Question # 5

In the spring of 2000 I did meet with Mr. Derber to discuss upgrading my electrical service from 100 to 600 amps and after many phone discussions and a meeting in person he agreed that this would be possible. Mr. Derber provided me with a copy of CIPS' Rules and Specifications for Electric Service manual, which is on file with the commission, explained to me what electrical equipment I needed to purchase and where I should locate my service equipment. At the end of this meeting Mr. Derber instructed me to call him after I had completed installing this equipment and he would have the new 600-amp service energized. Over the course of the next week I purchased roughly $2,500 of metering equipment and other electrical components in order to be in compliance with the terms of the service agreement that Mr. Derber had set for me. Mr. Derber contacted me later and stated that what he previously told me was incorrect because his supervisor said that my service needed to be classified as temporary and because of this I would have to pay CIPS $3,100 to energize it.

Question # 6

While a lawsuit was filed to recover money lost by myself when I relied upon Mr. Derber's word that he would provide me with a 600-amp service after I purchased and installed this electrical equipment, the suit was filed by my mother as was the appeal to the 5th District Appellate Court. The complaint made around that same time to the ICC was later determined by ALJ Don Woods to be a separate issue from the complaint made in small claims court. CIPS, my mother, and I reached a settlement agreement after CIPS had disconnected my electrical service on three occasions, one instance being for 3 days in July of 2001 when temperatures were in excess of 90 degrees. They had also decided to bill me hundreds of dollars for overtime charges incurred by their lineman when he had to disconnect and reconnect my service after hours at the request of CIPS.

Question # 11

After Mr. Derber, Mr. France, and myself spoke on November 28th, and made me aware of a problem with current spikes in excess of 400 amps, I determined that the heaters I had in my garage could be causing this problem. I stopped by Mr. Derber's office on a Friday on my way home from Carbondale. I did see the voltage charts and assured him that there would no longer be any problems because I had identified the culprit appliances that were causing the electrical problems and would disconnect them.

Question # 12

During my discussion with Mr. Derber at his office, I did inform him of a potential problem with the CIPS electrical system. The neutral cable in the triplex that runs from CIPS' pole to my service equipment had shocked me. Upon further investigation I discovered a potential difference of about thirty volts between the neutral and the ground. I informed Mr. Derber of this problem. My intention in doing so was to prevent anyone from being hurt by the unsafe conditions of CIPS' electrical equipment that was serving my residence and nine other properties.

Question # 15

The Christmas lights use about 120 amps when they are all illuminated. The total current consumption can be determined by multiplying the current rating of one light strand which is 200 milliamps, by the total number of strands which is 600. 0.2 A X 600 = 120 amps at 120 volts. Other load would be the load of lights and appliances in my home and the heaters on the weekends. After I talked to CIPS I kept the current under 200 amps by limiting the heaters used and by monitoring household appliance use.

Question # 16

It is true that the when the lighting display is operating alone there is no major voltage problem but if my mother were to decide to do laundry or watch television, the low voltage caused by the operation of other appliances (excluding the garage heaters) in addition to the lights would cause the voltage to drop below the minimum of 113. This would create problems with interior lights, computers, and other sensitive electrical equipment. There are many occasions recorded by CIPS' voltmeter that show the voltage below 113 volts when the heaters were not operational. During the weekdays, the heaters were not used because I was at school and did not need to heat the garage. I also did not use them all the time. When my Mom wanted to use a major appliance I would turn them off. As the recorder shows, the current did come close to 200 amps while I was at school and this could only be caused by household appliances and the lights because the heaters could not be operated by anyone but me.

Question #17

The statement that there would be no voltage problems if the heaters were not being operated is incorrect. In compliance with a discovery request made by CIPS I provided the nameplate data for all of the major appliances in my house and it is obvious that the operation of certain combinations of these appliances in addition to the lights would bring the total current consumption up to a level that will create a voltage drop below 113.

Question # 18

In November of 2001 I had used all 40 heaters at once to heat my garage. After talking with Mr. Derber and Mr. France on the telephone and being made aware of the problem that the heaters were causing, I disconnected most of them so that the current would not go above 200 amps when the heaters and lights were operational.

Question # 19

While the size of individual heaters may vary, the fact is that heating my garage would require the same amount of BTUs whether I was using eight large heaters, or 20 small heaters, and this would still require the same amount of power to operate them. Since the load from the heaters and the lights is purely resistive, staging them in would only create the voltage drop at a slower rate. After all of them were on there would still be a voltage problem. During our meeting about the voltage charts, Mr. Derber told me that I would need to turn my lights on in 4 or more stages to prevent the neighbors who share my transformer from noticing the voltage drop when their lights dimmed. I told Mr. Derber that I didn't feel that it was my responsibility to hide the voltage problem from my neighbors. If CIPS didn't want the other customers to complain, then they needed to fix the problem.

Question # 20

What Mr. Derber stated is true if the voltage drop caused by the resistive loss in the triplex that connects my service equipment to the CIPS line is not considered. Section 410.300 states that the voltage reading should be taken at the customer's point of delivery, which in my case would be the line side if the electric meter. CIPS took the voltage readings from the street and so to know what the voltage at the delivery point is the resistance in the triplex has to be factored in.

The voltage drop in the triplex can be figured by using Ohm's law V=I*R where V is the potential difference in volts, I is the current in amps, and R is the resistive value constant of the conductor being measured. According to the manufacture's specifications for the triplex, the resistive value is 0.1992 ohms/1000 feet. The length of the triplex can be determined by using basic calculus equations to find the length of the catenary curve which is expressed by the hyperbolic cosine function of y = a * cosh (x/1) + c. By factoring in the height of the triplex on both ends, the height at the lowest point in the middle, and the horizontal length of the triplex, the total length including the sag in the triplex can be figured. This comes out to be nearly 100 feet. Using the manufacturer's resistive value, we can find the resistance in 100 feet of triplex to be 0.01992 ohms. By plugging this into ohm's law, V = 200Amps * 0.01992 ohms, we get a total voltage drop of 4 volts @ 200 amps. This means that whatever CIPS' recorder measured, the voltage at my point of delivery was actually four volts less line to neutral. The charts clearly show a number of instances where the voltage was at or below 117 volts for up to an hour and at times when the heaters were not operational.

Question # 21

According to CIPS' specifications manual, sections 8.01, 8.02, 8.03, and 8.04, on file with the commission, the heaters I used in my garage cannot be considered commercial, and do not qualify as one of the exceptions to Section 410.300c. The only requirement of heaters like the ones that I used in my garage is that they be connected at line-to-line voltage if the total power exceeds 2000W. The heaters were rated for 3000W and I had them connected at 240 volts. The statement by Mr. Derber that the heaters qualified as an apparatus that caused large inrush currents is not true. While turning on all of the lights and heaters at once would create a large current, this current would remain constant weather the lights and heaters were turned on at once or in stages; therefore, they can not be considered an apparatus that causes inrush current.

It can be determined by the wording of 410.300c 2, specifically "large inrush currents" and by section 8.01 of CIPS' service specifications which mentions hoists, elevators, welders, arc furnaces, etc., that the problem of inrush currents is created by inductive and capacitive load. The operation of a large induction motor such as one in an elevator creates an initial current spike greater than the rated ampacity of the unit and then the current levels off after the motor begins to get up to its running RPM speed. The initial current spike as the motor accelerates is inrush current. Lights and heaters on the other hand are purely resistive load and do not have an initial current value greater than their continuous run ampacity and therefore cannot create inrush currents.

Question # 23

The amount of current I use is within CIPS residential service guidelines. CIPS provides for a residential 400-amp service in table 6.1 of their specification guidelines. They have refused to provide me with this service. As a result my neighbors and I will continue to suffer from low voltage problems until the service is corrected.

The current service they provide is not good safe and reliable as Mr. Derber claims. The transformer that serves my residence and my neighbors is rated for a maximum of 208 amps. When my lights and other appliances are on and using 200 amps, and one of the other customers turns on an electric stove or a vacuum then the transformer is overloaded. The triplex that serves my residence is also overloaded. It is rated for 139 amps and I have a 200-amp service that I have maxed out. The line wire that runs from the transformer to the triplex is also overloaded. It is rated for a maximum of 163 amps. This substandard equipment is part of the voltage loss problem and is certainly not "good safe" as claimed. It is a hazard that needs to be corrected. The best way to resolve this dangerous situation is to upgrade my service to 400 amps, replace the transformer with a larger one and replace the line wire and triplex with cables rated for the current that will be loaded on them.

August 20, 2001

Penny Shehadeh -vs- Central Illinois Public Service Company Complaint as to refusing service without payment of $3,100 because service is being called temporary in Taylorville, Illinois.	: : : : : : :	01-0048

Penny Shehadeh
1312 Sportmans Dr.
Taylorville, IL 62568

Robert J. Mill
Central Illinois Public Service Company
607 E. Adams St.
Springfield, IL 62739
bob_mill@ameren.com

Steven R Sullivan, Vice President
Central Illinois Public Service Company,
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Stephen R. Kaufmann
Atty. for Central Illinois Public Service Company
Sorling, Northrup, Hanna, Cullen & Cochran, LTD
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PO Box 5131
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srkaufmann@sorlinglaw.com

NOTICE
AND
NOTICE OF CONTINUANCE OF HEARNG

Dear Sir/Madam:

Notice is hereby given that the Administrative Law Judge, having reviewed the pleadings associated with Respondent's Motion to Dismiss in the above captioned cause, hereby grants the motion in part and denies the motion in part. The motion is granted with respect to all requests for monetary damages and fines. The Motion is denied with respect to Complainant's request that the Commission adjudicate the claim that Respondent inappropriately determined that the service being requested was temporary or seasonal and subject to billing determinate under those tariff terms. This matter was not raised in the Circuit Court proceeding and is squarely within the subject matter jurisdiction of the Commission.

Notice is also given that a hearing to establish a schedule for the filing of testimony will he held at on September 19, 2001 at the Offices of the Commission, Springfield, Illinois, at the hour of 10:00 A.M.

Sincerely,

Donna M. Caton
Chief Clerk

sc
Administrative Law Judge Woods

B. Where multiple switches or circuit breakers in separate enclosures constitute the service equipment, the main ungrounded service-entrance conductors shall have an ampacity of not less than 100% of the sum of the rating of all the switches, but not to exceed six total switches or circuit breakers. Tap conductors to each main switch or circuit breaker shall be sized according to 6.02A. Conductors at all times shall have adequate ampacity for the load calculated in accordance with the latest edition of the National Electrical Code.

C. Where multiple switches or circuit breakers in a single enclosure constitute the service equipment, the ampacity of the service-entrance conductors shall be equal to or greater than the main bus rating of the enclosure. Modular meter devices shall comply with this provision.

D. Where two to six service disconnecting means in separate enclosures are grouped at one location and supply separate loads from one service drop or lateral, one set of service-entrance conductors shall be permitted to supply each or several equipment enclosures.

E. A maximum of two sets of conductors will be permitted for single-phase, self-contained metering greater than 200A. The minimum allowed switch size will be 100 ampere. Total combined ratings not to exceed 400 ampere.

F. When service entrance conductors of 500 kcmil copper or larger are required, parallel runs of service-entrance conductors may be installed in separate raceways. Aluminum or copper conductors, comprising each phase or neutral, will be permitted to be connected in parallel (electrically joined at both ends to form a single conductor) only if all of the following conditions are met: all of the parallel conductors of each phase (or neutral), but not necessarily all phases are; of the same length, of the same conductor material, same circular-mil area, same insulation type, terminated in the same manner. Separate raceways will have the same physical characteristics. Each set of conductors of a parallel service shall include each phase conductor and a neutral. Minimum size of conductor to be used for parallel operation is 1/0. The Company's concern in the use of paralleled circuits is that the conductors in parallel per phase (or neutral) will evenly divide the load current.

G. Copper conductors are recommended for all service entrances. However, aluminum conductors are approved for most service entrances provided the aluminum conductors are thoroughly cleaned and coated with NO-OX-ID Grease, or equivalent, before clamping at all connections.

H. Maximum allowed amperage of conductor is based on 75 degrees Centigrade temperature rise and 30 degrees Centigrade ambient.

TABLE 6.1

RESIDENTIAL
120/240 VOLT, 3-WIRE, SINGLE-PHASE

Ampere Rating of **Single Main** Disconnect	Size of Phase Conductors		Minimum Neutral Size	
	Copper	Aluminum	Copper	Aluminum
100	4 AWG	2 AWG	6 AWG	4 AWG
200	2/0 AWG	4/0 AWG	1/0 AWG	2/0 AWG
400	400 kcmil	600 kcmil	300 kcmil	400 kcmil

SECTION VIII

UTILIZATION EQUIPMENT

8.01 PROTECTION OF SERVICE

A. Hoists, elevators, welding machines, X-ray machines, arc furnaces, compressors and other equipment where the use of electricity is intermittent or the load fluctuates rapidly, shall be installed and used in such manner that they will not adversely affect voltage regulation or impair the Company's service to other customers. The customer shall, prior to completing plans to use such equipment, furnish the Company complete information as to the manufacturer, type, size, voltage, amperage, power factor, harmonic content and other data regarding the equipment's performance under conditions of maximum output, and shall also supply such other information pertaining to the equipment as the Company will require to enable it to determine if adequate service for the equipment is available at the desired location. In all cases the customer must obtain Company approval before using such equipment.

B. Whenever a customer's utilization equipment, other than acceptable equipment described in this section, has characteristics which cause objectionable interference with the Company's service to other customers or to the Company's use of its equipment, the customer shall make changes in such equipment or provide and maintain at his expense the necessary additional equipment to prevent or eliminate such interference; however, where practical, the Company upon request, will furnish in accordance with the provisions for furnishing "Excess Facilities", a separate transformer or other facilities to reduce or eliminate such interference. The Company, however, does not by installing such facilities waive its right, where detrimental conditions from such equipment still exist, to require the customer to install corrective equipment. Unless corrected, the Company will discontinue all service to the Customer.

C. When a customer desires additional Company facilities (such as transformers) to minimize voltage fluctuations on his own electrical circuits or to provide satisfactory operation of his equipment (i.e., welders, induction heating equipment, X-ray machines, computer and/or electronic equipment), such facilities, where practical, will be furnished by the Company in accordance with the provisions for furnishing "Excess Facilities".

D. The Company reserves the right to inspect and test any equipment connected to its lines to determine its operating characteristics and to require that such equipment be provided with name plates showing the voltage, phase, power factor, harmonic content, full-load and/or locked rotor amperes, operating amperes and/or kilovolt ampere requirements.

E. When a customer installs capacitors on his electrical facilities to improve the power factor of his installation, the customer shall provide, at the request of the Company, in order to avoid abnormal voltages or damage to Company's facilities, a means of automatically disconnecting any or all of the capacitors when the equipment causing the low power factor is not operating.

F. High frequency equipment, such as automatic heating equipment, spark discharge devices, radio transmitting equipment, etc., shall be designed and operated in such a manner as to prevent the presence of high frequency or other disturbances on the Company's electrical system.

8.02 LOAD BALANCE

The customer's 120 volt load on 120/240 volts circuits and single-phase load on three-phase circuits shall be so connected that a minimum of unbalanced current occurs on the Company's facilities.

8.03 SINGLE PHASE SERVICE

A. In general, miscellaneous single-phase equipment, except motors, may be connected at 120 volts, if the equipment does not have a rated capacity in excess of 2 kilowatts or 2 kilovolt amperes. When the rating of any single piece of equipment exceeds 2 kilowatts or 2 kilovolt amperes, it shall be connected at 240 volts. (For motors, see Paragraph 8.05).

B. All flasher signals or signs which require more than one supply circuit shall be connected for 3-wire, 120/240 volts, and the load shall be balanced throughout each portion of the flasher signal.

8.04 VOLTAGE FLUCTUATION

A. Starting of motors can produce voltage fluctuations resulting in objectionable flicker on lighting equipment which is supplied by the same circuits. Through industry standardization, motor starting currents of generally used domestic appliances have been established at values which will not cause objectionable flicker under normal conditions.

B. Starting of large three-phase motors requires special consideration of the power supply and wiring. The Company is prepared to assist the customer in planning these installations. In every case the Company must be notified so that adequacy of the service facilities may be determined and changes may be made, if necessary.

8.05 SINGLE PHASE MOTORS

A. All single-phase motors with ratings of 1/2 H.P. and larger should be connected for supply at 240 volts whenever it is practical in order to minimize voltage fluctuation in the wiring system. Where service is available from a 208Y/120 volts system, the single-phase motors should be connected for supply at 208 volts.

B. Whenever a starting current causes undue interference with service to other customers, the customer shall provide a starting device, of a type which will reduce the starting current to the value required to eliminate such interference: otherwise, it may be necessary to take service from a separate transformer as provided in Paragraph 8.01.C.

C. Motor installations for air conditioning equipment, farm applications and heat pumps in ratings of 1/2 to 7 1/2 H.P. should be of the capacitor-start, capacitor-run design.

D. When equipment has more than one motor with a common control, the combined instantaneous starting currents of all motors starting simultaneously shall not exceed the Company's Voltage Fluctuation Standards.

E. Overload protection must be provided for all motor circuits in accordance with the *National Electrical Code* requirements.

8.06 THREE PHASE MOTORS

A. The Company shall be notified of each installation of 7 1/2 H.P. or more, or whenever a proposed installation will increase the customer's connected load by 20% or more.

B. Prior to purchasing or installing any three phase motors, it is advisable that the Company be notified to assure the character and adequacy of the supply facilities.

C. Customers having three-phase service may install three-phase motors of 7 1/2 H.P. or less with across-the-line starting. It may be necessary that three-phase motors of greater than 7 1/2 H.P. be installed with starting devices that will reduce the starting current to limits established by the Company for the conditions of that particular location.

8.07 PROTECTIVE DEVICES

A. The customer's equipment must be equipped with overload devices which conform to the *National Electrical Code*.

B. Under-voltage-release starting equipment is required on all motors of 7 1/2 H.P. and larger and on all motors that cannot be safely subjected to full-voltage starting. The under-voltage release shall be of a type that will return the starting device to the "off" position when the electric supply is interrupted. Under certain conditions, time-delay under-voltage release starting equipment will be permitted.

C. Any three-phase motor that is installed to operate elevators, cranes or other apparatus which would cause damage due to a reversal of motor rotation shall be equipped with reverse-phase relays designed to disconnect the motor from the line in case it should receive single-phase or reverse-phase power. In addition, mechanical devices shall be installed to prevent damage due to travel of the driven mechanism in the wrong direction. The Company assumes no liability for damage resulting from single-phase or reverse-phase operation of three-phase equipment.

8.08 TRANSFORMERS

When a customer desires 120 volts for lighting or small appliance use from a four-wire, three-phase 480Y/277 volt supply, autotransformers may be provided and installed by the customer if a grounded conductor on the supply side is solidly connected to a grounded conductor on the secondary side of the transformer. In all other cases, the transformers for such use shall have separate primary and secondary windings with appropriate ground-connections on the secondary windings.

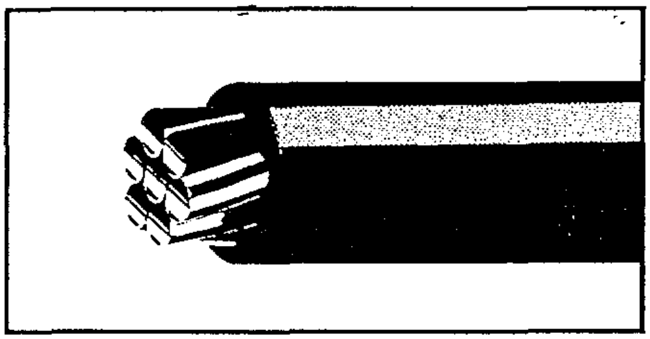
8.09 FURNACES, OVENS, WELDERS, AND VARIABLE SPEED MOTOR CONTROLS

The customer shall secure information from the Company pertaining to the availability of service for all electric furnaces, welders, ovens and variable speed motor control devices prior to completing plans or purchasing such equipment.

Service Wire Co.

Over 25 years of service

ISO 9002



Weatherproof LineWire HMWPE/Copper

Solid/Stranded

Soft, Medium Hard, Hard Drawn

Description:

Copper conductor, solid or stranded, soft (annealed), medium hard, or hard drawn, covered with black high molecular weight polyethylene (HMWPE).

Application:

For use in overhead distribution systems where protection from environmental elements is required.

Standards:

Service Wire line conforms to ASTM standards:

- B-1 (Hard Drawn)
- B-2 (Medium Hard Drawn)
- B-3 (Soft or Annealed)
- B-8 (Concentric Stranded Copper)

Service Wire line wire conforms to ANSI C8.35 / ICEA S-70-547

WEATHERPROOF LINE WIRE

Size AWG or MCM	Stranding	Covering Thickness (mils)	Nominal Diameter Overall (inch)	Aprox. Net Weight per 1000 feet (lbs.)	DC Resistance (Ohms per 1000 ft.) @ 20° C			Ampacity* (Amps)
					Hard Drawn	Medium Drawn	Soft (Annealed)	
6	Solid	30	.22	86.7	.4110	4088	.3952	130
4	Solid	30	.26	135.2	.2584	.2571	.2485	163
4	7	30	.29	138.6	.2636	.2622	.2540	163
2	Solid	45	.35	218.3	.1625	.1617	.1563	219
2	7	45	.38	223.6	.1660	.1650	.1590	219
1	7	45	.42	283.6	.1316	.1309	.1265	--
1/0	7	60	.49	357.5	.1042	.1037	.1002	297
2/0	7	60	.53	446.1	.0826	.0822	.0795	344
3/0	7	60	.58	556.9	.0655	.0652	.0630	401
4/0	7	60	.64	696.4	.0519	.0517	.0499	466
250	37	60	.70	818.8	.0440	.0438	.0423	519
350	37	60	.80	1136.1	.0314	.0313	.0302	--
500	37	75	.97	1626.2	.0220	.0219	.0212	812
750	61	75	1.16	2415.2	.0146	.0146	.0141	1050
1000	61	95	1.34	3234.0	.0110	.0109	.0106	1253

*Per NEC Table B-310-4. Based on conductor temperature of 80° C; ambient temperature of 40° C; 2 ft./sec. wind.
NOTE: The data shown is approximate and subject to standard industry tolerances. April 1997 01-05

Culloden, WV 800-624-3572 • Houston, TX 800-231-9473 • Pittsburgh, PA 800-778-9473 • Bartow, FL 800-635-9473

SHEHADEH v. CIPS
ICC No. 02-0002

The positive and negative sequence reactances (X1 and X2) for a conductor are given by:

$$X1 = X2 = Xa + Xd$$

Where: Xa = reactance due to the internal and external flux out to a one foot radius (self or 1 - foot reactance)

Xd = reactance due to the flux from the 1 - foot radius out to the return conductor (separation reactance)

Xa is a constant and is listed for each aluminum conductor in the following table along with the A.C. resistance. (both @ 50 degrees C.)

Conductor & Type	R - A.C. Ohms/K-Ft.	Xa Ohms/K-Ft.
4 ACSR	.4778	.1345
2 ACSR	.3097	.1252
1/0 ACSR	.1992	.1150
1/0 AAAC	.1804	.1184
2/0 ACSR	.1615	.1117
3/0 ACSR	.1307	.1083
4/0 ACSR	.1078	.1051
110.8 ACSR	.1932	.1176
266.8 ACSR	.0718	.0881
335.6 T-2	.0599	.0931
336.4 ACSR	.0575	.0875
397.5 AAC	.0493	.0869
477 ACSR	.0407	.0835
559.5 ACAR	.0364	.0826
4 Du.	.4658	.0279
4 Tri.	.4658	.0291
1/0 Tri.	.1844	.0283
4/0 Tri.	.0922	.0261
4 Quad.	.4658	.0350
1/0 Quad.	.1844	.0337
4/0 Quad.	.0922	.0310

Xd is dependent solely on conductor separation and is given by:

$$Xd = .0529 \, Log(d) \quad (Ohms/K\text{-}Ft.)$$

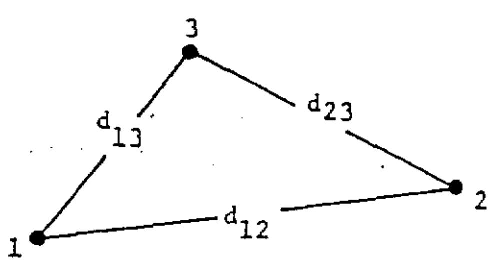
Where: Log is base 10

1-Phase d = distance (feet) from conductor to neutral

2-Phase d = Geometric Mean Distance (GMD) of conductor to conductor to neutral (in feet)

3-Phase d = GMD of conductor to conductor to conductor (in feet (3-Phase is assumed balanced and the neutral neglected)

The Geometric Mean Distance (GMD) is an average given by:



$$d = \sqrt[3]{d_{12} \cdot d_{23} \cdot d_{13}}$$

ALUMINUM WIRE TABLE

ck de nber	Size AWG/ KCM	Type	Strand	Nominal O.D. (in)	Weight lb./ K-ft.	Ultimate Strength (lb.)	75C Normal Rating (Amps)	100C 4 Hr Emerg. Rating (Amps)	Code Name
31040	4	ACSR	7/1	0.257	67	2360	108	150	Swanate
31090	2	ACSR	7/1	0.325	107	3640	142	201	Sparate
31190	1/0	ACSR	6/1	0.398	145	4380	186	266	Raven
32300	1/0	AAAC	7	0.518	166	4010	192	282	Oilnut-XLP
31260	2/0	ACSR	6/1	0.447	183	5310	213	307	Quail
31290	3/0	ACSR	6/1	0.502	231	6620	244	355	Pigeon
31340	4/0	ACSR	6/1	0.563	291	8350	280	411	Penguin
31360	110.8	ACSR/EHS	12/7	0.481	305	11300	202	292	Minorca
31390	266.8	ACSR	26/7	0.642	367	11300	322	478	Partridge
31450	336.4	ACSR	18/1	0.684	365	8680	364	543	Merlin
31550	335.6	ACSR/T-2	6/1	1.004	462	13240	351	538	T-2 Pigeon
32410	397.5	AAC	19	0.852	469	6400	399	607	Molles-XLP
31640	477	ACSR	18/1	0.814	518	11800	447	677	Pelican
30550	559.5	ACAR	12/7	0.858	525	13810	466	725	-

CROSSLINKED POLY MULTIPLEX CABLE

ck de nber	Size AWG	Type	Strand	75C Normal Rating (Amps)	100C 4 Hr Emerg. Rating (Amps)	Ultimate Strength (lb.)	Equiv. O.D. (in)	Weight lb./ K-ft.	Code Name
10910	4	Duplex	7	92	128	1760	0.565	105	Whippet
11110	4	Triplex	7	92	128	1760	0.64	165	Barnacle
11410	1/0	Triplex	7	162	229	4460	0.98	400	Gammarus
11480	4/0	Triplex	19	244	352	8560	1.32	746	Lepas
11730	4	Quadruplex	7	80	112	1760	0.72	224	Arabian
11880	1/0	Quadruplex	19	139	200	4460	1.11	542	Shetland
12440	4/0	Quadruplex	19	210	307	8560	1.49	1004	Walking

es:
Current ratings calculated with the following parameters: ambient temp. = 40C; wind = 2 ft./sec. normal to wire; emmissivity = 0.9; solar absorptivity = 1.0. (EPRI Dynamp Program)
Multiplex neutrals and power conductors are the same size. Neutrals are 7 strand.
Equivalent O.D. for multiplex includes insulation (45 mils for #4 and 60 mils for 1/0 and 4/0).
AAAC and multiplex neutrals are Aluminum Alloy 6201-T81; AAC and compressed multiplex power conductors are Aluminum Alloy 1350-H19.
Resistance and reactance are covered by DS 3030.

1) To each new customer, not later than 60 days after the date of commencement of service, through a billing insert, separate mailing or direct customer contact by a representative of the entity providing billing.

2) To all affected customers in the event of a change in overall rate levels. The disclosure statement shall be transmitted, at a minimum, within the second complete billing cycle after the rates become effective following the issuance of a final order in any rate proceeding. If the disclosure is sent during a period in which proration occurs, a statement such as the following shall be incorporated in the text:

> "This summary is being sent during a period in which proration occurs. Proration occurs when part of your bill is charged on old rates and part of your bill is charged on new rates. If an attempt is made to calculate your bill using this rate summary, your calculation will not yield the proper billing amount for this billing period, but will do so in subsequent months. We recommend that you retain this summary for future reference in computing proper billing amounts."

h) Each ARES shall provide to all residential and small commercial customers, at least annually, a disclosure statement with the following information:

1) the average monthly prices; and

2) the terms and conditions of the products and services sold to the customer.

i) At least annually, each electric utility shall provide to small commercial and residential customers an identification and explanation of optional or experimental rates or classifications available to the customer.

SUBPART D: ELECTRIC SERVICE STANDARDS

Section 410.300 Voltage Regulation

a) Standard voltage. Each entity supplying electrical energy for general use shall adopt a standard service voltage of 120 volts (when measured phase to neutral) and shall maintain the service voltage within the allowable variations from that value at all times.

b) Allowable voltage variations. For service rendered at the standard service voltage, voltage variations as measured at any customer's point of delivery shall not exceed a maximum of 127 volts nor fall below a minimum of 113 volts for periods longer than two minutes in each instance. For service rendered at voltages other than the standard voltage value, voltage variations as measured at any customer's point of delivery shall not exceed 10% above or below the service voltage for a longer period than two minutes in each instance.

c) Variations of voltage in excess of those specified above shall not be considered a violation of this Section if caused:

1) by operations of a retail customer in violation of an agreement with or the rules of the entity;

2) by the operation of apparatus on a retail customer's premises that results in large inrush currents;