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Electrical Formulas (Includes Conversion, Amperes and Voltage Drops)

Table 310.16 Allowable Ampacities of Insulated Conductors Rated 0 through 2000 Volts, 60 C through 90 C, Not More Than Three Current Carrying Conductors in Raceway, Cable, or Earth

	Type: TW, UF	Type: RHW, THHW, THW, THWN, XHHW, USE, ZW	Type: TBS, SA, SIS, FEP, FEPB, MI, RHH, RHW-2, THHN, THHW, THW-2, THWN-2, USE-2, XHH, XHHW, XHHW-2, ZW-2
AWG or kcmil	**60 C**	**75 C**	**90 C**
14	20	20	25
12	25	25	30
10	30	35	40
8	40	50	55
6	55	65	75
4	70	85	95
3	85	100	110
2	95	115	130
1	110	130	150
1/0	125	150	170
2/0	145	175	195
3/0	165	200	225
4/0	195	230	260
250	215	255	290
300	240	285	320
350	260	310	350
400	280	335	380
500	320	380	430
600	355	420	475
700	385	460	520
750	400	475	535
800	410	490	555
900	435	520	585
1000	455	545	615

Transformer Amperes

Secondary Amperes 1-Phase	=	VA/Volts
Secondary Amperes 3-Phase	=	VA/Volts x $\sqrt{3}$
Secondary Available Fault 1-Phase	=	VA/(Volts x %impedance)
Secondary Available Fault 3-Phase	=	VA/(Volts x $\sqrt{3}$ x %Impedance)
Delta 4-Wire: Line Amperes	=	Phase (one winding) Amperes x $\sqrt{3}$
Delta 4-Wire: Line Volts	=	Phase (one Winding) Volts
Delta 4-Wire: High-Leg Voltage (L-to-G)	=	Phase (one winding) Volts x 0.5 x $\sqrt{3}$
Wye: Line Volts	=	Phase (one winding) Volts x $\sqrt{3}$
Wye: Line Amperes	=	Phase (one winding) Amperes

Notes on Circuits

Parallel Circuits

1. Total resistance is always less than the smallest resistor RT = $1/(1/R_1 + 1/R_2 + 1/R_3 + ...)$
2. Total current is equal to the sum of the currents of all parallel resistors
3. Total power is equal to the sum of power of all parallel resistors
4. Voltage is the same across each of the parallel resistors

Series Circuits

1. Total resistance is equal to the sum of all the resistors
2. Current in the circuit remains the same through all the resistors
3. Voltage source is equal to the sum of voltage drops of all resistors
4. Power of the circuit is equal to the sum of the power of all resistors