

**AUTOMATIC**

# AMPERITE

**REGULATOR**

**BALLAST TUBE FOR AUTOMATIC REGULATION OF CURRENT AND VOLTAGE**



STANDARD

## AUTOMATIC REGULATION

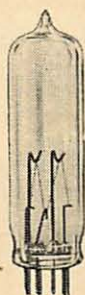
### What It Is!

The **AMPERITE Ballast-Regulating Tube** is an automatic "rheostat" designed to keep the current in a circuit at a definite value, for example, 0.5 amps.

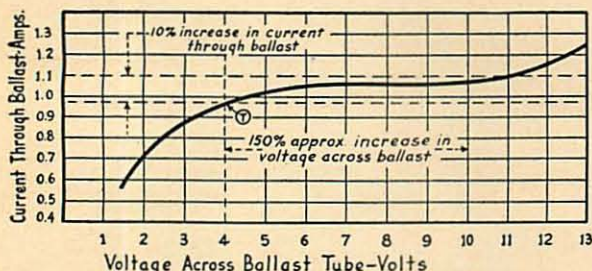
Should the supply voltage increase, this Ballast-Regulating Tube will automatically increase in resistance to take up the increase in supply voltage.

Being a constant current device, the **AMPERITE Ballast-Regulating Tube** can be used only to regulate a constant load—fixed wattage. Thermostatic relays can sometimes be included in these regulators to reduce initial surge.

We strongly recommend that you send us your specifications on special problems, and let us recommend the **BALLAST TUBE** you need.



MINIATURE



T = Threshold Current & Voltage

Characteristic curve of a typical Amperite. Approximate curve of any other Amperite can be obtained by multiplying or dividing the current or voltage scale by any number.

### Standard Types of Amperite Ballast Tubes List \$3.00 Amperite NE70V Neon Lamp List \$3.00

D6-1E	1H20	*3T4	4A10	6-3	7-4	9-4A	12-4
*D6T4	1H22	*3T4A	4-12	6-4	**7TF4	9-7	12-7
**D6TK7	**2TK7	**2TF4A	4H3	6-4A	7A10	9-8	12A10
**D6TF10	2A10	**3TF4	4H4	6-4B	7-11	9A10	12-11
**D6TF30	2A12	**3TFV4	4H4C	*6T4	**7HTF2	10T1	13-4
D7-20	2A20	3V4	**4HTF4	*6T4F	**7HTF3	**10TF2	15-2
D7H4	*2HT2	3-7	**4HTF7	**6TF4	**7HTF4	10-3	15-4
*D7HT4	2H4	**3TF7	4H10	6-7	7H4	10-4A	16-4
*D7HT11	*2HT4	3A10	4H11	**6TF7	7H4B	10-4B	17-3
1A10	**2HTF4	3-11	5E1	6-8B	7H7	10-4C	20-3
**1TF10	2H10	3H11	**5TF2	6A10	7H11	10-4D	20-4
1-15	3-2	*3T11	5-4	6-11	**8TF2	10-4E	22-4
*1HT2	**3TF2	3TF11	**5TF4	6-12	8-3B	10A10	24-3
*1HT4	**3TK2	**3TF12	5A10	6-13	8-4	10A12	34-2
1H10	3-4	3-14	5-11	6A15	8A10	10-25	35-4
**1HTF10	3H-1-7	3-16	5-16	6-36	**9TF2	11-3	40-6E
*1HT11	3H4	3A20	5H3	6H4	9-3	11-4	41-7E
**1HTF11	**3HTF4	3H-25	5H4	**6HTF4	9-4	11A10	55-1
		3-38A	5H10	6H6		11-11	55-4
		3-50A	5H11				

\*T denotes T5½ bulb-7 pin miniature, e.g., 3T4.  
\*\*TF denotes T6½ bulb-9 pin miniature, e.g., 3TF4.  
Base Wiring: Octal, 7 and 9 pin miniature—prongs 2-7.

**AMPERITE NEON LAMP TYPE NE70V List \$3.00**

## ADVANTAGES

Light . . . Compact . . . No Moving Parts (Will withstand vibrations of 15G min.) (Not affected by altitude or humidity changes) . . . Can Be Changed as Easily as a Radio Tube . . . Operates Equally Well on AC or DC . . . Inexpensive.

## CAPACITIES AVAILABLE

Current values of 60 ma. to 5 amps; threshold voltage 0.4 to 40 V. Maximum dissipation per **AMPERITE** 60w per tube (ST19 bulb). Any number of **AMPERITES** with the same voltage range can be operated in parallel. **AMPERITES** should not be used in series.

## AGEING

**AMPERITE** Ballast Tubes may change approximately up to 3% in current if aged for 4 to 8 hours, at maximum voltage. They will change very little thereafter.

## LIFE EXPECTANCY

Average life if operated as recommended . . . . . **2000 Hours**  
If operated continuously at maximum voltage . . . . . **1000 Hours**  
If operated continuously at 80% maximum voltage . . . . . **5000 Hours**  
If filament is operated below glow point . . . . . **5000 Hours up**

In operation, the **Amperite** filament starts to glow at one point; as the voltage is increased, the glow spreads over the entire filament. Like incandescent lamps, turning **Amperite** on and off reduces its life, especially if operating near its maximum voltage.

## TIME LAG CHARACTERISTICS

Time lag encountered in an **Amperite Ballast Tube** depends upon the wattage consumed by the ballast and the size of the bulb. Where the wattage is small for the size of the bulb, the action can be made practically instantaneous—less than 1 second. In such cases the bulb will remain at practically ambient temperature. When the wattage is high enough to heat the bulb to a temperature uncomfortable to the hand (160°F) the lag might be as much as several minutes for final readings—but normally reaches within 10% of final readings within a few seconds.

## AMPERITE NUMBERING SYSTEM

In general, the **AMPERITE** number approximately denotes the current—voltage threshold value. For example:

AMPERITE NUMBER	3-4	3H4	10-7	12-11	12H11
THRESHOLD CURRENT	0.3	0.35	1.0	1.2	1.25
THRESHOLD VOLTAGE	4.0	4.0	7.0	11.0	11.0

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# AMPERITE

**REGULATOR**

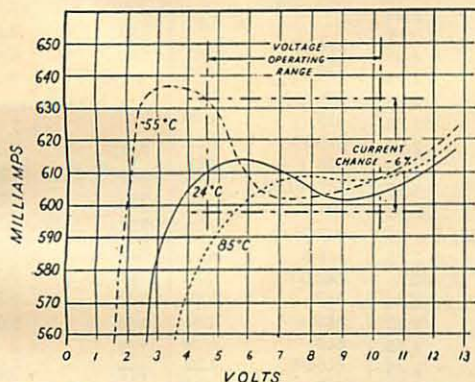
**BALLAST TUBE FOR AUTOMATIC REGULATION OF CURRENT AND VOLTAGE**



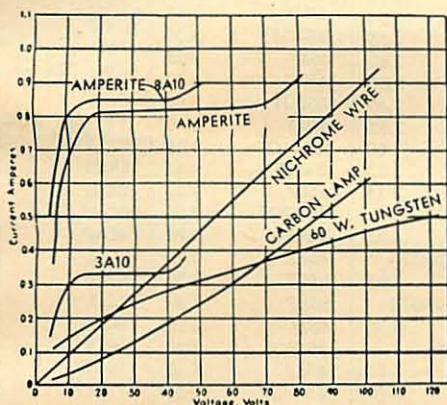
### AMBIENT EFFECTS

Ambient temperature variation of  $-50^{\circ}$  to  $+100^{\circ}\text{C}$  will change the current value of an Amperite approximately 2% on regulating portion of curve as shown directly below. Being hermetically sealed the Amperite is not affected by altitude or humidity changes.

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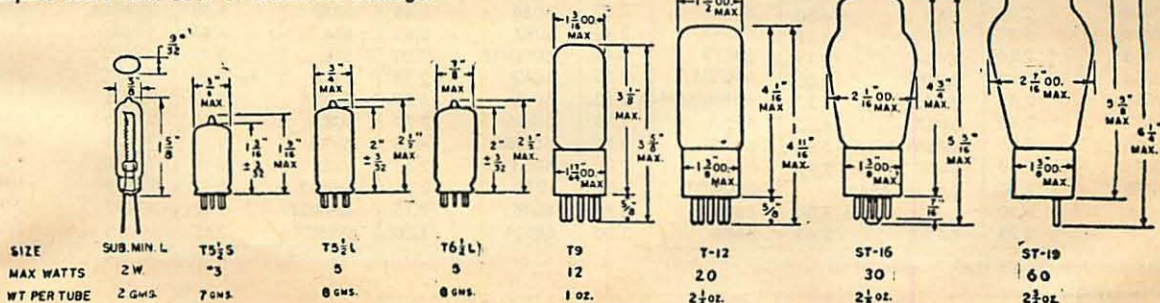


Amperite Ballast-Type 6-4 current voltage characteristic under ambient conditions of  $-55^{\circ}$ ,  $24^{\circ}$ , and  $85^{\circ}\text{C}$ . The percentage change with ambient is approximately the same with all type Amperite ballasts.



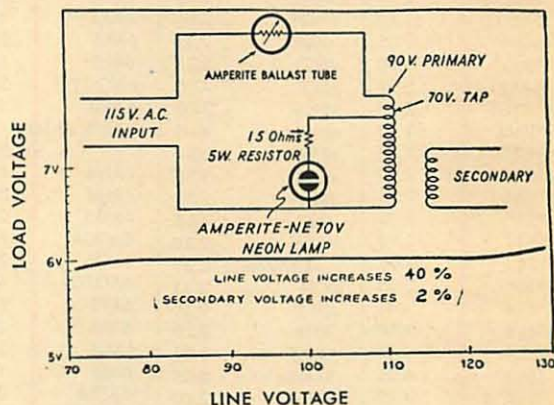
This diagram illustrates for superior regulating characteristics of the Amperite Ballast-Regulating Tube.

**STANDARD SIZES available for various wattage consumption . . . For good regulation, a bulb should not be required to dissipate more than 50% of maximum wattage.**



### BATTERY CHARGING AND DISCHARGING

Amperite Ballast Tubes are very successfully used for keeping the current constant in charging and discharging batteries. Any number of Amperites of the same voltage range can be placed in parallel to obtain proper current. The current can be kept to  $\pm 1\%$ . Advise voltage variation and currents desired.



A light, compact, and inexpensive method of obtaining close regulation is to use an Amperite Ballast Tube with an Amperite Neon Lamp—type NE70V. Base octal-base wiring-prongs 2-5. One NE70V is used for all loads up to 100W.

### POWER SUPPLIES

We strongly recommend, for any particular application, to fill in and return one of our special problem sheets (ASP 343) and permit us to recommend the most suitable AMPERITE.

Power Supply	Dry Cells	6 Volts	12 Volts	26 Volts	115 Volts
Supply Variation	2.2-3.0V	5.5-7.5V	10.0-14.0V	22.0-30.0V	105-125V
Desired on Load	1.8-2.0V	3.9-4.1V	6.1- 6.4V	17.5-18.5V	90- 95V
Required on AMPERITE	0.4-1.0V	1.6-3.4V	3.9- 7.6V	4.5-11.5V	15- 30V
Current Variation	.29-.32a	.29-.31a	.29-.31a	.29-.32a	.29-.32a

The above chart shows the maximum load voltage for the given supply to obtain  $\pm 2\%$  regulation on load. Better regulation is obtainable by increasing the voltage across the AMPERITE. Up to a point, the higher the percent of the supply voltage taken up by the AMPERITE, the better the regulation.

Radio tube filament loads—have low cold resistance which causes a high initial surge. For such loads we recommend a bleeder of 20 to 50% prox. of load and the corresponding Amperite. e.g.

FILAMENT LOAD	USE AMPERITE	TOTAL CURRENT
0.3a	4HTF4	0.45a
0.6a	8-4	0.8a
0.7a	9-4	0.9a

On Radio tube filament loads the bleeder will also improve the regulation.