

# TRANSFORMER AND WIRE SIZING CALCULATIONS FOR LANDSCAPE LIGHTING



**Guidelines for selecting wire size to maximize the efficiency of a low voltage lighting system:**

<b>#12-2</b>	Total combined lamp wattage of 100 watts or less. Total wire run of 100 ft. or less to the Spider Splice™.
<b>#10-2</b>	Total combined lamp wattage of 140 watts or less. Total wire run in excess of 100 ft. to the Spider Splice™.
<b>#8-2</b>	Very expensive wire—better to run two pieces of #10-2 wire than one #8-2 wire.

## SYSTEM REQUIREMENT

**Halogen Lamps must operate between 10.8 and 12.0 volts**

### WIRING AND LAMP INFO

RUN #	WIRING METHOD (SPIDER OR TEE)	WIRE SIZE	TOTAL LAMP WATTAGE ON THE WIRE RUN (See Example Below)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

### TO DETERMINE VOLTAGE TAPS REQUIRED

AMP LOAD (Lamp Wattage Divided by 12)	x	WIRE LENGTH (To Spider Splice or Tee Connection)	x	2	x	RESISTANCE PER FOOT (See Chart Below)	=	VOLTAGE DROP	+12	=	TAP NEEDED (Round up to nearest whole number)
	x		x	2	x		=		+12	=	
	x		x	2	x		=		+12	=	
	x		x	2	x		=		+12	=	
	x		x	2	x		=		+12	=	
	x		x	2	x		=		+12	=	
	x		x	2	x		=		+12	=	
	x		x	2	x		=		+12	=	
	x		x	2	x		=		+12	=	
	x		x	2	x		=		+12	=	
	x		x	2	x		=		+12	=	

### TO FIND TRANSFORMER WATTAGE

AMP LOAD (From previous AMP LOAD column)	x	TAP NEEDED (From Previous TAP NEEDED Column)	=	TOTAL WATTS
	x		=	
	x		=	
	x		=	
	x		=	
	x		=	
	x		=	
	x		=	
	x		=	
	x		=	
	x		=	
	x		=	

TRANSFER AMP LOAD VALUES FOR EACH RUN TO THIS COLUMN

**GRAND TOTAL**  
(Min. Transformer Wattage)

## TYPICAL EXAMPLE

1	Spider	#10/2	4@35w=140w	11.66 amps	x	150 ft.	x	2	x	.00108	=	3.77	+12	=	15.77	11.66	x	16	=	186.56
				↑ 140 watts is divided by 12 volts = 11.66 amps						↑ #10-2 Wire Resistance per ft. from chart below					↑ Tap Required (Round up to 16 volts)					↑ Actual Transformer Watts Required

## REFERENCE TABLES

### RULE OF THUMB

Since Wire Loss can be as high as 20%, the Lamp Load should never exceed 80% of the transformer's rated wattage capacity.

### WIRE AMP RATINGS

Wire Size	Recommended	Maximum
#12/2	100w/8.3A	192w/16A
#10/2	140w/12.0A	288w/24A

### RESISTANCE PER FOOT (According to Wire Size)

Wire Size	Resistance per Foot	Wire Size	Resistance per Foot	Wire Size	Resistance per Foot	Wire Size	Resistance per Foot
#18	.006385	#14	.002525	#10	.00108	#6	.000395
#16	.004016	#12	.00162	#8	.00064	#4	.000249

Formula for Voltage Drop is 2 x Length of Wire x Amps x Resistance per Foot