

NATIONAL BUREAU OF STANDARDS REPORT

8351

Interlaboratory Intercomparisons
of
200-Watt Incandescent Lamps

by

Velma I. Burns
Photometry and Colorimetry Section
Metrology Division



U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

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* NBS Group, Joint Institute for Laboratory Astrophysics at the University of Colorado.

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ABSTRACT

A group of six clear and five inside-frosted, 200-watt incandescent lamps were measured by each of nine laboratories. The voltage across each lamp was held at 120.0 volts while the luminous flux and current were measured. The results of the measurements made by the individual laboratories and an analysis of the results are given in this report.

I. Introduction

This intercomparison was undertaken to determine the uniformity of measurements on 200-watt incandescent lamps made at the participating laboratories. The laboratories participating and the order of the measurements are as follows:

1. National Bureau of Standards
2. Electrical Testing Laboratories
3. Duro Test
4. Westinghouse
5. Sylvania
6. Champion
7. El Tronics
8. General Electric
9. Verd-A-Ray
10. National Bureau of Standards

The intercomparison was started with six clear and six inside-frosted lamps; however, one inside-frosted lamp lost its base early in the intercomparison.

The National Bureau of Standards measured the lamps before and after the other laboratories measured them. The clear lamps appear to have dropped in lumen output between the two measurements by 0.68%. The frosted lamps measured the same before and after they were measured by the other laboratories. The values reported in the tables for the National Bureau of Standards measurements is the average of the before and after measurements. Lamp Number NBS 6806 burned out during the last measurement at the National Bureau of Standards.

Lumens
Clear Bulb Lamps

Lamp No.	NBS	ETL	Duro T	West	Syl	Champ	E I T	GE	V-A-R	Av.
NBS 7258	3640	3646	3680	3653	3641	3656	3628	3659	3652	3650.6
NBS 7259	3656	3654	3700	3673	3668	3662	3625	3676	3681	3666.1
NBS 7260	3680	3679	3734	3698	3695	3695	3652	3696	3710	3693.2
NBS 7261	3658	3671	3714	3681	3665	3675	3643	3678	3655	3671.1
NBS 7262	3642	3667	3703	3672	3638	3635	3603	3642	3642	3649.3
NBS 7263	3674	3679	3720	3687	3680	3675	3654	3671	3657	3677.4
Av.	3658.3	3666.0	3708.5	3677.3	3664.5	3666.3	3634.2	3670.3	3666.2	3668.0
Δ	- 9.7	- 2.0	+40.5	+ 9.3	- 3.5	- 1.7	-33.8	+ 2.3	- 1.8	
% Δ	- 0.26	- 0.05	+ 1.10	+ 0.25	- 0.10	- 0.05	- 0.92	+ 0.06	- 0.05	
Inside-Frosted Lamps										
NBS 6800	3701	3699	loose base							
NBS 6801	3650	3654	3705	3653	3683	3675	3645	3665	3678	3667.6
NBS 6802	3694	3691	3739	3701	3734	3712	3695	3712	3715	3710.3
NBS 6803	3676	3675	3727	3678	3703	3690	3678	3699	3695	3691.2
NBS 6805	3738	3744	3791	3748	3764	3768	3745	3760	3760	3757.6
NBS 6806	3691	3691	3733	3705	3719	3718	3693	3716	3718	3709.3
Av. of 5	3689.8	3691.0	3739.0	3697.0	3720.6	3712.6	3691.2	3710.4	3713.2	3707.2
Δ	-17.4	-16.2	+31.8	-10.2	+13.4	+ 5.4	-16.0	+ 3.2	+ 6.0	
% Δ	- 0.47	- 0.44	+ 0.86	- 0.28	+ 0.36	- 0.15	- 0.43	+ 0.09	+ 0.16	

Current in Amperes
Clear Bulb Lamps

Lamp No.	NBS	ETL	Duro T	West	Syl	Champ	EI T	GE	V-A-R	Av.
NBS 7258	1.663	1.664	1.664	1.663	1.664	1.665	1.660	1.661	1.66	1.6627
NBS 7259	1.670	1.670	1.670	1.670	1.670	1.670	1.665	1.669	1.67	1.6693
NBS 7260	1.671	1.672	1.672	1.672	1.673	1.675	1.669	1.671	1.67	1.6717
NBS 7261	1.667	1.668	1.668	1.669	1.668	1.670	1.662	1.670	1.67	1.6680
NBS 7262	1.665	1.668	1.667	1.668	1.666	1.670	1.661	1.662	1.67	1.6663
NBS 7263	1.676	1.679	1.680	1.677	1.676	1.680	1.675	1.678	1.68	1.6779
Av.	1.6687	1.6702	1.6702	1.6698	1.6695	1.6717	1.6653	1.6685	1.6700	1.6693
Δ	-0.0006	+0.0009	+0.0009	+0.0005	+0.0002	+0.0024	-0.0040	-0.0008	+0.0007	
% Δ	-0.04	+0.05	+0.05	+0.03	+0.01	+0.14	-0.24	-0.05	+0.04	
<u>Inside-Frosted Lamps</u>										
NBS 6800	1.652	1.653								
NBS 6801	1.650	1.651	1.650	1.650	1.651	1.650	1.649	1.650	1.66	1.6512
NBS 6802	1.648	1.648	1.649	1.649	1.649	1.650	1.643	1.650	1.65	1.6484
NBS 6803	1.658	1.658	1.660	1.657	1.658	1.660	1.658	1.659	1.66	1.6587
NBS 6805	1.647	1.647	1.650	1.647	1.647	1.650	1.643	1.648	1.66	1.6488
NBS 6806	1.649	1.650	1.652	1.649	1.650	1.650	1.649	1.650	1.66	1.6510
Av. of 5	1.6504	1.6508	1.6522	1.6504	1.6510	1.6520	1.6484	1.6514	1.658	1.6516
Δ	-0.0012	-0.0008	+0.0006	-0.0012	-0.0006	+0.0004	-0.0032	-0.0002	+0.0064	
% Δ	-0.07	-0.05	+0.04	-0.07	-0.04	+0.02	-0.19	-0.01	+0.39	

Table 3.

Lumens per Watt

Clear Bulb Lamps

Lamp No.	NBS	ETT	Duro T	West	Syl	Champ	El T	GE	V-A-R	Av.
NBS 7258	18.24	18.26	18.43	18.31	18.23	18.30	18.21	18.36	18.33	18.30
NBS 7259	18.24	18.23	18.46	18.33	18.30	18.27	18.14	18.35	18.37	18.30
NBS 7260	18.35	18.34	18.61	18.43	18.41	18.38	18.23	18.43	18.51	18.41
NBS 7261	18.29	18.34	18.56	18.38	18.31	18.34	18.27	18.35	18.24	18.34
NBS 7262	18.23	18.32	18.51	18.35	18.20	18.14	18.08	18.26	18.17	18.25
NBS 7263	18.27	18.26	18.45	18.32	18.30	18.23	18.18	18.23	18.14	18.26
Av.	18.27	18.29	18.50	18.35	18.29	18.28	18.18	18.33	18.29	18.31
Δ	- .04	- .02	+ .19	+ .04	- .02	- .03	- .13	+ .02	- .02	
% Δ	- .22	- .11	+ 1.04	+ .22	- .11	- .16	- .71	+ .11	- .11	

Inside Frosted Lamps

NBS 6800	18.67	18.65								
NBS 6801	18.43	18.44	18.71	18.45	18.59	18.56	18.42	18.51	18.46	18.51
NBS 6802	18.68	18.66	18.90	18.70	18.87	18.75	18.74	18.75	18.76	18.76
NBS 6803	18.48	18.47	18.71	18.50	18.61	18.52	18.49	18.58	18.55	18.55
NBS 6805	18.91	18.94	19.15	18.96	19.04	19.03	18.99	19.01	18.88	18.99
NBS 6806	18.65	18.64	18.83	18.72	18.78	18.78	18.66	18.77	18.66	18.72
Av. of 5	18.63	18.63	18.86	18.67	18.78	18.73	18.66	18.72	18.66	18.70
Δ	- .07	- .07	+ .16	- .03	+ .08	+ .03	- .04	+ .02	- .04	
% Δ	- .37	- .37	+ .86	- .16	+ .43	+ .16	- .21	+ .11	- .21	

Figure 1
Lumens
Clear Bulb Lamps

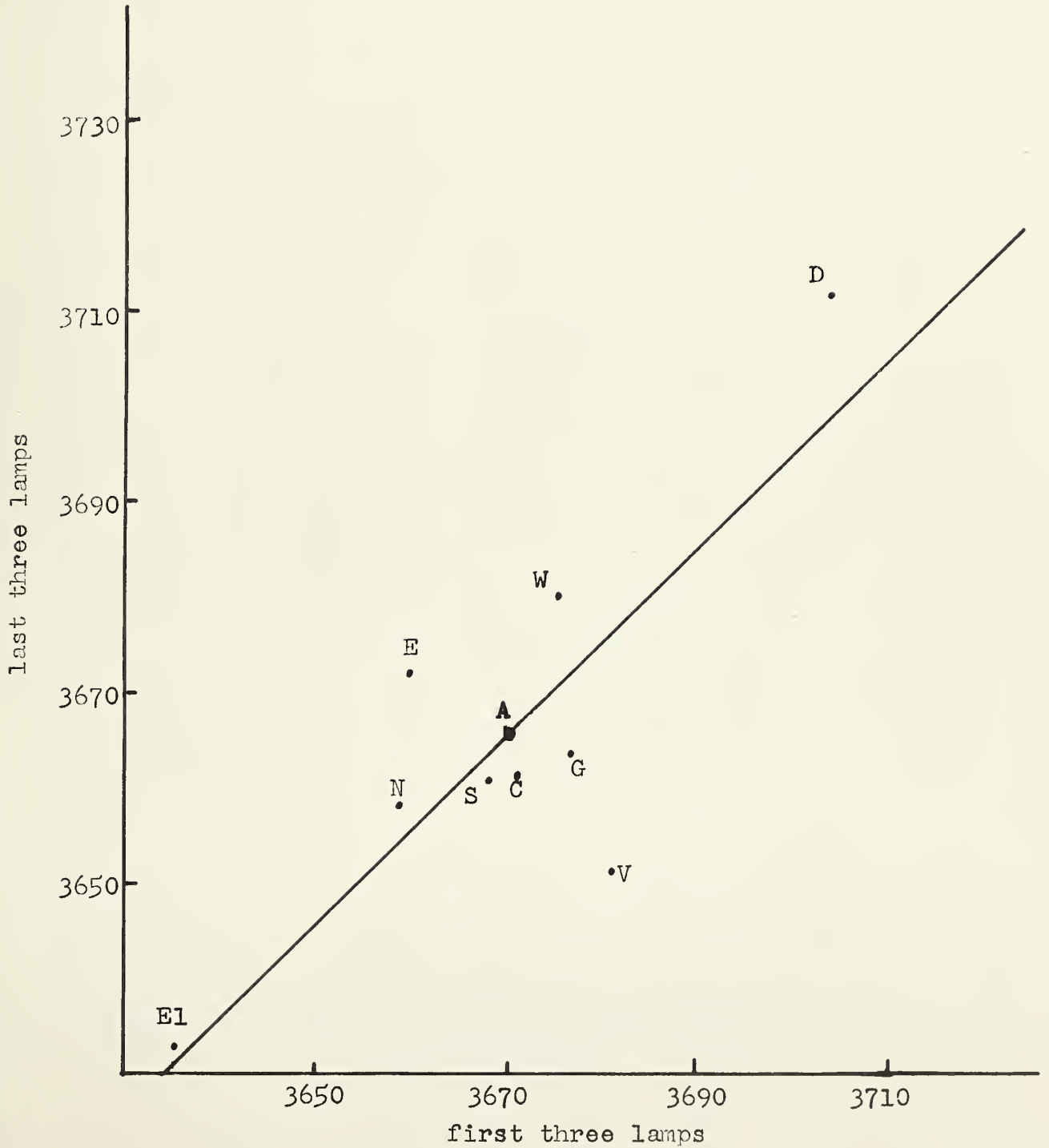


Figure 2
Lumens
Inside-Frosted Lamps

