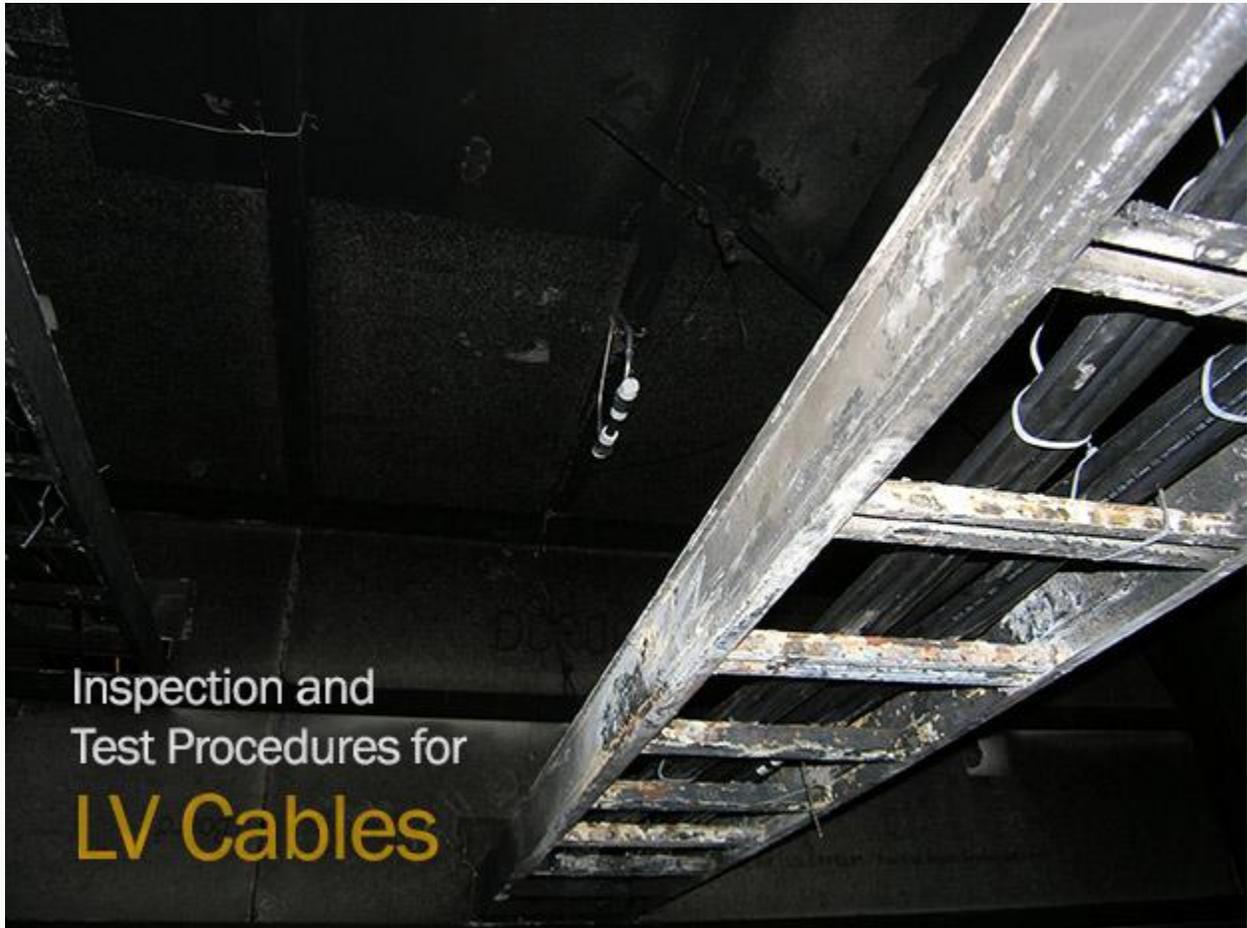


# Inspection and Test Procedures for LV Cables



*Inspection and Test Procedures for LV Cables*

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**Cables**, Low-Voltage, 600 Volt Maximum

## 1. Visual and Mechanical Inspection

1. Compare cable data with drawings and specifications.

2. Inspect exposed sections of cables for physical damage and correct connection in accordance with single-line diagram.
3. **Inspect bolted electrical connections for high resistance using one of the following methods:**
  1. Use of low-resistance ohmmeter in accordance with previous Section 1.2.
  2. Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or **Table 100.12**.
  3. **Perform thermographic survey:**
    1. Perform thermographic survey when load is applied to the system
    2. Remove all necessary covers prior to thermographic [inspection](#). Use appropriate caution, safety devices, and personal protective equipment
    3. Perform a follow-up thermographic survey within 12 months of final acceptance by the owner
4. Inspect compression-applied connectors for correct cable match and indentation.
5. Inspect for correct identification and arrangements.
6. Inspect jacket insulation and condition.

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## 2. Electrical Tests

1. Perform resistance measurements through bolted connections with **low-resistance ohmmeter**.
2. Perform insulation-resistance test on each conductor with respect to ground and adjacent conductors. Applied potential shall be **500 volts DC for 300 volt rated cable** and **1000 volts DC for 600 volt rated cable**. Test duration shall be **one minute**.
3. Perform continuity tests to insure correct cable connection.
4. Verify uniform resistance of parallel conductors.

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## 3. Test Values

1. Compare bolted connection resistances to values of similar connections.
2. Bolt-torque levels should be in accordance with **Table 100.12** unless otherwise specified by the manufacturer.
3. **Microhm** or [millivolt drop](#) values shall not exceed the high levels of the normal range as indicated in the manufacturer's published data. If manufacturer's data is not

available, investigate any values which deviate from similar connections by more than 50 percent of the lowest value.

4. Insulation-resistance values ***should not be less than 50 megohms.***
5. Investigate deviations in resistance between parallel conductors.

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## TABLE 100.12

### US Standard Fasteners – Bolt-Torque Values for Electrical Connections

Table 100.12.1 Heat-Treated Steel - Cadmium or Zinc Plated				
Grade	SAE 1&2	SAE 5	SAE 7	SAE 8
Head Marking				
Minimum Tensile (Strength) (lb <sup>f</sup> /in <sup>2</sup> )	64K	105K	133K	150K
Bolt Diameter in Inches	Torque (Pound-Feet)			
1/4	4	6	8	8
5/16	7	11	15	18
3/8	12	20	27	30
7/16	19	32	44	48
1/2	30	48	68	74
9/16	42	70	96	105
5/8	59	96	135	145
3/4	96	160	225	235
7/8	150	240	350	380
1.0	225	370	530	570

Table 100.12.1 - Heat-Treated Steel - Cadmium or Zinc Plated

Table 100.12.2 Silicon Bronze Fasteners <sup>b</sup> Torque (Pound-Feet)		
Bolt Diameter in Inches	Nonlubricated	Lubricated
5/16	15	10
3/8	20	14
1/2	40	25
5/8	55	40
3/4	70	60

Table 100.12.2 - Silicon Bronze Fasteners

Table 100.12.3 Aluminum Alloy Fasteners <sup>c</sup> Torque (Pound-Feet)	
Bolt Diameter in Inches	Lubricated
5/16	8.0
3/8	11.2
1/2	20.0
5/8	32.0
3/4	48.0

Table 100.12.3 - Aluminum Alloy Fasteners

Table 100.12.4 Stainless Steel Fasteners <sup>d</sup> Torque (Pound-Feet)	
Bolt Diameter in Inches	Uncoated
5/16	14
3/8	25
1/2	45
5/8	60
3/4	90

Table 100.12.4 - Stainless Steel Fasteners

- a.** Consult manufacturer for equipment supplied with metric fasteners.
- b.** This table is based on bronze alloy bolts having a minimum tensile strength of 70,000 pounds per square inch.
- c.** This table is based on aluminum alloy bolts having a minimum tensile strength of 55,000 pounds per square inch.
- d.** This table is to be used for the following hardware types:

- Bolts, cap screws, nuts, flat washers, locknuts (18–8 alloy)
- Belleville washers (302 alloy).

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**Resource:** *Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems – NETA 2003*

Source:

<http://electrical-engineering-portal.com/inspection-and-test-procedures-for-lv-cables>