

## Photometric Test Report

### Relevant Standards

ANSI/IES LM-79-2019

### Prepared For

**Paragon Semiconductor Lighting Technology Co., Ltd.(ParagonLED®)**

3F No 369 Sec 2 Wenhua 2Nd Rd New Taipei City, 244 TW

### Catalog Number

TTL-225-50-120V-01Z

### Project Number

4791276382.1.1

### Report Number

4791276382.1-2a

### Test Date

2024-06-27~2024-06-28

### Issue Date

2024-07-03

Prepared By

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Approved By

*Michael Chang*

Michael Chang

The results contained in this report pertain only to the tested sample.  
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## 1.0 Test List

Test Item	Test	Test Date	Model Number	Tests Conducted By
1	Integrating Sphere Test	2024-06-28	TTL-225-50-120V-01Z	Jeff Hsu
2	Goniophotometer Test	2024-06-27	TTL-225-50-120V-01Z	Jeff Hsu

## 1.1 Test Site

Company Name	Underwriters Laboratories Taiwan Co., Ltd.
Address	No. 35, Sec. 2, Zhongyang S. Rd., Beitou Dist., Taipei City 112, Taiwan

## 1.2 Remark

1. UL test equipment information is recorded on Meter Use in UL's Aurora database.
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## 2.0 Production Description

**Luminaire Description:** High Bay Luminaire , Models TTL-225-50-120V-01Z

**Electrical Rated:** 120 Vac, 60 Hz, 225W

**Nominal CCT:** 5000K

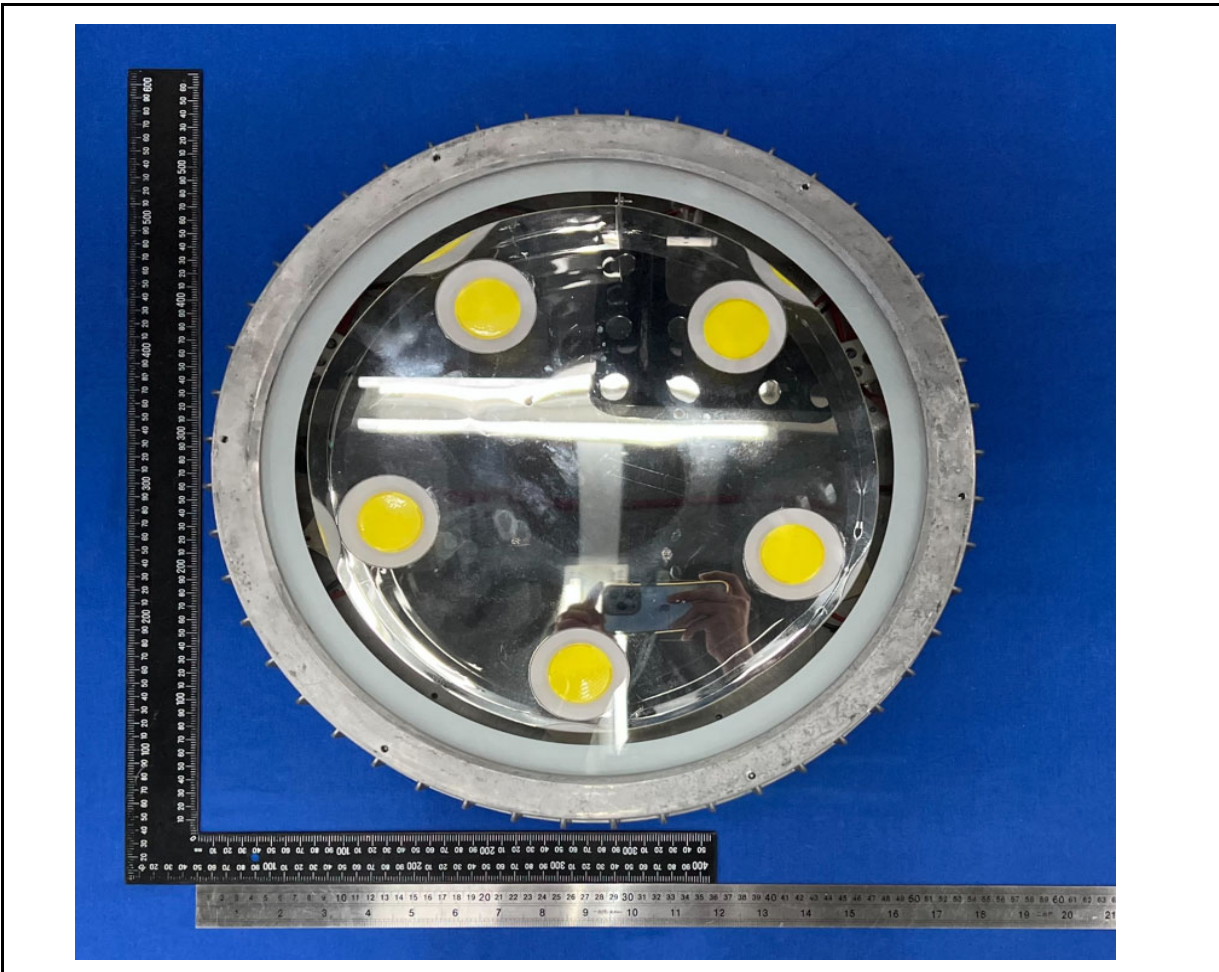
**Family Model and Variation:** N/A

**Representative (tested) Model:** TTL-225-50-120V-01Z

**Sample Received Date:** 2024-06-27

**Number of hours operated prior to measurement (0 h for rating new products):** 0 h

Photos of Luminaire Characteristics



### 3.0 LM-79 Measurement and Test Results

#### 3.1 Integrating Sphere Test

Model No.	TTL-225-50-120V-01Z	Sample No.	7347432
Operate time (Min.)	90	Stabilization time (Min.)	80

#### Test Method

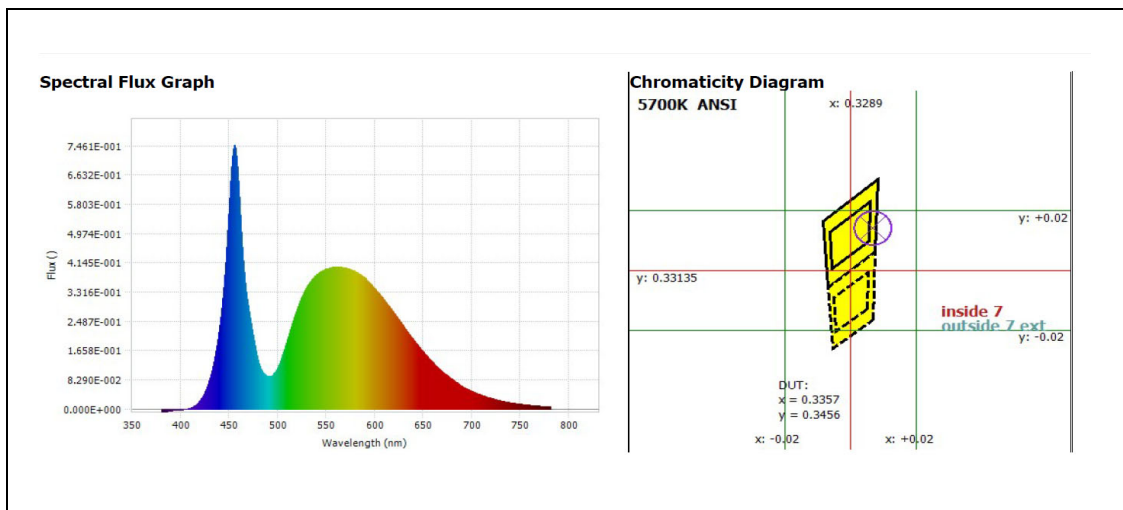
- The samples were tested according to ANSI/IES LM-79-19.
- Photometric parameters were measured using a 2-m integrating sphere with more than 97% coating reflectance, 4 $\pi$  geometry, a spectroradiometer, and software.
- The ambient temperature condition inside the sphere was maintained at 25 °C  $\pm$  0.7 °C (U=0.5 °C, k=2), laboratory humidity should be monitor and maintained between 10 to 65 %RH.
- The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. Self-absorption correction is applied in measurements. The sample was operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm.

#### Integrating Sphere Test Conditions

Ambient Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
25.3	120.18	60	2.118	223.99	0.8800	Base up

#### Test Results

CCT (K)	CRI (R <sub>a</sub> )	R <sub>9</sub>	Duv	Luminous Flux (lm)	Luminous Efficacy (lm/W)
5,364	76	-10	0.0009	24062.2	107.4



**3.1 Integrating Sphere Test (Cont'd)**

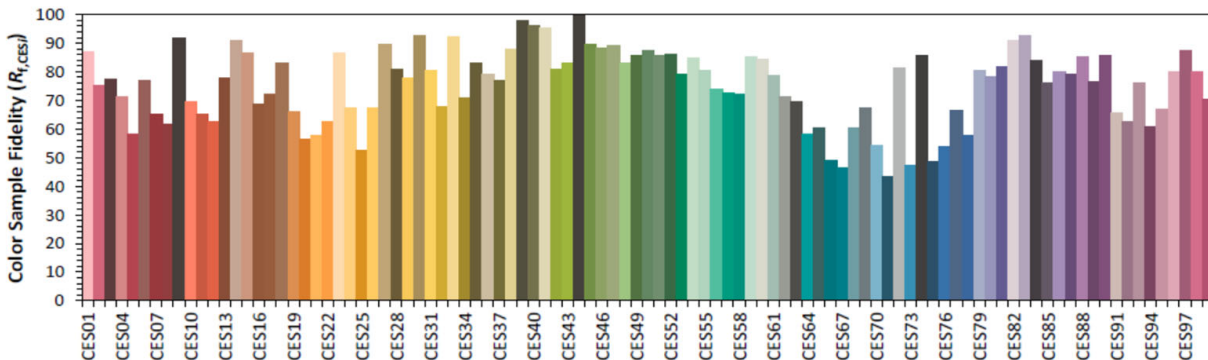
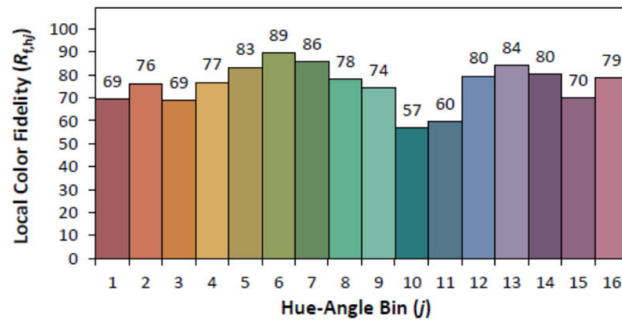
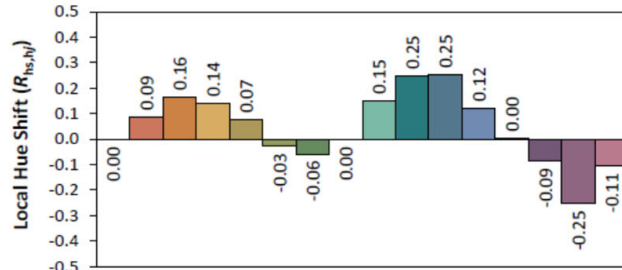
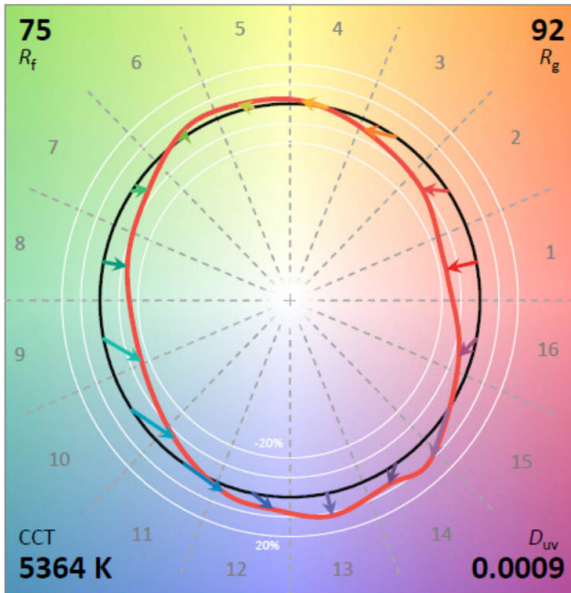
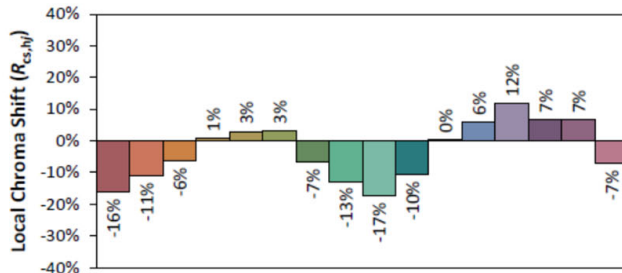
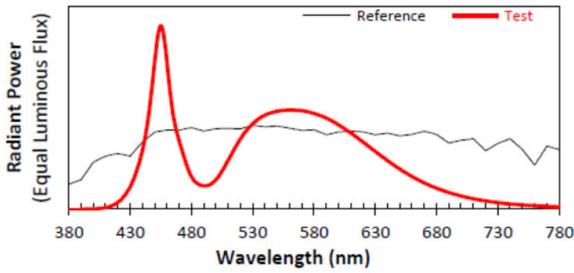
Chrom x	0.3357	Chrom y	0.3456
Chrom u	0.2073	Chrom v	0.3202
Chrom u'	0.2073	Chrom v'	0.4803
R <sub>1</sub>	74	R <sub>2</sub>	82
R <sub>3</sub>	84	R <sub>4</sub>	73
R <sub>5</sub>	73	R <sub>6</sub>	72
R <sub>7</sub>	85	R <sub>8</sub>	63
R <sub>9</sub>	-10	R <sub>10</sub>	53
R <sub>11</sub>	67	R <sub>12</sub>	42
R <sub>13</sub>	76	R <sub>14</sub>	91
R <sub>15</sub>	71	R <sub>cs,h1</sub>	-16%
R <sub>f</sub>	75	R <sub>g</sub>	92

3.1 Integrating Sphere Test (Cont'd)

ANSI/IES TM-30-18 Color Rendition Report

Date: 2024-06-28

Model: TTL-225-50-120V-01Z



Notes: This is a recommended method for displaying ANSI/IES TM-30-18 information.

x 0.3357  
y 0.3456  
u' 0.2073  
v' 0.4803

CIE 13.3-1995 (CRI)	
R <sub>a</sub>	76
R <sub>g</sub>	-10

### 3.0 LM-79 Measurement and Test Results

#### 3.2 Goniophotometer Test

<b>Model No.</b>	TTL-225-50-120V-01Z	<b>Sample No.</b>	7347432
<b>Operate time (Min.)</b>	70	<b>Stabilization time (Min.)</b>	60

#### Test Method

1. The sample was tested according to the ANSI/IES LM-79-2019.
2. Photometric parameters were measured using a type C goniophotometer and software.
3. The ambient temperature shall be maintained at 25 °C ± 0.5 °C (U=0.7 °C, K=2), measured at a point not more than 1.5 m from the sample and at the same height as the sample.
4. Laboratory humidity should be monitored and maintained between 10 to 65 %RH; the instantaneous tangential velocity of any point on the DUT shall be less than an upper tolerance limit of 0.2 m/s.
5. The samples were operated at rated voltage and were stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 1° vertical intervals and 22.5° horizontal intervals.

#### Goniophotometer Test Conditions

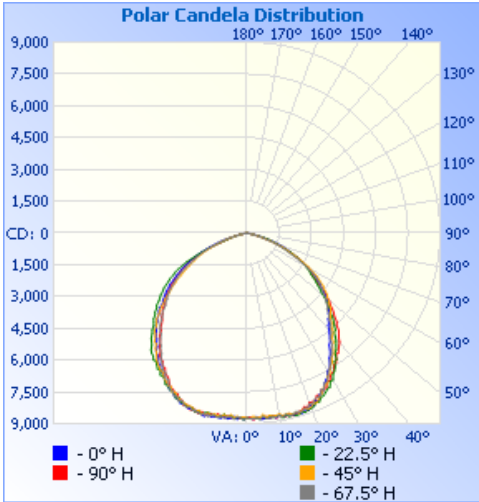
Ambient Temperature (°C)	Voltage (Vac)	Frequency (Hz)	Current (A)	Power (W)	Power Factor	Orientation
24.9	120.05	60	2.147	227.48	0.882	Base Up

#### Test Result

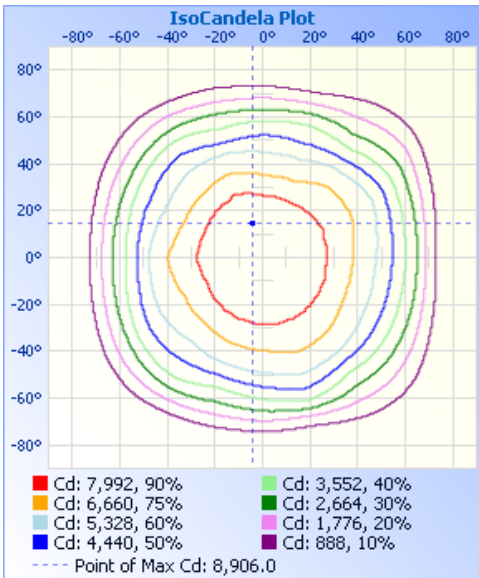
Flux (lm)	Zonal Lumen Requirement (20-50°)	Field Angle, ° (10%)		Beam Angle, ° (50%)		Luminous Efficacy (lm/W)
		Horizontal Spread	Vertical Spread	Horizontal Spread	Vertical Spread	
22724.7	55.5	144.7	147.4	104.5	106.1	99.90

### 3.2 Goniophotometer Test (Cont'd)

#### Polar Candela Distribution



#### IsoCandela Plot



### 3.2 Goniophotometer Test (Cont'd)

#### Zonal Lumen Summary

##### **Zonal Lumen Summary**

Zone	Lumens	% Luminaire
0-30	7,085.6	31.2%
0-40	11,496.3	50.6%
0-60	19,625.8	86.4%
60-90	3,096.0	13.6%
70-100	707.1	3.1%
90-120	0.1	0%
0-90	22,721.8	100%
90-180	0.1	0%
0-180	22,721.9	100%

#### Lumens Per Zone

##### **Lumens Per Zone**

Zone	Lumens	% Total	Zone	Lumens	% Total
0-5	208.7	0.9%	90-95	0.1	0%
5-10	624.8	2.7%	95-100	0	0%
10-15	1,039.7	4.6%	100-105	0	0%
15-20	1,431.9	6.3%	105-110	0	0%
20-25	1,765.8	7.8%	110-115	0	0%
25-30	2,014.7	8.9%	115-120	0	0%
30-35	2,170.7	9.6%	120-125	0	0%
35-40	2,240.0	9.9%	125-130	0	0%
40-45	2,234.5	9.8%	130-135	0	0%
45-50	2,149.5	9.5%	135-140	0	0%
50-55	1,991.7	8.8%	140-145	0	0%
55-60	1,753.8	7.7%	145-150	0	0%
60-65	1,413.2	6.2%	150-155	0	0%
65-70	975.8	4.3%	155-160	0	0%
70-75	518.9	2.3%	160-165	0	0%
75-80	160.8	0.7%	165-170	0	0%
80-85	23.0	0.1%	170-175	0	0%
85-90	4.3	0.0%	175-180	0	0%

### 3.2 Goniophotometer Test (Cont'd)

#### Candela Table - Type C

Candela Table - Type C																	
y/C	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	360
0	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721	8721
1	8749	8773	8736	8768	8671	8653	8702	8798	8800	8800	8682	8806	8744	8645	8721	8687	8749
2	8782	8743	8649	8769	8818	8763	8795	8733	8681	8707	8706	8714	8749	8661	8768	8786	8782
3	8673	8736	8720	8729	8679	8662	8700	8794	8804	8714	8664	8677	8730	8712	8773	8749	8673
4	8790	8799	8712	8813	8748	8663	8709	8709	8669	8745	8700	8812	8698	8622	8697	8776	8790
5	8804	8677	8597	8671	8790	8729	8799	8840	8762	8628	8602	8699	8758	8727	8803	8751	8804
6	8778	8806	8729	8813	8700	8651	8665	8694	8820	8749	8725	8718	8690	8621	8641	8675	8778
7	8796	8683	8672	8787	8804	8751	8798	8746	8697	8615	8630	8801	8729	8734	8814	8800	8796
8	8697	8787	8710	8785	8698	8659	8720	8820	8819	8725	8706	8685	8718	8667	8689	8656	8697
9	8824	8760	8716	8782	8840	8651	8678	8735	8795	8776	8740	8813	8629	8659	8712	8764	8824
10	8711	8718	8663	8714	8723	8755	8802	8846	8786	8690	8664	8747	8778	8773	8807	8667	8711
15	8861	8906	8762	8730	8819	8674	8778	8810	8720	8682	8649	8790	8819	8764	8738	8699	8861
17	8665	8796	8729	8562	8511	8522	8642	8644	8566	8551	8536	8622	8634	8584	8542	8449	8665
20	8330	8465	8330	8162	8177	8098	8240	8297	8212	8247	8249	8204	8131	8270	8175	8079	8330
25	7499	8007	7710	7557	7766	7512	7651	7757	7726	7816	7753	7582	7626	7761	7778	7432	7499
30	6746	7284	7000	6882	7265	6905	6915	7177	7185	7389	7309	6915	7063	7225	7270	6686	6746
35	5950	6428	6222	6108	6709	6286	6029	6477	6519	6881	6707	6209	6336	6764	6674	5953	5950
40	5366	5659	5508	5417	5925	5773	5357	5674	5886	6137	5941	5566	5615	6235	5839	5173	5366
45	4876	4725	4990	4791	5026	5106	4811	4805	5116	5470	5036	4840	5012	5468	4839	4594	4876
50	4166	3887	4341	4150	3998	4373	4224	3945	4428	4775	4057	4173	4317	4629	3820	4079	4166
55	3345	3192	3421	3184	3295	3474	3547	3063	3571	3951	3108	3303	3526	3694	2896	3390	3345
60	2371	2386	2312	2125	2407	2358	2400	2302	2671	2784	2315	2435	2612	2740	2148	2378	2371
65	1575	1461	1360	1317	1444	1425	1244	1392	1667	1359	1452	1539	1327	1770	1390	1310	1575
70	674	699	516	464	581	464	457	536	635	599	660	696	607	781	680	527	674
75	117	65	88	67	63	74	63	54	82	115	81	103	151	137	81	113	117
80	18	16	14	14	15	15	15	13	17	18	20	20	25	22	21	22	18
85	2	2	2	4	2	2	0	2	3	3	2	2	2	4	3	0	2
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
105	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
125	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
155	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
165	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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