

AURIGA LAMPS

FOR
ARTISTIC, EFFICIENT
AND ECONOMICAL
ILLUMINATION



THE BRITISH WESTINGHOUSE
ELECTRIC AND MFG. CO., LTD.,
TRAFFORD PARK WORKS, MANCHESTER.

(For Branch Offices and Colonial Agents, see page 14).

AURIGA Metal-Filament LAMPS

NOTES TO USERS

When Ordering, state maximum voltage of the circuits on which the lamps have to burn, the Catalogue Number, and whether for series or parallel burning.

Series Burning.—When lamps are required for series burning, those bearing the same Series Number (in Roman or ordinary figures) should be used to ensure satisfaction.

Unpacking and Storing.—Great care should be taken to see that the casks containing the lamps are lifted off the lorry carefully: they must not be dumped down, otherwise the filaments will be broken. Open casks carefully; do not hammer the lids off. After taking lamps out, lay them gently on to a soft surface.

Handling.—The filaments sometimes run great risk of breakage when the lamps are being cleaned: this risk can be practically obviated if the cleaning is done when the lamp is alight, as, when alight, the filament is soft, and should withstand a fair amount of handling.

Rise in Voltage.—10% increase of line voltage above the lamp voltage increases the c.p. of a Tungsten Lamp approx. 40% and of a carbon lamp approx. 70%.

Fall in Voltage.—10% decrease in line voltage as compared with the lamp voltage decreases the c.p. of a Tungsten Lamp approx. $33\frac{1}{3}\%$ whereas with a Carbon Lamp the decrease is approx. 45%.

AURIGA Metal-Filament LAMPS

are manufactured under Westinghouse Patents and by new manufacturing processes, ensuring the production of perfected tungsten lamps suitable for burning on either continuous or alternating current.

EFFICIENCY

As an AURIGA LAMP has an efficiency of $1\frac{1}{4}$ watts per British candle-power—1 watt per Hefner candle-power approx. (as compared with $3\frac{1}{2}$ to 4 watts per candle-power of the best carbon lamp)—**it is apparent that an Auriga Lamp gives nearly three times the light of a carbon lamp** having the same current consumption. In other words, AURIGA LAMPS **effect a saving of $2\frac{1}{4}$ watts on each candle-power produced.**

In addition to its notable economy, **the Auriga Lamp emits a light of very superior colour and quality closely resembling clear daylight.** The whiteness of its light, due to the extremely high temperature at which the Tungsten filament operates, has alone been sufficient to bring the AURIGA LAMP into high favour.

CHARACTERISTICS

The three most important characteristics of the AURIGA LAMP are its (1) **high efficiency**, (2) **long life**, and (3) **uniform brilliancy throughout its life.** These features combine to make the AURIGA LAMP **the most economical electric-lighting unit ever produced.**

LIFE

The average life of AURIGA LAMPS is 1,000 hours, although this is often greatly exceeded. It will be noted that this life, which is all useful life, is **double that of high efficiency carbon lamps.**

PERFORMANCE

The performance of the AURIGA LAMP is in several ways superior to that of the carbon lamp. **The Auriga Lamp maintains practically its initial candle-power and efficiency during its whole life**, the drop in candle-power being inappreciable up to the time the lamp burns out. Owing to the fact that the resistance of the tungsten filament increases with the increase of temperature, **Auriga Lamps are not nearly so sensitive to variations in voltage as carbon lamps.** The current does not change in direct proportion to the voltage, and this makes the fluctuations in candle-power with variations of voltage relatively small. This feature is manifestly advantageous on circuits having poor regulation, as a moderate change in voltage will not noticeably affect the lamps. For example, a drop in voltage of 10 per cent. will reduce the candle-power of an AURIGA LAMP about $33\frac{1}{3}$ per cent., and that of a carbon lamp about 45 per cent.

ILLUMINATION

The quality of light from AURIGA LAMPS is greatly superior to that of any other kind of electric light owing to its pure whiteness, in which respect it resembles clear daylight. **Under this light, colours appear in their true values, and slight distinctions of shades and colours are as readily appreciated under the light of an Auriga Lamp as they are by daylight.** This makes the AURIGA LAMP invaluable in places where it is necessary to match colours.

FROSTED LAMPS

Where AURIGA LAMPS are used so as to come directly into the line of vision, their brilliancy, if unshaded, is too intense for near-by illumination. The use of frosted lamps will be found very advantageous under these conditions. The whole bulb may be frosted, but the best results will be obtained by having the lower part of the bulb frosted and using the lamp with a suitable shade so that the direct light from the filament cannot reach the eye. **Frosted lamps used in this way give a very soft and agreeable lighting effect.**

ANALYSIS OF COST

Owing to the difficult and intricate process of manufacture, the first cost of the AURIGA LAMP is considerably higher than that of the carbon lamp, but its greater length of life and its very low cost of operation far more than compensate for the difference in first cost, in fact **it pays for itself in about 150 hours.**

In order to compare the economy of a carbon lamp and an AURIGA LAMP of the same candle-power, take for example a 40-watt, 32-c.p., AURIGA LAMP and a 32-c.p carbon lamp. By computing the total cost of each of these lamps when burned for the same number of hours at the same price per kilowatt hour, the superior economy of the AURIGA LAMP is easily apparent. The high-efficiency 32-c.p. carbon lamp has an efficiency of $3\frac{1}{2}$ watts per c.p., making the total wattage of the carbon lamp 112. Its useful guaranteed life is 400 hours, which gives a total energy consumption of $400 \times 112 = 44,800$ watt hours, or 44.8 kilowatt hours during its normal life. At $4\frac{1}{2}$ d. per unit (per kilowatt hour) its cost of operation will be $44.8 \times 4\frac{1}{2}$ d. = 16/10, to which the first cost of the lamp, 1/2, is added, making the total cost 18/- for 400 hours.

The 40-watt AURIGA LAMP has a useful life of 1000 hours, giving a total energy consumption during its life of $40 \times 1000 = 40,000$ watt hours or 40 kilowatt hours. At $4\frac{1}{2}$ d. per unit (per kilowatt hour) its cost of operation will be $40 \times 4\frac{1}{2}$ d. = 15/-, and, adding the first cost of the lamp (2/9), its total cost will be 17/9 for 1000 hours. The total cost of the carbon lamp **for 1000 hours** is therefore 45/-, and that of the AURIGA LAMP 17/9, shewing **a saving of 27/3 in favour of the Auriga Lamp.**

A perhaps more ready appreciation of the economy of AURIGA LAMPS will be gained by considering the reduction in the monthly lighting expenses of a small shop using say $20 = 32$ watts (25-c.p.), AURIGA LAMPS to replace the same number of 16-c.p. carbon lamps, assuming the lamps to be burned for five hours per day for 27 days in the month. This would give 135 hours of

service per month. The first cost of the AURIGA LAMPS would be £2 15s. for a life of 1000 hours, making the proportion of this cost for 135 hours equal to $\frac{7}{5}$. Twenty 32-watt AURIGA LAMPS would have a total wattage of 640 and for 135 hours would consume 86.4 kilowatt hours. At $4\frac{1}{2}$ d. per kilowatt hour the cost for current would be $4\frac{1}{2}\text{d.} \times 86.4 = 32\frac{2}{5}$, and, adding the total cost of the lamps, $\frac{7}{5}$, the total monthly cost of lighting would be $\frac{39}{10}$.

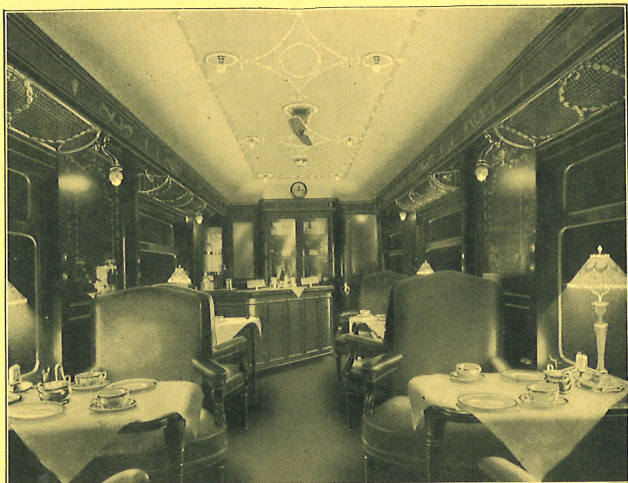
Twenty 16-c.p. carbon lamps would cost $2\frac{3}{4}$ for a life of 400 hours or $\frac{7}{10}$ for 135 hours. At 60 watts each the total wattage would be $60 \times 20 = 1,200$, making a monthly consumption of the lamps 162 kilowatt hours. At $4\frac{1}{2}$ d. per kilowatt hour the cost of operation would be $4\frac{1}{2}\text{d.} \times 162 = \text{£}3 \text{ os. } 9\text{d.}$, and, adding the first cost of $\frac{7}{10}$, the total monthly cost would be £3 8s. 7d.

This shows a total monthly saving of £1 8s. 9d. by substituting 20 = 25 candle-power Auriga Lamps for the same number of 16 candle-power carbon lamps and at the same time the consumer obtains 55 per cent. more light. It is also apparent that, even if the carbon lamps were furnished free, there would still be a large saving in using AURIGA LAMPS in spite of their first cost.

While these figures show a remarkable economy, they hardly do justice to the AURIGA LAMP, as no account has been taken of the drop in candle-power during the life of the carbon lamps. The AURIGA LAMP will maintain practically its full initial candle-power for 1000 hours, while the carbon lamps will have but about 80 per cent. of their initial candle-power at the end of 400 hours.

The AURIGA LAMP is the cheapest source of light considering both first cost and cost of current, even when the latter is as low as $\frac{1}{2}$ d. per kilowatt hour, and its economy increases rapidly as the cost of current increases.

The question of initial cost, therefore, entirely disappears in considering the AURIGA LAMP.



Pullman Car lighted by Auriga Lamps.

TESTIMONIALS

"HAVE had **better results** than with any other metallic lamp on the market. They have burned for street lighting on a ventilation shaft for over 3,000 hours; I have had 2,600 hours from another pair of your series burning lamps at our Works."—Ref. A150.

**Burned over
3000 hours.**

"THE Tungsten Filament Lamps which you have supplied us with **in some thousands**, have given our clients **every possible satisfaction**. Our clients have tried lamps by different makers, but have decided **after exhaustive tests** to adopt those **supplied by you**."—Ref. A110.

**Thousands have
given every
satisfaction.**

**Very pleased.
Let us have
more.**

"WE are **very pleased** with the 200-volt lamps, and we shall be glad if you will let us have **25 more** by return, also **50** of your 105 volts."—Ref. A102.

**Very well
satisfied.**

"WE may say in confidence that our customers appear **very well satisfied**."—Ref. A104.

A large number of Auriga lamps were fitted to illuminate the interior of the Crystal Palace.



Fig.

Burning over 1,700 hours without any appreciable difference in the light.

"YOUR 50-c.p. 220-volt lamps were put on test along with several other makes at these works, and **your lamps** have been burning over 1,700 hours without any appreciable difference in the light."—Ref. A200.

Lamps giving satisfaction.

"THE lamps are **giving satisfaction.**"
—Ref. A130.

Are giving satisfaction.

"They are giving satisfaction."—Ref. A103.

A very good light.

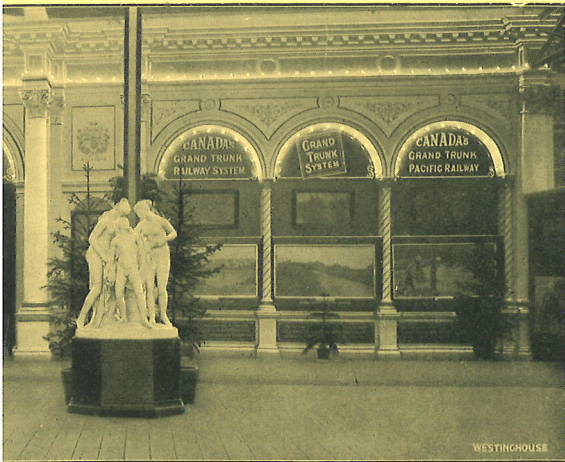
"KINDLY send me on this week ... more of the lamps you sent me last. I think they are a very good light."—Ref. A120.

Excellent results.

"HAVE given excellent results."—Ref. A100.

"You will be interested to hear that the Engineer of the Co. was over from and asked the writer if he would use Westinghouse metal-filament lamps (not knowing we had arranged to do so). He gave as his reasons two large installations in where they had removed the whole of the lamps and installed Aurigas, and with great satisfaction to themselves. One of these installations included 500 lamps and the other I think about 400. We are very glad to hear your lamps are being appreciated in"—Ref. A101.

Asked by Engineer to use Westinghouse Lamps.



This picture shows the Canadian section fitted with Auriga lamps burning at all angles.

Every satisfaction.

"We find your lamp is giving every satisfaction in this district."—Ref. A140.

Satisfactory.

"We hear from our Engineer that the lamps are satisfactory."—Ref. A115.

Complete Satisfaction.

"The lamps have given complete satisfaction." Ref. A105.

Given satisfactory results.

"We have no complaints to make of the 'Auriga' lamps that you have supplied, as they have given satisfactory results."—Ref. A151.

Gave satisfaction.

"The lamps gave satisfaction."—Ref. A111.

So satisfied, shall use Aurigas next year.

"We had about 400 of these installed in and another 200 in The majority of these were either pointing upwards, or hanging downwards, the remainder over arches, so that they were practically in every conceivable position. The lamps have given every satisfaction. So satisfied are we with these lamps that we shall employ the same type next year, as we have not obtained better results from any other make."

AURIGA Metal-Filament LAMPS

Westinghouse Patents.

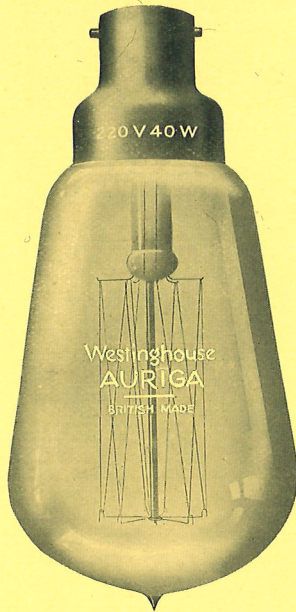


Fig. 32774c.

Rating.—In future, all lamps will be rated and marked according to watts consumed instead of candle-power. We reserve the right, however, of sending lamps marked in C.P. until our stock of such lamps has run out. Generally speaking, the efficiency is 1.25 watts per Br. C.P. The lamps are listed at standard wattage ratings, the actual consumption of the lamps may vary up or down slightly. When lamps are required for series burning the series number of the lamps they are to burn with must be stated.

Hitherto AURIGA LAMPS have all been made at the Westinghouse factory in Vienna. We have now, however, made arrangements for their *manufacture in England also*. Therefore, as soon as our present stock of Vienna-made lamps is exhausted, English-made lamps can be supplied.

AURIGA Metal-Filament LAMPS

Westinghouse Patents.

For burning in
downward or
vertical position.

Round Bulb
Standard
Bayonet Caps.

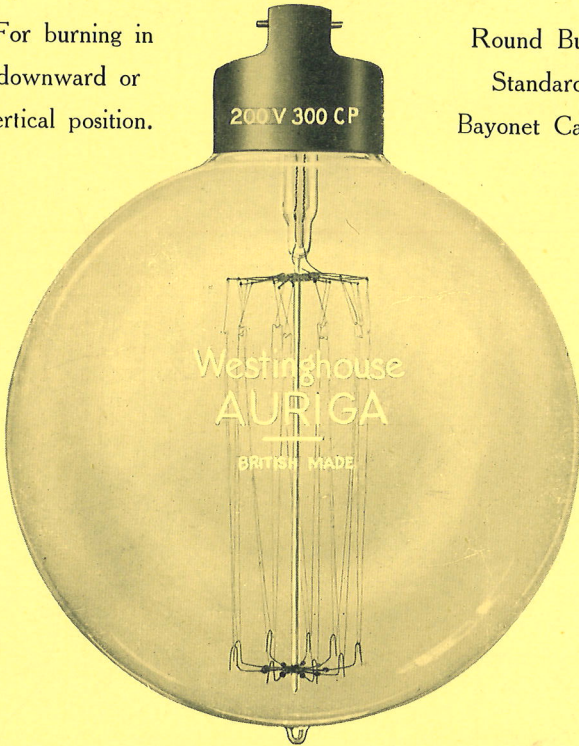


Fig. 7637A ch.

Apprx. Br. CP.	75	100	200	300	400	Appro Br. CP.	75	100	200	300	400
Watts	90	125	250	375	500	Watts.	90	125	250	375	500
Volts	Catalogue Numbers.					Volts.	Catalogue Numbers.				
100	02156	01907	01908	01909	01910	200	02163	01935	01936	01937	01938
105	02157	01911	01912	01913	01914	210	02164	01939	01940	01941	01942
110	02158	01915	01916	01917	01918	220	02165	01943	01944	01945	01946
115	02159	01919	01920	01921	01922	230	02166	01947	01948	01949	01950
120	02160	01923	01924	01925	01926	240	02167	01951	01952	01953	01954
125	02161	01927	01928	01929	01930	250	02168	01955	01956	01957	01958
130	02162	01931	01932	01933	01934	260	02169	01959	01960	01961	01962
Price each	5/-	6/-	13/6	18/-	22/6	Price each	6/-	7/-	13/6	18/-	22/6

For Half Frosting add C to Cat. No. and 5% to List Price.
For Whole Frosting add D to Cat. No. and 5% to List Price.
For Edison Screw Cap add E to Cat. No. No extra charge.

CONDITIONS OF SALE, Etc.

Delivery.—Packing and Delivery of Rail and Carrier consignments, minimum quantities of 25 standard lamps or one dozen 100 watt to 1,000 watt lamps **free** within the Railway Company's free delivery radius. Route at our discretion. Under 25 standard lamps or below one dozen, 100 to 1,000 watt, packing charges 1/-, carriage forward.

Sound Delivery.—We offer the following sound delivery clauses: sound delivery is guaranteed on all consignments of 25 standard lamps, or one dozen 100 to 1,000 watt lamps, provided any lamps broken in transit from our stores to Customers' premises are returned carriage paid to our Works within one week from date of despatch and duly advised. Such Lamps will be replaced or credited. Sound delivery is not guaranteed on consignments below 25 standard lamps, or under one dozen 100 to 1,000 watt lamps.

Cash Discounts.—Thirty days 2½%. Strict cash with order or against pro-forma invoice before goods are despatched, 5%. Cash on receipt of invoice after goods have been despatched does not carry 5%.

Re-Despatch.—We do not take any risk of breakages in transit of lamps re-despatched by our customers.

Retail Sales.—These lamps must be re-sold to the public at List prices only, and orders received will be taken as acceptance of this condition.

Series Lamps.—We accept no responsibility for lamps placed to burn in series, unless they have been specially supplied by us as suitable for series running. Care should be taken to mention when ordering if lamps are to be burnt in series.

Export Orders.—Conditions as to replacement and packing do not apply to export orders. For export we pack 4% extra lamps, to cover risk of breakage, &c.

The British Westinghouse Electric & Mfg. Co. Limited.

HEAD OFFICE & WORKS:

MANCHESTER: Trafford Park.

*Telegraphic and Cable Address:—"Westinghouse, Manchester."
National Telephone:—Nos. 7101 to 7108 Central (inclusive.)*

REGISTERED OFFICES & EXPORT DEPT.:

LONDON: Westinghouse Building, Norfolk Street, Strand, W.C.

*Telegraphic and Cable Address:—"Multiphase, London."
National Telephone:—No. 3261 to 3265 Gerrard (inclusive).
Codes used:—Westinghouse and Lieber.*

BRANCH OFFICES:

BIRMINGHAM.—Avebury House, 55, Newhall Street. *Nat. Tel.: 2540.*
CARDIFF.—102, St. Mary Street. *Nat. Tel.: 1370.*
GLASGOW.—17, St. Vincent Place. *Nat. Tel.: 3767-8, Royal.*
MANCHESTER.—Victoria Buildings, 5, Deansgate. *Nat. Tel. 5236-7*
NEWCASTLE-ON-TYNE.—Ward's Buildings, High Bridge. *(City)*
Nat. Tel.: 568 National.
SHEFFIELD.—53, West Street. *Nat. Tel.: 3434 Central.*
LONDON.—3, West Street, Charing Cross Road.*

*Telegraphic Address for all Branch Offices: "Multiphase" (with
name of town), excepting * which is "Westelec."*

Branch Office for South Africa:—

JOHANNESBURG—Consolidated Building.
Tel. Address: "Converter, Johannesburg."

AGENTS:

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CAIRO	FLOWER BROS., Maison Wafa, 2, Sharia Gama Charkass, Cairo (for Egypt).	
BUENOS AYRES	AGAR CROSS & CO., 947, Calle Cuyo 949 (for Argentine, Uruguay and Paraguay).	
IQUIQUE	J. K. ROBINSON, Casilla, No. 646 (for Chile, Peru Bolivia and Ecuador).	
RIO DE JANEIRO	WALTER BROS. & CO., Rua General Canara 65 (for Brazil).	
HAVANA	CHAS. H. THRALL & CO. (for Cuba).	
CITY OF MEXICO	G. & O. BRANIFF, Calle de Cadena No. 19, Apartado 303 (for Mexico).	
ST. JOHN'S	REID NEWFOUNDLAND CO. (for Newfoundland).	
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TIENTSIN	SHEWAN, TOMES & CO., Machinery Dept.	China.
HONG KONG	SHEWAN, TOMES & CO., Machinery Dept.	
JAPAN	TAKATA & CO., Yurakucho Itchome, Kojmachi Ru.	
SYDNEY	NOYES BROS. (Sydney), Ltd., 109, Pitt St.	
MELBOURNE	NOYES BROS. (Melbourne), Ltd., 153/7, William Street.	
PERTH	NOYES BROS. (Melbourne), Ltd., Commercial Bank Chambers, St. George's Terrace.	} For
BRISBANE	NOYES BROS. (Sydney) Ltd., 45, Adelaide Street.	Australia,
ADELAIDE	MESSRS. STEELE & BAKER, Bowman's Buildings, King William Street.	New
WELLINGTON	TURNBULL & JONES, Blair Street	Zealand,
AUCKLAND	TURNBULL & JONES, Fort Street	and
CHRISTCHURCH	TURNBULL & JONES, Electrical Engin'rs	Tasmania.
MELBURN	TURNBULL & JONES, Electrical Engin'rs	
CHRISTIANIA	AKTIESELSKABET ELEKTRISK BUREAU, Middelthunsgade 17, Majorstuen (for Norway).	



WESTINGHOUSE WORKS, MANCHESTER.