



Brochure

LED Lumen Maintenance and Life Test System (LEDLM-80PL)

Global Office of Lisun Electronics Inc.

<http://www.Lisungroup.com>

Lisun Group (Hong Kong) Limited

Add: Room C, 15/F Hua Chiao Commercial Center, 678 Nathan Road, Mongkok, KL, HK

Tel: 00852-68852050 Fax: 00852-30785638

Email: SalesHK@Lisungroup.com

Lisun Electronics (Shanghai) Co., Ltd

Add: 113-114, No. 1 Building, Nanxiang Zhidi Industry Park, No. 1101, Huyi Road, Jiading District, Shanghai, 201802, China

Tel: +86(21)5108 3341 Fax: +86(21)5108 3342

Email: SalesSH@Lisungroup.com

Lisun Electronics Inc. (USA)

Add: 445 S. Figueroa Street, Los Angeles, CA 90071, U.S.A.

Email: Sales@Lisungroup.com

Lisun China Factory

Add: NO. 37, Xiangyuan Road, Hangzhou City, Zhejiang Province, China

Tel: +86-189-1799-6096

Email: Engineering@Lisungroup.com

Lead in CFL & LED Test Instruments

Rev. 1/29/2019

1. 工作原理

额定其初始光输出流明维持寿命，经过工作时间超过该LED光源将维持百分比p，其初始光输出如：

- L70 (hours): 维持70%光通量的时间
- L50 (hours): 维持30%光通量的时间

LED 寿命根据阿仑尼乌斯模型预测，公式如下

1. $P = P_0 \exp(-\beta t)$
2. $\beta = \beta_0 I^m \exp(-E_a / K T_j)$

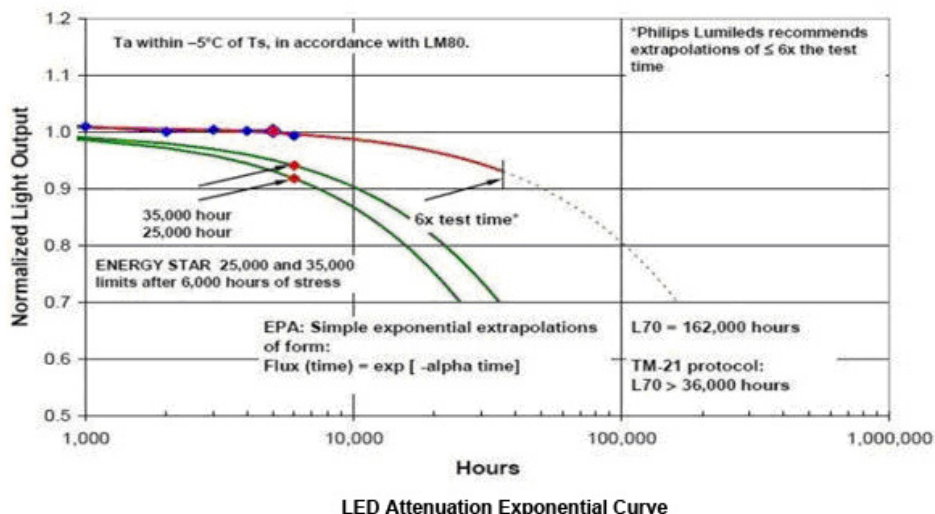
注：P₀ 为初试光通量。P 为加温加电后的光通量；β 为某一温度的衰退系数。t 为某一温度下的加电工作时间；β₀ 为常数；E_a 为激活能；K 为波耳兹曼常数；I 为工作电流；T_j 为结温

首先我们以每1000小时光衰推断寿命。例如：假定1000小时光衰光衰率为 n %：
 由公式1可得50%光衰公式： $t = 1000 * \ln 0.5 / \ln (1 - n\%)$
 由公式1可得30%光衰公式： $t = 1000 * \ln 0.7 / \ln (1 - n\%)$

我们可以得到：

测试温度	千小时光衰	50%光衰寿命 (h)	30%光衰寿命 (h)
85℃	8%	8312.950414	4277.62127
70℃	3%	22756.57306	11709.922

温度 T_j (温度指灯底部与电路板接触处表面温度，在散热条件充分时即为环境温度，350mA 使用时结温比环境温度高15摄氏度) 对于测试结果会有很大影响，我们可以用公式2来推断不同温度下的 LED 寿命，假定已知某种 LED 温度 T₁ (摄氏度) 时的寿命为 t₁，温度 T₂ (摄氏度) 时的寿命为 t₂，由公式2可得温度 T₃ 条件下的寿命 t₃ 为在 T₃ 温度下： $t_3 = t_1 * \exp \{ (\ln(t_2/t_1) / [1/(T_2+15+273) - 1/(T_1+15+273)]) * [1/(T_3+15+273) - 1/(T_1+15+273)] \}$



2. 系统配置

参考LM-80，LED拥有非常长的使用寿命，根据驱动电流和使用条件，可以使用50,000小时以上。

LED光通量维持率及寿命测试系统包含两个功能：LED光通量维持率测试及LED光色参数随时间变化的曲线，如相关色温、色品坐标、光通量等随时间变化的曲线。



注：电脑和打印机需客户准备

全套LEDLM-80PL光通量维持率及寿命测试系统包括如下：

- **LED老化控制系统和模拟阿伦尼斯软件 (LM-80PL)**：该系统总共能测试记录16组通道曲线： photometric VS colorimetric VS power VS temperature VS time。老化时间最大可以做到10000个小时。依据TM-21标准可以测算出寿命时间数。
- **多路温度巡检仪 (TMP-16)**：同时测试16个样品的温度并可以和LM-80PL软件通讯。
- **光度 & 色度 & 电参数测试系统**：可以测试16通道的光、色、电参数，所有的设备均可以和LM-80PL软件通讯
- **多通道电源开系统**：控制被测灯电源供电。
- **高温箱内被测灯具适配器**：根据客户要求定制，最多能定制16个。

请注意如下设备需要单独准备：

- **高温箱**：依据被测灯的最大尺寸。
- **AC交流电源**：取决于被测灯的最大输出功率。

3. 参考如下标准：

IEC/PAS 62612 Self-ballasted LED-Lamps for General Lighting Services-Performance Requirements

IEC/PAS 62717 LED modules for general lighting – Performance requirements

IEC/PAS 62722-2-1 Luminaire Performance –Part 2-1: Particular requirements for

LED luminaires

IES LM-80-08 Approved Method for Measuring Lumen Maintenance of LED Light Sources

IES TM-21-11 Projecting Long Term Lumen Maintenance of LED Packages

IESNA LM-82-12 Approved Method: Characterization of LED Engines and LED Lamps for Electrical and Photometric Properties as a Function of Temperature

ENERGY STAR® Program Requirements Product Specification Eligibility Criteria

如下是 **LEDLM-80 LED 寿命测试系统测试报告**:

Lumen Maintenance Test Report

Client : OSRAM Lighting

Address : Jiading Shanghai

Description of the samples under test:

Sample Name : White SMD LED
Model : YL-T3528W-AA-60C
Ratings : 20mA, 6.5lm, 75(Ra), 6000K
Manufacturer : OSRAM Lighting
Sample Quantity : 6
Sample Tested Date : 2014-11-12 ~ 2014-12-12

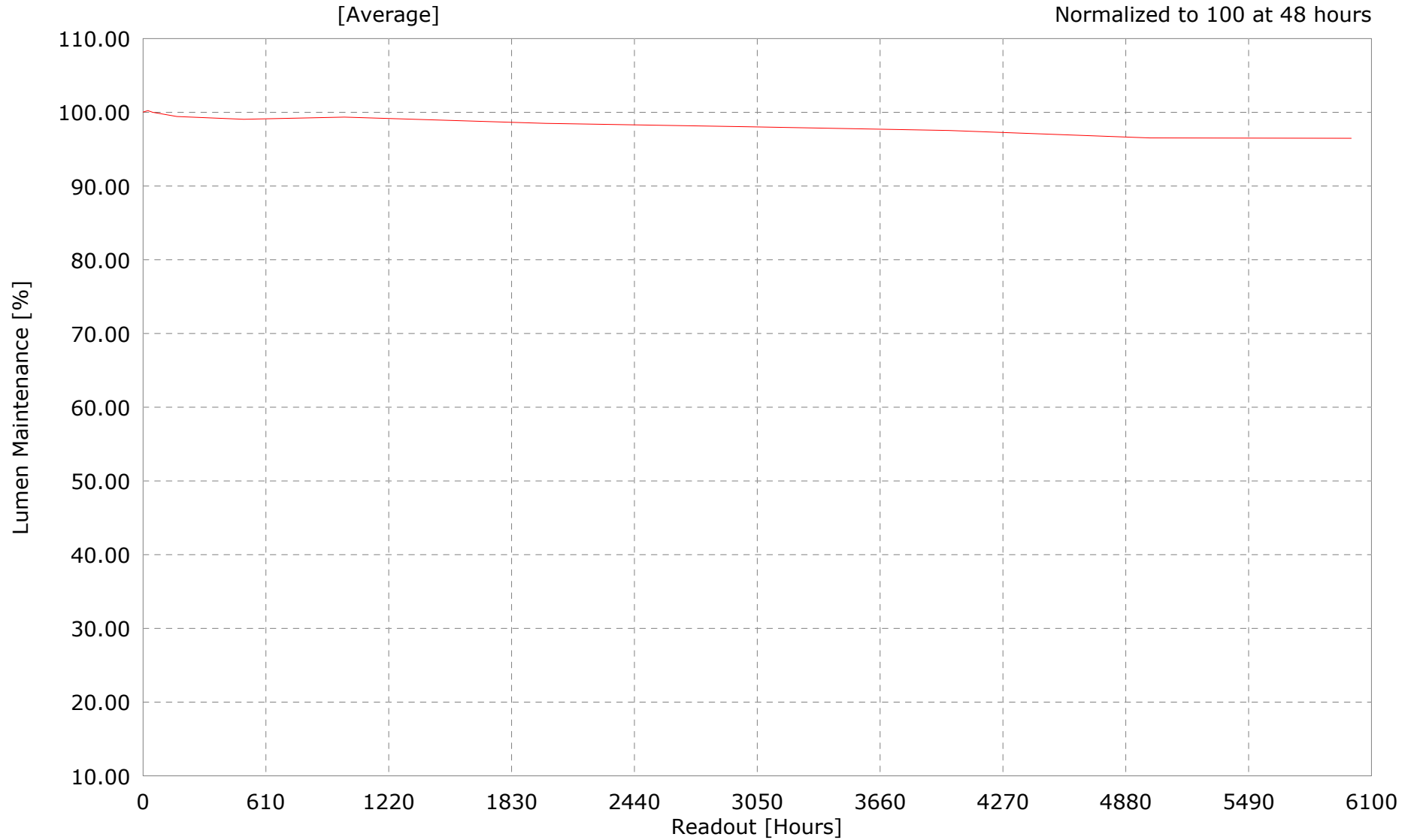
Equipment list:

Test Equipments	Model/SN
Photometer _Colorimter	LMS-4000/201201002
Digital Power Meter	LS2008R/201302005
Power Supply	LSP-500VAR/201403001
Thermometer	TMP-8/201403005
High Temperature Chamber	GDW-015A/201403002

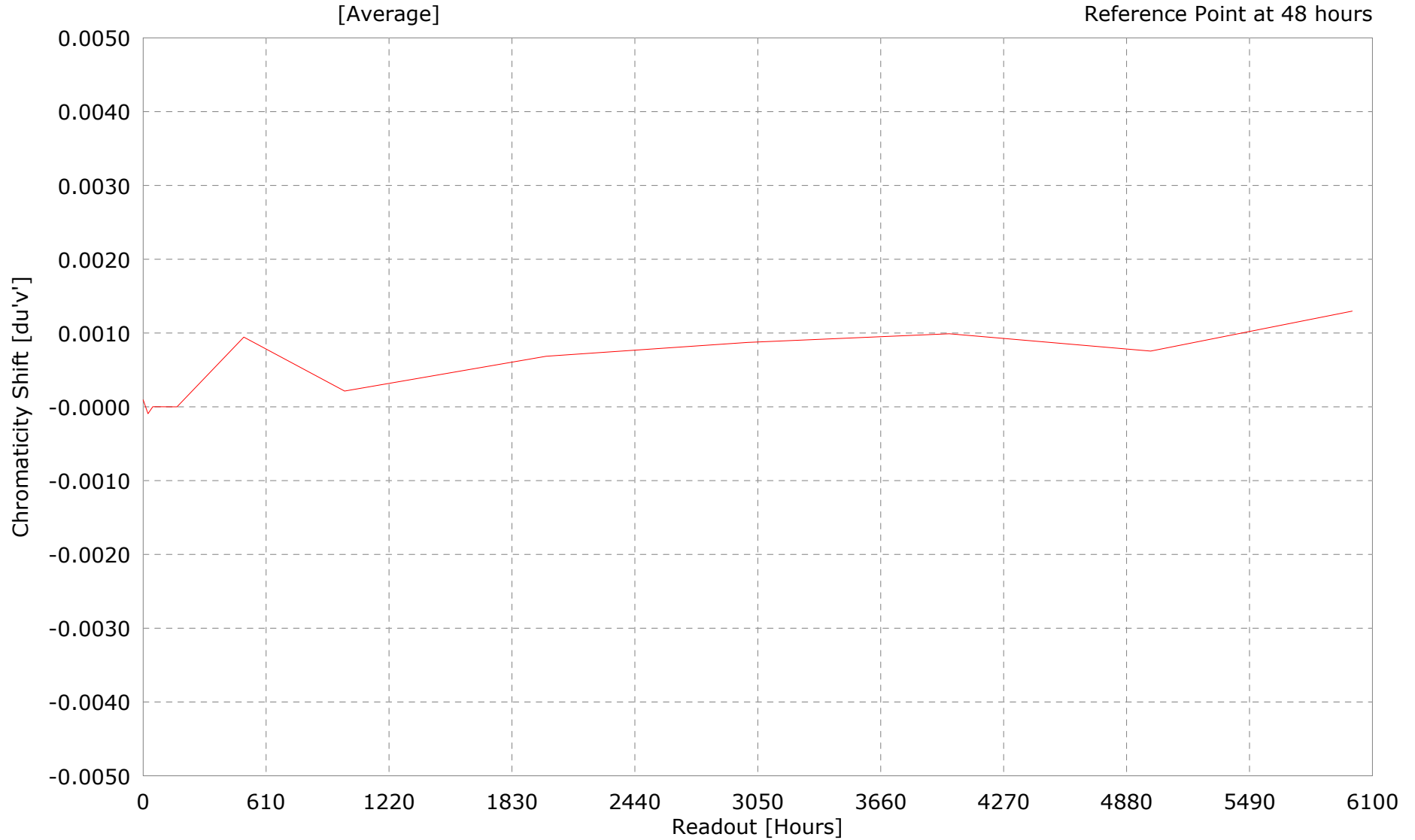
Lumen Maintenance Life Prediction(Based on TM-21)

Test Condition - 55°C Case Temp	
Sample Name: White SMD LED	
Model: YL-T3528W-AA-60C	
Ratings: 20mA, 6.5lm, 75(Ra), 6000K	
Manufacturer: OSRAM Lighting	
Sample Quantity	6
Number Of Failures	0
DUT drive voltage used in the test (V/Hz)	220.1/50.02
Test duration (hours)	6000
Test duration used for projection (hour to hour)	1000 - 6000
Tested case temperature (°C)	55
α	6.081E-006
B	0.998
Calculated L70(6k) (hours)	815715
Reported L70(6k) (hours)	> 33000
Calculated L50(6k) (hours)	871049
Reported L50(6k) (hours)	> 33000

Lumen Maintenance Graph [%]



Chromaticity Shift Graph [du'v']



Lumen Maintenance Table [%]

Model : YL-T3528W-AA-60C

Ratings : 20mA, 6.5lm, 75(Ra), 6000K

Actual Temperature : Ta = 55.0°C, Ts = 65.0°C

Humidity : R.H. = 60%

Number Of Failures : 0

Uncertainty : 4%

Drive Voltage : U = 220.1V, Freq. = 50.02Hz

No.	0H	24H	48H	168H	500H	1000H	2000H	3000H	4000H	5000H	6000H
1	100.45	100.36	100.00	99.46	97.21	99.01	98.01	97.47	96.75	95.85	95.74
2	99.91	100.09	100.00	99.28	98.01	99.36	98.54	98.08	97.63	96.53	96.53
3	99.82	100.27	100.00	99.65	98.31	99.55	98.74	98.38	97.92	96.92	96.83
4	100.09	100.27	100.00	99.54	100.27	99.72	98.99	98.62	98.16	97.15	97.15
5	100.00	100.18	100.00	99.50	100.20	99.44	98.52	97.96	97.50	96.38	96.31
6	99.91	100.18	100.00	99.15	100.32	98.99	98.17	97.71	97.25	96.24	96.25
Median	99.95	100.23	100.00	99.48	99.25	99.40	98.53	98.02	97.56	96.46	96.42
Average	100.03	100.23	100.00	99.43	99.05	99.34	98.49	98.03	97.53	96.51	96.47
Std. deviation	0.2260	0.0948	0.0000	0.1829	1.3750	0.2941	0.3587	0.4215	0.4998	0.4715	0.4893
Min.	99.82	100.09	100.00	99.15	97.21	98.99	98.01	97.47	96.75	95.85	95.74
Max.	100.45	100.36	100.00	99.65	100.32	99.72	98.99	98.62	98.16	97.15	97.15

Chromaticity Shift Table [du'v']

Model : YL-T3528W-AA-60C Ratings : 20mA, 6.5lm, 75(Ra), 6000K
 Actual Temperature : Ta = 55.0°C, Ts = 65.0°C Humidity : R.H. = 60%
 Number Of Failures : 0
 Drive Voltage : U = 220.1V, Freq. = 50.02Hz

No.	0H	24H	48H	168H	500H	1000H	2000H	3000H	4000H	5000H	6000H
1	0.0001	-0.0001	0.0000	-0.0001	0.0008	0.0001	0.0006	0.0007	0.0008	0.0006	0.0011
2	0.0003	0.0000	0.0000	0.0001	0.0014	0.0004	0.0008	0.0010	0.0011	0.0008	0.0016
3	0.0000	-0.0001	0.0000	0.0000	0.0001	0.0001	0.0006	0.0007	0.0008	0.0007	0.0013
4	0.0000	-0.0001	0.0000	-0.0001	0.0011	0.0000	0.0006	0.0007	0.0008	0.0007	0.0011
5	0.0000	-0.0001	0.0000	0.0001	0.0018	0.0001	0.0007	0.0010	0.0010	0.0007	0.0013
6	0.0001	0.0000	0.0000	0.0000	0.0004	0.0004	0.0008	0.0011	0.0013	0.0010	0.0014
Median	0.0001	-0.0001	0.0000	0.0000	0.0010	0.0001	0.0006	0.0008	0.0009	0.0007	0.0013
Average	0.0001	-0.0001	0.0000	-0.0000	0.0009	0.0002	0.0007	0.0009	0.0010	0.0008	0.0013
Std. deviation	0.00012	0.00007	0.00000	0.00013	0.00064	0.00017	0.00014	0.00019	0.00018	0.00015	0.00017
Min.	0.0000	-0.0001	0.0000	-0.0001	0.0001	0.0000	0.0006	0.0007	0.0008	0.0006	0.0011
Max.	0.0003	0.0000	0.0000	0.0001	0.0018	0.0004	0.0008	0.0011	0.0013	0.0010	0.0016