Electrical safety for general households, etc.

Classification of power facilities

- **Power facilities for business use**
  - electrical power companies
  - generating stations, transmission lines, etc.

- **Power facilities for private use**
  - They are those client facilities that receive high-voltage (higher than 600 V) electric power, such as factories and buildings

- **Power facilities for general use**
  - They are those client facilities that receive low-voltage (600 V or lower) electric power, such as general households and stores
Classification of power facilities in general households, etc.

Indoor wiring for equipment ranging from distribution switchboard to lighting equipment, electrical outlets, etc.

Wiring arrangement for general households
[reference data]

The wiring arrangement is made based on the single-phase three-wire system to which a voltage of 100 VAC or 200 VAC is applied.

The voltage to ground for indoor wiring is, in principle, 150 V or below.

The earthing system of Japan is TT type earthing system.
Electrical safety system and laws, regulations or ordinances for general households, etc.

Laws to ensure electrical safety

Power facilities for general use

- Electrical Appliance and Material Safety Law
- Electric constructor Law
- Electric Business Act

Electricity Utilities Industry Law

- Obligation imposed on electric power companies to conduct inspection
- Consignment to registration inspection organization body.
- Compliance inspection to check for conformity to technical standards
- Electrical safety inspection

Direct supervision by the Japanese government

- Order for conformity to technical standards
- On-the-spot inspection conducted by the Japanese government officials

Electrical safety system for client facilities receiving high-voltage electric power

Power facilities for business use

Self-managing of electrical safety

- Mandatory compliance with technical standards
- Preparation, notification and observance of electrical safety regulations

Self-managing is complemented by the Japanese government

- Appointment, and notification of licensed electrician or outsourcing
- Statutory inspection for business operations
- Safety management review
- Approval or notification of planned project

Direct supervision by the Japanese government

- Notification to start use of power facilities for private use

Inspection before use, periodical inspection

- Reporting obligation for accidents and others
- On-the-spot inspection
- Order for conformity to the technical standards, and order for improvement in electrical safety regulations

A strict control system has been established for client facilities receiving high-voltage electric power than for general households.
Measures to ensure electrical safety in general households, etc.

Manufacturing stage (Manufacturing and selling of components and materials)
- **Electrical Appliance and Material Safety Law**
  - This law regulates manufacturers and importers.

Construction stage
- **Electric Constructor Law and other laws**
  - These laws regulate electric constructors and electric contractors.

Maintenance and operation stage
- **Electricity Utilities Industry Law**
  - This act regulates general households and electric power companies.

General measures to ensure electrical safety in general households, etc.

Manufacturing stage (including manufacturing and selling of electrical components and materials)

- Compliance with technical standards for electrical appliances and materials
- Approval by a third party in private sector for quality certification of electrical appliances and materials
- Sample-purchase inspection, modification of products, etc.
Construction stage
Workflow of quality assurance during electric work

- Qualified engineer must carry out the required work specified by laws and regulations.

## Electrical contractors
- Application for electricity use
- Execution of electric work
  - Self inspection
  - Notification of completion of work
- Acceptance of inspection results
- Meeting the inspection standards requirements specified by the Japanese government

## Electric power company
- Exams of drawings, etc.
- Acceptance for use
- Acceptance for completed work
- Execution of final-completion inspection

## Clients
- Delivery of electric equipment

### Types and frequency of inspection services at the maintenance and operation stage

#### Final-completion inspection
- This inspection is performed when a power facility for general household, etc. is installed or expanded and modified.
- Confirmation of drawings as well as of facility and equipment.
- Verification of insulating state, etc.
- Once every four years.

#### Periodic inspection
- Inspector — An electric power company or an inspection agency which is listed on the Japanese government’s registry (electrical safety inspection association, constructors’ association, etc. of each of Japan’s prefectures or city governments).
- Checking for electric leakage
- Inspection of power facilities
- Brief interview with clients about any problems
- Electrical safety instructions (awareness-raising activities for electrical safety)
- The periodic inspection service is performed once every four years.
- This inspection is performed once or more every year for such facilities as schools, hospitals and swimming pools.

- It depends on electric power company and a registered testing organizations body.
Standards for electrical safety inspection

[Engineering standards of electrical facilities and interpretation thereof]

• Earth works pursuant to Article 19, insulation performance of low-voltage electrical circuit pursuant to Article 58, etc.

[Polices for periodic inspection of power facilities for general use]

● Content and frequency of inspection
  The inspection should be made once or more every four years to check to see if the electrical equipment for general households, etc. complies with the “Engineering standards of electrical facilities” from the date on which the previous inspection was conducted. (Note, however, that there are some pieces of equipment to which this inspection frequency does not apply.)

● How to conduct periodic inspection
  • Insulating state should be verified through measurement using an insulation resistance tester or a leakage current measuring device.
  • After asking questions about any problems, the inspection is performed for any visible areas and a check is made to see if there is any defective part.

● Promoting modification
  • The inspection shall be conducted once again in the event that a client who has been informed of defect of his/her facility notifies that such facility is already modified.
  • A modification shall be made as required to the equipment which is deemed to be important in terms of electrical safety for prevention against poor insulation, etc.

● Keeping customers well informed of safety precautions when visiting with them for periodic inspection
  • Electrical safety precautions should be made well known to customers to prevent risk associated with use of electricity.

Historical background and evaluation

<table>
<thead>
<tr>
<th>Revised year of system</th>
<th>Intervals at which a periodic inspection is conducted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>General households, etc.</td>
</tr>
<tr>
<td>1891</td>
<td>As required</td>
</tr>
<tr>
<td>1896 *1</td>
<td>Once every year</td>
</tr>
<tr>
<td>1911</td>
<td>Once every year</td>
</tr>
<tr>
<td>1949</td>
<td>Once every two years</td>
</tr>
<tr>
<td>1965 *2</td>
<td>Once every two years</td>
</tr>
<tr>
<td>From 1989 onward</td>
<td>Once every four years</td>
</tr>
</tbody>
</table>

*1 In 1896, a periodic inspection system was institutionalized.

*2 In 1965, scope of electric equipment for and responsibility for electrical safety of general households, etc. was clarified.
Changes in electrical fire accidents and other accidents resulting from electric shock

Electrical fire accidents account for about 4% of the total fire accidents (54,500) which occurred in 2007 nationwide.

Generally, electrical fire accidents tend to decrease.

Accidents resulting from electric shock have been on a downward trend in recent years, with deaths from electric shock now 14 per year.

According to the annual statistics, the rate of death from electricity is equivalent to 0.2 persons or less out of 1-million people.

In this past few years, no death accident caused by electric shock has occurred in general households.

The data shown above is based on the survey data of Safety Division of Industrial Safety and Health Department in Labour Standards Bureau of the Ministry of Health, Labour and Welfare in Japan.

Social system regarding electrical safety for general households, etc.

**General households**

- Insufficient knowledge of safety control

**National government**

- Educational activity
- Disclosure of information
- Legislative action by means of establishment of electrical safety standard, etc.

**Electrical works operators**

- Issuance of certificate of completed electrical work implementation
- Quality assurance under responsibility of a person in charge of execution of electrical work

**Manufacturer, etc.**

- Reliability improvement in power facilities and safety devices
- Product recall

**Electric power company and inspection agency**

- Inspection's quality maintenance
- Public relations activity for electrical safety
- Various service options
Introduction to our inspection services
Visit the general family; and inspection in being at home

Typical amount of time required for a periodic inspection service for general household is about 10 minutes, and it costs about 1,000 yen.

Insulation resistance being measured with a distribution switchboard

Explanation about safe use of electricity

For those customers who are not at home or whose power supply cannot be cut off, the insulating state is checked for any defect.

Verification of insulating state through leakage current measurement (The acceptable leakage current value should be 1 mA or less.)

Leakage current measurement at a customer’s site where an ordinary measurement cannot be carried out readily.
The future of electrical safety for general households

A consciousness survey was conducted regarding the current inspection system among 708 persons who were randomly selected nationwide.

Results of questionnaire survey concerning evaluation made on details of the current inspection services

- No idea: 7%
- Not required: 1%
- The current services suffice: 75%
- The details should be improved: 17%

Results of questionnaire survey concerning the current contents of the inspection duties imposed on electric power companies

- No idea: 7%
- The services should be provided on their own responsibility: 4%
- The inspection duties imposed on electric power companies should continue: 89%

Source: Data from Inspection Vision Workshop of Nationwide Liaison Conference for Electrical Safety Inspection Associations

Customer comments on the current inspection system

- As seen in the existing system, it is a good method for the current inspection services to be provided evenly and continuously. (Customers also entertain expectations for the system because it will help prevent fire spreading from neighboring houses.)
- The current inspection system is better in order for us to live at ease on a aging society.
- The current bill collection system whereby about 20 yen of inspection charge is included in monthly electricity rate is better than other billing method by which inspection charge is collected for each inspection service.
- The current inspection system and method are considered better, because the relevant inspection service is required to be provided by a reliable service provider such as an electric power company.

Source: Data from Inspection Vision Workshop
Progress of technological innovation and basic policy for future inspection service

- The Electrical Safety Inspection Association has been striving aggressively to provide attentive, conscientious and effective inspection services which can meet the needs of its customers.
- While at the same time, we at the Association think that IT (information-technology) revolution and development of equipment technology, such as solar photovoltaic technology, to deal with environmental problems will have a significant effect on the current inspection services and their methods as well.
- For this reason, we, as one of the members of the electrical safety inspection associations in Japan, also need to examine our basic policy for the inspection services and the association’s work tasks into which a new technology will be brought, while closely monitoring the changing trends in development of such technology.