

**ELECTRICITY SUPPLY AND DISTRIBUTION (STANDARDS OF PERFORMANCE) REGULATIONS,  
2008**

**ARRANGEMENT OF REGULATIONS**

*Regulation*

*Purpose and Application*

1. Purpose
2. Application

*Application for new service*

3. Breach of application processing procedures

*Reliability of Electricity Supply*

4. Interruption of supply
5. Emergency interruption of supply or disconnection
6. Restoration of supply
7. Notification for interruption of supply
8. Reporting Standards

*System Voltage*

9. System voltage complaint
10. Power Factor
11. Harmonics control
12. Negative sequence voltage
13. Load Balance

*The meter*

14. Requirement for a meter
15. Separate meter
16. Prepayment meters
17. Meter repositioning
18. Revision of meter
19. Meter Complaint
20. Safety of Supply

*Miscellaneous provisions*

21. Notification of rights of Customers
22. Provision of information
23. Penalty
24. Interpretation

*SCHEDULE I***ELECTRICITY SUPPLY AND DISTRIBUTION (STANDARDS OF PERFORMANCE) REGULATIONS,  
2008**

In exercise of the powers conferred on the Board of the Energy Commission acting in consultation with the Public Utilities Regulatory Commission by section 27 of the Energy Commission Act, 1997, (Act 541) these Regulations are made this ..... day of .....

*Purpose and application***Purpose**

1. The purpose of these Regulations is to provide for performance benchmarks for electricity supply and distribution in conformity with the provisions of Electricity Supply and Distribution (Technical and Operational) Rules, 2005 (LI 1816).

**Application**

2. (1) These Regulations apply to the electricity Supplier licensed by the Commission.

**Breach of application processing procedures**

3. (1) A Supplier of electricity shall process a customer's application for connection to electricity services in accordance with the requirements specified in rule 1 of Electricity Supply and Distribution (Technical and Operational) Rules, 2005 L.I. 1816 or as amended and the National Electricity Distribution Code.

(2) A Supplier shall, subject to these Regulations, pay the customer the sum prescribed in the Schedule I where:

- (a) that Supplier fails to provide the applicant with an estimate and charges for the connection service within
  - (i) three working days, if the connection is to be made from an existing supply line in metropolitan and urban areas; or
  - (ii) five working days, if the connection is to be made from an existing supply line in a rural area
  - (iii) ten working days, if the connection requires a line extension in a metropolitan and urban area; or
  - (iv) Thirty working days, if the connection requires a line extension in a rural area.

- (b) that Supplier fails to provide the connection service to a customer after that customer has paid the required charges for the connection service within:
- (i) three working days, if the connection is to be made from an existing supply line in metropolitan and urban areas; or
  - (ii) five working days, if the connection is to be made from an existing supply line in a rural area
  - (iii) ten working days, if the connection requires a line extension in a metropolitan and urban area; or
  - (iv) Thirty working days, if the connection requires a line extension in a rural area.

*Reliability of electricity supply*

**Interruption of supply**

4. (1) A Supplier may disconnect or interrupt electricity supply to a locality or a customer for the purpose of carrying out planned maintenance, including repair and installation of new equipment.
- (2) A Supplier of electricity shall ensure that the cumulative electricity interruption for each Customer within an operational year does not exceed
- (a) forty-eight hours, in a metropolitan or municipal area, or industrial estate;
  - (b) seventy-two hours, in a district capital; and
  - (c) one hundred and forty-four hours, in a rural area.
- (3) Despite sub-regulation (2), the Supplier shall ensure that the electricity interruption to a customer's premises within an operational year does not exceed six periods.
- (4) Despite sub regulations (2) and (3) the duration of each outage shall not exceed
- (a) eight hours, in a metropolitan or municipal area or industrial estate;
  - (b) twelve hours, in a district capital; and
  - (c) twenty-four hours, in rural areas.
- (5) For the purposes of sub regulations (2), (3) and (4) the period of an interruption shall be consistent and commence from the time the Supplier is initially informed by:

- (a) a customer that the supply to the customer's premises has been interrupted; or
  - (b) a person other than the customer or is otherwise made aware by the operation of any automatic system operated by the Supplier in circumstances in which the supply to the customer's premises has been interrupted or may reasonably be expected to have been interrupted.
- (6) Despite sub regulations (2), (3) (4) and (5), an interruption of supply to a customer shall not be treated as wrongful where:
- (a) the interruption was as a result of a major fault or damage to an indispensable equipment in the electricity Supplier's distribution system subject to sub-regulation (6);
  - (b) the interruption was as a result of a failure of, fault in or damage to either the transmission system to which the electricity Supplier's distribution system was connected or a generating station connected to that transmission system; or
  - (c) the interruption was as a result of a failure of, fault in or damage to a generating station connected to the Supplier's distribution system;
  - (d) the interruption was one to which the Electricity Supply and Distribution (Technical and Operational) Rules, 2005 (LI 1816) applies.
  - (e) the customer informed the Supplier that the customer did not wish the Supplier to take any action.
- (7) Where a major outage was due to the negligence of the Supplier, paragraph (a) of sub-regulation (6) shall not apply.
- (8) A Supplier shall, subject to these Regulations, pay into the Energy Fund the sum prescribed in the Schedule I where that Supplier is in breach of the supply interruption limits specified in sub regulations (1) (2) and (3).
- (9) Subject to regulation 19, the sum prescribed in the Schedule I shall not be paid by the Supplier where:
- (a) the Supplier has not received a claim for compensation from the customer within a period of three months after the expiry of the relevant year;
  - (b) the interruptions were not in respect of the supply to the same premises; or
  - (c) the customer or where more than one person is the customer, at least one such person was not the customer of the premises to which the supply was interrupted

when each of the interruptions as a result of which this regulation applies.

### **Emergency interruption of supply or disconnection**

5. (1) A Supplier may in an emergency disconnect or interrupt supply to a customer without notice to the customer.

(2) The Supplier shall take the appropriate measures to rectify the situation and immediately advise the customer.

### **Restoration of supply**

6. (1) Where a Supplier is informed of an interruption in the customer's supply due to a fault in or damage to the Supplier's distribution system either by the customer or a person other than the customer, the Supplier shall, unless the fault was caused by a natural disaster, restore supply to the customer's premises

(a) in the case of a minor fault, within:

(i) eight hours, in the case of a metropolitan or municipal area or industrial estate,

(ii) twelve hours, in the case of a district capital, and

(iii) twenty-four hours, in the case of a rural area; or

(b) in the case of a major fault that would require capital intensive equipment replacement, within:

(i) eighty hours, in the case of a metropolitan or municipal area or industrial estate,

(ii) one hundred and twenty hours, in the case of a district capital, and (iii) two hundred and forty hours, in the case of a rural area.

(2) A Supplier shall restore electricity supply to a customer who has been disconnected for non-payment of electricity bill or undisputed arrears within

(a) six hours, in the case of a metropolitan or municipal area or industrial estate,

(b) twelve hours, in the case of a district capital, and

(c) eighteen hours, in the case of a rural area,

after settlement of all outstanding financial obligations.

(3) Where the electricity supply to a customer's premises is interrupted by natural disaster supply shall be restored by the Supplier within the period specified in sub regulations (1) and (2) after the situation returns to normalcy.

(4) A Supplier shall pay the customer the sum prescribed in the Schedule I

- (a) where the Supplier fails to restore supply to the customer's premises in accordance with the time specified in sub regulations (1) and (2); and
  - (b) in respect of each consecutive twelve-hour period after the expiry of the period specified for the restoration of supply.
- (5) Subject to sub-regulation (4), the sum prescribed shall not be paid by the Supplier where
- (a) it was not practicable for the Supplier to be aware that the supply had not been restored; or
  - (b) the premises or the vicinity within which the premises is situated is supplied through an electric feeder situated on a river or seabed; or
  - (c) the premises are situated on an island and no alternative means of supply to the island exists.

### **Notification for interruption of supply**

7. (1) A Supplier may disconnect or interrupt electricity supply to a locality or a Customer for the purpose of carrying out planned maintenance, including repair and installation of new equipment.

(2) Except in a situation of emergency, the Supplier shall not exercise its power under sub-regulation (1) unless the Supplier informs the customer of the intended disconnection or interruption, and stipulates the approximate duration of the disconnection or interruption through

- (a) public notice, or
- (b) direct contact by telephone, electronic mail, satellite phone broadcast or any other appropriate information technology system.

(2) For the purpose of paragraph (a) of sub-regulation (1), the public notice shall be given for a period of not less than three working days after which supply may be interrupted.

(3) Where the Supplier interrupts supply, the Supplier shall restore electricity supply after the stipulated period.

### **Reporting Standards`**

8. (1) A Supplier shall prepare and submit to the Commission and the PURC separate technical and financial reports quarterly and annually which shall contain proper records of the performance of the Supplier over the relevant period.

(2) A Supplier shall submit to the Commission and Public Utilities Regulatory Commission

- (a) quarterly technical reports within one month after the end of each quarter, and
- (b) quarterly financial reports within two months after the end of each quarter.

- (3) A Supplier shall, within three months after the end of each operational year in the case of a technical report and within four months after the end of the operational year in the case of a financial report, submit to the Commission and the Public Utilities Regulatory Commission, a report on the levels of performance achieved in respect of the standards of performance for that year.
- (4) The Supplier shall ensure that the contents of the report submitted under sub-regulation (1) include:
- (a) the system average interruption frequency index;
  - (b) the system average interruption duration index;
  - (c) the customer average interruption duration index, and
  - (d) Financial Statements.
- (5) Where a Supplier fails to submit the quarterly reports and annual reports in the manner specified in this regulation, the Supplier shall pay to the Commission and Public Utilities Regulatory Commission the sum prescribed in the Schedule I.

### *System Voltage*

#### **System voltage complaint**

9. (1) The Supplier shall ensure that the voltage at the point of supply to a customer's premises or electrical installation is within plus or minus ten per cent of the following voltage levels:
- (a) 230 Volts;
  - (b) 400 Volts;
  - (c) 11 Kilovolts;
  - (d) 33 Kilovolts; or (e) 34.5 Kilovolts.
- (2) A Supplier shall visit a customer's premises within twelve hours on receiving a supply voltage complaint to investigate and, where possible, rectify any problem where the Supplier:
- (a) has been notified that the electricity supply to a customer's premises is or has been at a voltage outside the limits of the permitted variations prescribed in sub-regulation (1), or
  - (b) may have reason to expect that an event which has occurred within the distribution system or in the power system external to the distribution system may have been the cause of the supply voltage being outside the limits of the permitted variations.
- (3) Despite sub-regulation (2), the Supplier shall within forty-eight hours after receiving notice

of the supply voltage problem send to the customer an explanation of the cause of the problem.

(4) The Supplier shall rectify the problem

(a) in the case of a voltage problem, within:

- (i) eight hours, in the case of a metropolitan or municipal area or industrial estate,
- (ii) twelve hours, in the case of a district capital, and
- (iii) twenty-four hours, in the case of a rural area.

(5) Where the Supplier fails to visit the customer's premises, investigate and rectify a supply voltage problem contrary to sub-regulation (2) or to communicate to the customer an explanation of the problem contrary to sub-regulation (3), the Supplier shall, subject to these Regulations, pay the customer the prescribed sum in the Schedule I

(6) Any variations from the relevant standard voltage levels under sub rule (1) shall be as provided in Schedule II to these Rules.

(7) The Supplier shall minimize the frequent occurrence of voltage fluctuations which shall not exceed the limits in the steady state in Schedule II.

#### **Power factor**

10. (1) A Supplier shall advise an industrial customer on the appropriate steps to be taken to ensure that the customer's load power factor is within the relevant range set out in Schedule III.

(2) Pursuant to sub-regulation (1), the customer shall within a period agreed upon with the Supplier, install shunt compensators on the customer's electrical system to improve the power factor and minimize line losses.

(3) The Supplier shall impose a power factor surcharge to be determined by the PURC, if the customer fails to install shunt compensators to improve the power factor to at least 0.9 lagging.

(4) Notwithstanding sub regulations (1) and (2) the Supplier may install shunt compensators anywhere in the distribution system as may be necessary to minimise system line losses.

#### **Harmonics control**

11. (1) A Supplier shall ensure that the voltage harmonic distortions at the point of common coupling nearest to a customer's point of supply do not exceed the levels set out in Schedule IV.

(2) Notwithstanding sub-regulation (1), the Supplier shall comply with the Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems as pertains to applicable standards.



(3) A customer categorized as a bulk or industrial customer shall ensure that the voltage and current harmonic distortions in the customer's electrical system are within the limits stated in Schedules IV and V.

(4) Where it is apparent to the Supplier that a customer's voltage and current harmonic distortions exceed the limits specified in Schedules IV and V, the Supplier may disconnect electricity supply to the customer.

(5) The Supplier must reconnect supply to the customer in accordance with applicable Code after the customer has complied with the relevant limits.

(6) A customer practicing net metering should ensure that the voltage and current harmonic distortions in the customer's electrical system are within the limits stated in Schedules IV and V.

### **Negative sequence voltage**

12. (1) A Supplier must ensure that the negative sequence voltage at the point of common coupling to a customer's three phase system is less than 1% and not more than 2% for a period of five minutes in every thirty minutes.

(2) In accordance with sub-regulation (1), the Supplier shall prevent the negative sequence voltage from fluctuating above 1% of an applicable voltage level, and when it does fluctuate above 1%, prevent it from exceeding 2% for a period of five minutes in every thirty minutes.

### **Load balance**

13. (1) A Supplier, in supplying electricity to customers, shall ensure that the connections are made to balance the loads on the three phases of the distribution network.

(2) A customer, shall ensure that the current in each phase of the customer's three phase system, does not deviate from the average of the three phase currents as pertains in the Distribution Code.

(a) 5% for a standard nominal voltage up to 1kV; or

(b) 2% for a standard nominal voltage above 1kV.

(3) Notwithstanding sub rule (2), deviations of

(a) 10% for a standard nominal voltage up to 1kV, or

(b) 4% for standard nominal voltage above 1kV,

for periods of less than two minutes, are permissible.

*The meter***Requirement for a meter**

14. (1) A Supplier shall provide, install and maintain a meter which will measure and record the amount of electricity supplied to the customer within the accuracy limits of that meter class.

(2) Where the Supplier breaches the requirement to provide a meter within six months, the Supplier shall pay the customer the sum prescribed in the Schedule I.

**Separate meter**

15. (1) A Supplier shall install a separate meter at the customer's premises where:

- (a) the customer requesting the separate meter is a distinct household and shares a meter with another household;
- (b) facilities exist on the premises for the Supplier to install the separate meter at the customer's own cost;
- (c) the customer who requested the separate meter is willing to make the necessary modifications to the wiring system to accommodate the separate meter; and

(2) For separate meter connection the Supplier shall not provide a new service connection from the service pole

(3) On receipt of the customer's request, the Supplier shall visit the premises, assess the situation and provide the customer with estimates for installing the meter within five working days.

(4) Where the customer pays the required charge for a separate meter, the Supplier shall provide and connect the separate meter to the electricity distribution system within five working days of the payment.

(5) A Supplier who fails to provide the estimates for the separate meter or does not install the meter upon payment of the required charge within the periods specified in sub regulations (2) and (3) shall pay to the customer the prescribed amount in the Schedule I.

**Prepayment meter**

16. (1) The Supplier shall ensure that a facility for the purchase of credit for a prepayment meter is:

- (a) Established within a distance not be less than two (2) km apart from each other in an Urban area and between five (5) km to ten (10) km in a Rural area so as not to inconvenience Customers

- (b) provision for online/remote vending or any third-party system to buy electricity is provided
  - (c) open for a minimum of eight hours each day of the week.
- (2) Where a Supplier fails to:
- (a) provide a facility for the purchase of credit in respect of a prepayment meter contrary to sub-regulation (1)(a), or
  - (b) keep the facility for the purchase of credit in respect of a prepayment meter open for the specified duration contrary to sub-regulation (1)(b), the Supplier shall pay into the Energy Fund the sum prescribed in the Schedule I.
- (3) Despite sub-regulation (2), a Supplier shall pay into the Energy Fund the sum specified in the Schedule I for each succeeding six months that the Supplier fails to provide the credit paying facility centre contrary to sub-regulation (1)(a).

### **Meter repositioning**

17. (1) A customer may apply to the Supplier for a change in the position of the meter at the customer's premises by stating the reasons for the change in position and indicating the preferred location of the meter.
- (2) On receipt of the customer's request, the Supplier shall provide the estimate and charge for repositioning the meter within five working days where the request is reasonable.
- (3) Where the Supplier rejects the request, the Supplier shall provide the customer with the reasons for the rejection.
- (4) Where the customer pays the required charge, the Supplier shall reposition the meter within fourteen days.
- (5) Where the Supplier fails to provide the estimates and charges contrary to sub-regulation (2) or fails to reposition the meter contrary sub-regulation (4), the Supplier shall, subject to these regulations pay the customer the sum prescribed in the Schedule I.

### **Revision of meter**

18. (1) A Supplier shall each year undertake an audit of meters that have been in operation for twenty years or more and replace at least 75% of the meters each year.
- (2) Despite sub-regulation (1), the Supplier shall, within six months of commencement of these Regulations, submit to the Commission
- (a) an audit report of the meters in operation for twenty years or more; and
  - (b) a programme for replacement of the meters within the subsequent sixty (60) months.

(3) A Supplier who does not comply with these requirements under these Regulations shall be in breach of a mandatory technical performance indicator requirement for Public Utilities Regulatory Commission's electricity tariff review.

### **Meter Complaint**

19. (1) The Supplier shall visit a customer's premises within twenty-four hours after receipt of a meter complaint from that customer in respect of the following matters

- (a) that the meter on the customer's premises is or may have been operating outside the permitted margins of error; or
- (b) that an event has occurred, or circumstances exist which the Supplier may reasonably expect to have been the cause of a meter operating beyond its margins of error;

and for that reason, the Supplier shall investigate the complaint.

(2) A Supplier shall after establishing a defect in the operation of a customer's meter replace the Customer's defective meter within forty-eight hours.

(3) The Supplier shall use an estimated consumption for billing the customer for up to six months, where the Supplier has no meter in stock for replacing a defective meter in accordance with sub-regulation (2).

(4) A Supplier who contravenes sub regulations (1) to (3) shall pay to the Customer the sum prescribed in the Schedule I.

### **Safety of supply**

20. (1) A Supplier shall ensure that its distribution system is safe and efficient for the supply of electricity to its customers and shall take the precautions necessary to protect customers or the public to exposed live electricity cables.

(2) Where a Supplier becomes aware either by being informed by the public or otherwise, that its distribution system at a locality is faulty and may pose danger to the public, the Supplier shall visit the locality and isolate the faulty part of the network

- (a) in the case of a metropolitan or municipal area:
  - i. 2 hours, where the location of the fault is within a 30 kilometre radius;
  - ii. 4 hours, where the location of the fault is within a 60 kilometre radius; or
  - iii. 5 hours where the location of the fault is within a radius 60 kilometres and above
- (b) In the case of a rural area,
  - i. 1 hours, where the location of the fault is within a 30 kilometre radius;

- ii. 2 hours, where the location of the fault is within a 60 kilometre radius; or
- iii. 3 hours where the location of the fault is within a radius 60 kilometres and above from the district or regional office of the Supplier where the information was received.

(3) The Supplier shall place danger notices to warn the public of the danger.

(4) The Supplier shall rectify the fault and restore supply within

- (a) 24 hours for LV minor faults;
- (b) 48 hours for LV major faults;
- (c) 48 hours for MV minor faults; and
- (d) 72 hours for MV major faults.

(5) A Customer shall not use electricity in a manner that would make the Supplier's distribution system unsafe.

#### *Miscellaneous*

##### **Notification of rights of customers**

21. A Supplier shall prepare and make available to its customers, a customer charter approved by PURC summarizing the rights and responsibilities of customers as well as the level of service customers are to expect.

##### **Provision of information**

22. A Supplier shall, on request provide a customer with information about the services provided to the customer's premises including the following

- (a) load profiles and power factors, where applicable;
- (b) meter readings for electricity supply to the customer's premises; and
- (c) the customer's account history

##### **Penalty**

23. The penalty units for the breach of these Regulations are specified in the Schedule I.

##### **Breach of notification**

21. (1) Where a Supplier:

- (a) fails to give notice of a planned interruption of supply through

- (i) public notice,
  - (ii) direct contact by telephone, electronic mail, satellite phone broadcast or any other appropriate communication system; or
- (b) gives notice but interrupts the supply at a time or on a day other than the time or day stated in the notice, the Supplier shall pay into the Energy Fund the sum prescribed in the Schedule I.

### **Transitional Provision**

24. The Commission shall on annual bases agree on performance targets that would progressively lead to performance benchmarks set out in LI1935

### **Interpretation**

25. In these Regulations unless the context otherwise requires:

“Act” means the Energy Commission Act, 1997 (Act 541);

“capital equipment” means major electrical equipment that attaches to the electricity network including among others power and distribution transformers, wire and cable, transmission and distribution switch gear;

“Commission” means the Energy Commission established under the Section 1 of the Act;

“connection service” means the installation and activation of connection assets in order to distribute electricity;

“customer” means a person that contracts to purchase electricity from a Supplier,

“customer average interruption duration index (CAIDI)” means a measure of the average duration of interruptions for customers interrupted during a year;

“distribution system” means a system consisting of a network of electric feeders, transformers, service lines meters, and other distribution switchgears;

“electric feeder” means an overhead conductor or underground cable used for bulk electricity supply;

“industrial estate” means an area or land demarcated and set aside for factories and warehouses

“major fault” means a fault that requires of high capital cost to fix or remedy such as a substation blast, cable blasts, damaged transformer, damaged switchgear etc;

“minor fault” means a fault that requires the replacement of equipment of minimal capital cost to fix or remedy such as blown substation LV fuse, jumper cut, blown aerial fuse etc.;

“operational year” is the same as a calendar year;

“Supplier” means an entity that has been licensed by the Energy Commission under the Act as an electricity distributor or retailer;

“system average interruption duration index (SAIDI)” means a measure of the average duration of interruptions recorded for the distribution system during a year;

“system average interruption frequency index (SAIFI)” means a measure of the average number of interruptions recorded for the distribution system during a year;

“residential” means electricity used by a customer for domestic purposes;

“non-residential” means electricity used by a customer for a purpose other than domestic activity and

“rural area” means an operational district with a customer population under five thousand and a demand below fifteen megawatts;

### Schedule I

\*\* Any such payments to be shared equally by Energy Commission and Public Utilities Regulatory Commission.

<b>REFERENCE REGULATIONS</b>	<b>DESCRIPTION</b>	<b>CHARGE</b>
Regulations 3 (1) (2)	Breach of an application processing procedure	Gh¢ 3000.00
Regulations 4 (2) (8)	Interruption of Supply	Gh¢ 3,000.00
Regulations 6 (2)(3) (4)	Restoration of supply	Gh¢ 3,000.00
Regulations 8 (2) (3)(5)	Reporting standards	Gh¢ 3,000.00
Regulations 9 (1) (2)(4)	System voltage complaints	Gh¢ 3,000.00
Regulations 11 (1) (5)	Harmonics control	Gh¢ 3,000.00
Regulations 12 (1)	Negative system voltage	Gh¢ 3,000.00
Regulations 13 (2)	Load Balance	Gh¢ 3,000.00
Regulations 14 (1) (2)	Requirement for a meter	Gh¢ 3,000.00
Regulations 15 (5)	Separate Meter	Gh¢ 3,000.00
Regulations 16 (1)	Prepayment Meters	Gh¢ 3,000.00
Regulations 18 (1) (2)(3)	Revision of Meters	Gh¢ 3,000.00
Regulations 19 (1) (2) (3)	Meter Complaint	Gh¢ 3,000.00
Regulations 20 (1) (2)(3)	Safety of Supply	Gh¢ 3,000.00



*Schedule II*

**STANDARD NOMINAL VOLTAGE**

Voltage Level in kV	Voltage Range for Time Period		
	Steady state	Transient State	
		Less than 1 minute	Less than 10 seconds
<1.0	±10%	±15%	Phase to Earth +50% -100% Phase to Phase +20%-100%
11	±10%	±15%	Phase to Earth +80% -100% Phase to Phase +20%-100%
33	±10%	±15%	Phase to Earth +80% -100% Phase to Phase +20%-100%
34.5	±10%	±15%	Phase to Earth +80% -100% Phase to Phase +20%-100%

*Schedule III*

**POWER FACTOR LIMITS**

Supply Voltage	Power Factor Range for Customers Maximum Demand and Voltage					
	Up to 100Kva		Between 100kVA -2MVA		Over 2MVA	
	Minimum		Maximum		Minimum	
	Lagging	Leading	Lagging	Leading	Lagging	Leading
<1.0	0.95	0.95	-	-	-	-
11	0.95	0.95	0.95	0.95	0.96	0.96
33	0.95	0.95	0.95	0.95	0.96	0.96
34.5	0.95	0.95	0.95	0.95	0.96	0.96

*Schedule IV*

**VOLTAGE HARMONIC DISTORTION LIMITS**

Voltage at point of common coupling	Total harmonic distortion	Individual voltage harmonics	
		Odd	Even
<1 kV	5%	4%	2%
>1kV	3%	2%	1%

*Schedule V*

**VOLTAGE HARMONIC DISTORTION LIMITS**

<b>Maximum Harmonic Current Distortion In Percent of k</b>						
Individual Harmonic Order “h” (Odd Harmonics)						
Isc/L	<11	11≤h<17	23≤h<35	17≤h<35	35≤h Distortion	Total Harmonics
<20*	4.0%	2.0%	1.5%	0.6%	0.3%	5.0%
20<50	7.0%	3.5%	2.5%	1.0%	0.5%	8.0%
50<100	10.0%	4.5%	4.0%	1.5%	0.7%	12.0%
100<1000	12.0%	5.5%	5.0%	2.0%	2.0%	15.0%
<100	15.0%	7.0%	6.0%	2.5%	1.4%	20.0%

**ENERGY COMMISSION**