(i) For terminal equipment on the "A" side of the interface, the dc current in the E lead shall not exceed 100 mA. The maximum ac potential between the E lead and ground shall not exceed 5 V peak.

(ii) For terminal equipment on the "B" side of the interface, the dc current in the SB lead shall not exceed 100 mA. The maximum ac potential between the SB lead and ground shall not exceed 5 V peak.

(iii) The maximum dc potentials to ground shall not exceed the following when measured across a resistor of 20 kohms $\pm 10\%$:

TABLE 68.306(b)—TYPE II E&M, DC POTENTIALS

	E lead	M lead	SB lead	SG lead
TE on "B" side of the interface originates signals to network on E lead.	± 5 V	± 5 V	-56.5 V; no positive potential with respect to ground.	± 5 V.