



## Sistema de Cadastramento Unificado de Fornecedores - SICAF

### Declaração

Declaramos para os fins exigidos na legislação, conforme documentação registrada no SICAF, que a situação do fornecedor no momento é a seguinte:

#### Dados do Fornecedor

CNPJ: 22.683.848/0001-03 DUNS®: 944965788  
Razão Social: ACR COMERCIO E SERVICOS LTDA  
Nome Fantasia: ACR COMERCIO E SERVICOS  
Situação do Fornecedor: Credenciado Data de Vencimento do Cadastro: 10/03/2025  
Natureza Jurídica: SOCIEDADE EMPRESÁRIA LIMITADA  
MEI: Não  
Porte da Empresa: Empresa de Pequeno

#### Ocorrências e Impedimentos

Ocorrência: Nada Consta  
Impedimento de Licitar: Nada Consta  
Ocorrências Impeditivas indiretas: Nada Consta  
Vínculo com "Serviço Público": Nada Consta

#### Níveis cadastrados:

Documento(s) assinalado(s) com "\*" está(ão) com prazo(s) vencido(s).

Fornecedor possui alguma pendência no Nível de Cadastramento indicado. Verifique mais informações sobre pendências nas funcionalidades de consulta.

Automática: a certidão foi obtida através de integração direta com o sistema emissor. Manual: a certidão foi inserida manualmente pelo fornecedor.

##### I - Credenciamento

##### II - Habilitação Jurídica (Possui Pendência)

##### III - Regularidade Fiscal e Trabalhista Federal

Receita Federal e PGFN	Validade:	03/11/2024	Automática
FGTS	Validade:	25/10/2024	Automática
Trabalhista ( <a href="http://www.tst.jus.br/certidao">http://www.tst.jus.br/certidao</a> )	Validade:	04/11/2024	Automática

##### IV - Regularidade Fiscal Estadual/Distrital e Municipal (Possui Pendência)

Receita Estadual/Distrital	Validade:	15/08/2024 (*)
Receita Municipal	Validade:	15/07/2024 (*)

##### VI - Qualificação Econômico-Financeira

Validade: 31/05/2025



# CONTROLADORIA-GERAL DA UNIÃO

Certidão negativa correccional (ePAD, CGU-PJ, CEIS, CNEP e CEPIM)

Consultado: **ACR COMERCIO E SERVICOS LTDA**

CPF/CNPJ: **22.683.848/0001-03**

Certifica-se que, em consulta aos sistemas ePAD e CGU-PJ e aos cadastros CEIS, CNEP e CEPIM mantidos pela Corregedoria-Geral da União, **NÃO CONSTAM** registros de penalidades vigentes relativas ao CNPJ/CPF consultado.

*Destaca-se que, nos termos da legislação vigente, os referidos cadastros consolidam informações prestadas pelos entes públicos, de todos os Poderes e esferas de governo.*

Os Sistemas ePAD e CGU-PJ consolidam os dados sobre o andamento dos processos administrativos de responsabilização de entes privados no Poder Executivo Federal.

O Cadastro Nacional de Empresas Inidôneas e Suspensas (CEIS) apresenta a relação de empresas e pessoas físicas que sofreram sanções que implicaram a restrição de participar de licitações ou de celebrar contratos com a Administração Pública.

O Cadastro Nacional de Empresas Punidas (CNEP) apresenta a relação de empresas que sofreram qualquer das punições previstas na Lei nº 12.846/2013 (Lei Anticorrupção).

O Cadastro de Entidades Privadas sem Fins Lucrativos Impedidas (CEPIM) apresenta a relação de entidades privadas sem fins lucrativos que estão impedidas de celebrar novos convênios, contratos de repasse ou termos de parceria com a Administração Pública Federal, em função de irregularidades não resolvidas em convênios, contratos de repasse ou termos de parceria firmados anteriormente.

Certidão emitida às 13:54:34 do dia 14/10/2024 , com validade até o dia 13/11/2024.

Link para consulta da verificação da certidão <https://certidoes.cgu.gov.br/>

Código de controle da certidão: sKU6UUwwsKoNyu4T2BW8

*Qualquer rasura ou emenda invalidará este documento.*



# CONTROLADORIA-GERAL DA UNIÃO

Certidão negativa correcional (ePAD, CGU-PJ, CEIS, CNEP e CEPIM)

Consultado: **CLAUDINEI ROBERTO LUNARDON**

CPF/CNPJ: **874.541.909-44**

Certifica-se que, em consulta aos sistemas ePAD e CGU-PJ e aos cadastros CEIS, CNEP e CEPIM mantidos pela Corregedoria-Geral da União, **NÃO CONSTAM** registros de penalidades vigentes relativas ao CNPJ/CPF consultado.

*Destaca-se que, nos termos da legislação vigente, os referidos cadastros consolidam informações prestadas pelos entes públicos, de todos os Poderes e esferas de governo.*

*Os Sistemas ePAD e CGU-PJ consolidam os dados sobre o andamento dos processos administrativos de responsabilização de entes privados no Poder Executivo Federal.*

*O Cadastro Nacional de Empresas Inidôneas e Suspensas (CEIS) apresenta a relação de empresas e pessoas físicas que sofreram sanções que implicaram a restrição de participar de licitações ou de celebrar contratos com a Administração Pública.*

*O Cadastro Nacional de Empresas Punidas (CNEP) apresenta a relação de empresas que sofreram qualquer das punições previstas na Lei nº 12.846/2013 (Lei Anticorrupção).*

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Certidão emitida às 13:55:53 do dia 14/10/2024 , com validade até o dia 13/11/2024.

Link para consulta da verificação da certidão <https://certidoes.cgu.gov.br/>

Código de controle da certidão: ZkCERC5vIeHo1LScxXb7

*Qualquer rasura ou emenda invalidará este documento.*

**PREFEITURA DE MARMELEIRO - PR**  
**EDITAL DE PREGÃO Nº 054/2024**  
**PROCESSO ADMINISTRATIVO ELETRÔNICO Nº 1474/2024**  
**MODALIDADE: PREGÃO ELETRÔNICO**  
**TIPO: MENOR PREÇO POR ITEM**

**OBJETO:REGISTRO DE PREÇOS** para futura e eventual contratação de empresa para fornecimento de Luminárias de LED para iluminação pública nas vias urbanas do município de Marmeleiro, atendendo as necessidades do Departamento de Urbanismo

**PROPOSTA DE PREÇOS**

A empresa ACR COMÉRCIO E SERVIÇOS LTDA , estabelecida na RUA NICOLAU SCHEFFER 255 - SANTA CÂNDIDA - CURITIBA - PR, FONE: (041) 99887-2440, E-MAIL: acr.mo@hotmail.com, inscrita no CNPJ sob nº 22.683.848/0001-03, neste ato representada por CLAUDINEI ROBERTO LUNARDON - SÓCIO, CARTEIRA DE IDENTIDADE: 6130828-8 SSP/PR CPF: 874.541.909-44, RUA GENÊSIS 65 - SANTA CÂNDIDA - CURITIBA - PR, propõe fornecer à Prefeitura Municipal de Marmeleiro, em estrito cumprimento ao previsto no Edital de Pregão Eletrônico nº 054/2024, conforme abaixo discriminado:

ITAM	DESCRIÇÃO DOS PRODUTOS	UNI.	QTDE	MARCA MODELO	PREÇO UNIT.	PREÇO TOTAL
4	Luminária LED (100W): Potência nominal mínima de 90W e máxima de 100W, tensão bivolt automática 127V/220V. Fluxo luminoso mínimo de 11.000 lúmens; eficiência luminosa mínima de 110 lúmens / W; índice e reprodução de cores (IRC) mínimo de 70%; temperatura de cor correlata (TCC) de 4500K á 5000K; fator de potência mínimo de 0,95; expectativa de vida útil de no mínimo 50.000h para L80; distorção harmônica total (THD) máxima de 10%; tecnologia dos LED's tipo SMD – Surface Mount Device ou COB; distribuição luminosa transversal tipo II, longitudinal média e/ou curta e controle de distribuição luminosa do tipo limitada ou totalmente limitada, conforme NBR 5101; corpo em alumínio injetado a alta pressão com pintura epóxi na cor cinza ou corpo extrudado; para instalação em postes e/ou braços de iluminação pública com diâmetro de 48,5mm a 60,3mm, fixação realizada por parafusos de aço inox, com controlador eletrônico para módulos de LED (driver) alojado (interno) ao corpo da luminária; conjunto óptico formado por conjuntos modulares; com tomada e relé fotoelétrico (com garantia de 5 anos) compatível com a luminária conforme NBR 5123 incorporada ao corpo da luminária; índice de proteção contra penetração de poeira e água IP 66 para o conjunto óptico e para o compartimento do driver; índice de proteção contra impactos de no mínimo IK08.	UNI.	70	RAJIX RLP1005E	R\$ 195,00	R\$ 13.650,00

7	Luminária LED (100W): Potência nominal mínima de 90W e máxima de 100W, tensão bivolt automática 127V/220V. Fluxo luminoso mínimo de 11.000 lúmens; eficiência luminosa mínima de 110 lúmens / W; índice e reprodução de cores (IRC) mínimo de 70%; temperatura de cor correlata (TCC) de 4500K á 5000K; fator de potência mínimo de 0,95; expectativa de vida útil de no mínimo 50.000h para L80; distorção harmônica total (THD) máxima de 10%; tecnologia dos LED's tipo SMD – Surface Mount Device ou COB; distribuição luminosa transversal tipo II, longitudinal média e/ou curta e controle de distribuição luminosa do tipo limitada ou totalmente limitada, conforme NBR 5101; corpo em alumínio injetado a alta pressão com pintura epóxi na cor cinza ou corpo extrudado; para instalação em postes e/ou braços de iluminação pública com diâmetro de 48,5mm a 60,3mm, fixação realizada por parafusos de aço inox, com controlador eletrônico para módulos de LED (driver) alojado (interno) ao corpo da luminária; conjunto óptico formado por conjuntos modulares; com tomada e relé fotoelétrico (com garantia de 5 anos) compatível com a luminária conforme NBR 5123 incorporada ao corpo da luminária; índice de proteção contra penetração de poeira e água IP 66 para o conjunto óptico e para o compartimento do driver; índice de proteção contra impactos de no mínimo IK08.	UNI.	210	RAJIX RLP1005E	R\$ 195,00	R\$ 40.950,00
<b>TOTAL</b>						<b>R\$ 54.600,00</b>

**VALOR TOTAL DA PROPOSTA - R\$ 54.600,00 (Cinquenta e quatro mil e seiscentos reais).**

A validade desta proposta é de 60 (sessenta) dias corridos, contados da data da abertura da sessão pública da DISPENSA ELETRÔNICA.

A apresentação da proposta implicará na plena aceitação das condições estabelecidas neste Aviso de Contratação Direta e seus anexos. Declaro que a proponente atende aos requisitos de habilitação e o declarante atesta a veracidade das informações prestadas (art. 63, I, da Lei nº 14.133/2021).

Responsável pela assinatura do Contrato:

- Nome: CLAUDINEI ROBERTO LUNARDON - SÓCIO
- CPF: 874.541.909-44
- Endereço: RUA GENÊSIS 65 - SANTA CÂNDIDA - CURITIBA - PR
- Telefone: FONE: (041) 99887-2440
- e-mail: acr.mo@hotmail.com

Informar Agência e Conta para pagamento: CAIXA ECONÔMICA AGÊNCIA: 1632 OP. 003 C/C: 3722-6

Nos preços ofertados já estão inclusos os tributos, fretes, taxas, seguros, encargos sociais, trabalhistas e todas as demais despesas necessárias à execução do objeto.

Curitiba, 14 de Outubro de 2024.

CLAUDINEI  
ROBERTO  
LUNARDON:874541  
90944

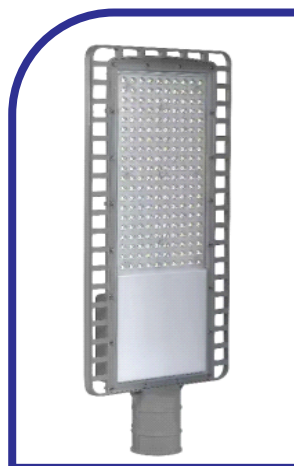
Assinado de forma digital  
por CLAUDINEI ROBERTO  
LUNARDON:87454190944  
Dados: 2024.10.14  
10:42:09 -03'00'

Claudinei Roberto Lunardon  
CPF – 874.541.909-44  
RG – 6130828-8  
Sócio



## LUMINÁRIA PÚBLICA LED

POTÊNCIA  
30-50-100-150-200W



\* Imagens meramente ilustrativas

30 E 50W

100W

150W

200W



5 ANOS DE GARANTIA



VIDA ÚTIL

50.000H



110 - 277  
VAC

110 ~ 277VAC



PROTEÇÃO  
IP66



CLASSIFICAÇÃO  
O EFICIÊNCIA  
ENERGÉTICA



CERTIFICADA  
NO INMETRO

A iluminação pública é um aspecto importante da infraestrutura urbana e pode ter um impacto significativo na segurança e no bem-estar dos cidadãos. As **LUMINARIAS PÚBLICAS LED da RAJIX** são uma opção popular para iluminação pública, pois oferecem vários benefícios em comparação com as tecnologias de iluminação convencionais.

Em termos de tecnologia, as luminárias **LUMINARIAS PÚBLICAS LED da RAJIX** são projetadas para serem mais eficientes em termos de energia do que as lâmpadas VAPOR DE SÓDIO ou VAPOR METÁLICO. Elas usam diodos emissores de luz (LEDs) para produzir luz, que é mais brilhante e mais uniforme do que a luz produzida por lâmpada. Além disso, as luminárias LED têm uma vida útil mais longa do que as lâmpadas convencionais, o que significa que elas precisam ser substituídas com menos frequência.

Em relação à durabilidade, as **LUMINARIAS PÚBLICAS LED da RAJIX** são construídas para durar muito tempo, com uma vida útil estimada em até 50.000 horas. Além disso, as luminárias LED são mais resistentes a vibrações e impactos do que as lâmpadas convencionais, o que as torna ideais para uso em áreas públicas movimentadas.

### Destaques do produto

- **5 Anos de garantia**
- **Índice de proteção IP66 / Resistência IK08**
- **Estrutura em alumínio injetado**
- **Certificada no INMETRO**
- **Pintura eletrostática a pó**
- **Vida útil de 50.000 horas**

## LUMINÁRIA PÚBLICA LED

**POTÊNCIA**  
**30-50-100-150-200W**

### INFORMAÇÕES TÉCNICAS

#### CARACTERÍSTICAS ELÉTRICAS

<b>Tipo do LED</b>	LED SMD 3030
<b>Tensão de alimentação</b>	110 - 277 VAC
<b>Frequência de operação</b>	50Hz / 60Hz
<b>Fator de potência</b>	≥0,55
<b>THD</b>	≤10%
<b>Driver de alimentação</b>	Invólucro em Alumínio anodizado / Proteção IP67
<b>DPS (Classe 1)</b>	DPS interno ao driver 10KV / 10KA
<b>Base para Relé</b>	3 pinos
<b>Alimentação</b>	Cabo PP 3x1,5mm <sup>2</sup> (L; L/N; G)

#### CARACTERÍSTICAS ÓPTICAS

<b>Abertura de lente</b>	<i>Tipoll Média</i>
<b>Temperatura de cor</b>	5000K
<b>IRC</b>	>70
<b>Vida útil</b>	>50.000h <i>* Comprovada através de ensaio LM-80 e projeção TM-21</i>

#### CARACTERÍSTICAS CONSTRUTIVAS

<b>Índice de Proteção</b>	IP66
<b>Resistência mecânica</b>	IK08
<b>Temperatura de operação</b>	-5°C - +50°C
<b>Instalação</b>	Bocal para fixação em braços de Ø48mm até Ø65mm, angulação de -5° até +5°
<b>Material do corpo</b>	Alumínio injetado sob pressão <i>* A.A. 369.00</i>
<b>Pintura</b>	Pintura eletrostática a pó com proteção UV <i>* Pintura Epóxi Poliéster</i>
<b>Cores</b>	Cinza
<b>Material da lente</b>	Lente óptica em policarbonato
<b>Material dos elementos de fixação</b>	Aço inoxidável 304

### Normas aplicáveis

Portaria n.º 20, de 15 de fevereiro de 2017

NBR IEC - 60598-1 Requisitos Gerais e Ensaios

NBR IEC - 60529 Grau de Proteção para Invólucros de Equipamentos Elétricos (Código IP)

NBR IEC - 62031 Módulos de LED para Iluminação em Geral - Especificações de Segurança

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

IES TM 21- Projecting Long Term Lumen Maintenance of LED light Sources



## LUMINÁRIA PÚBLICA LED

## POTÊNCIA 30-50-100-150-200W

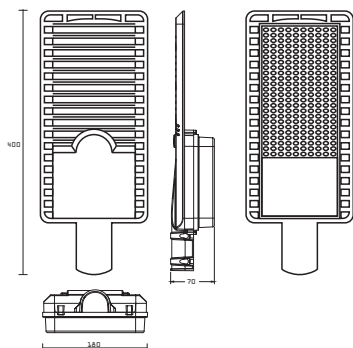
### MODELOS DISPONÍVEIS

CÓDIGO	TCC	CORRENTE NOMINAL	POTÊNCIA	EFICIÊNCIA	FLUXO	PESO
RLP0305E	5000K	127vac = 0,236mA 220Vac = 0,136mA	30W	140 lm/W	4200 lm	1,61 kg
RLP0505E		127vac = 0,393mA 220Vac = 0,227mA	50W	140 lm/W	7000 lm	2,77 kg
RLP1005E		127vac = 0,787mA 220Vac = 0,454mA	100W	140 lm/W	14000 lm	4,90 kg
RLP1505E		127vac = 1,181mA 220Vac = 0,681mA	150W	140 lm/W	21000 lm	4,92 kg
RLP2005E		127vac = 1,574mA 220Vac = 0,909mA	200W	140 lm/W	28000 lm	1,61 kg

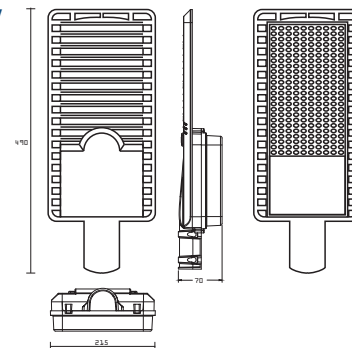
\* Valores de eficiência podem variar em  $\pm 10\%$  com relação ao valor nominal

### Desenho técnico e Dimensões

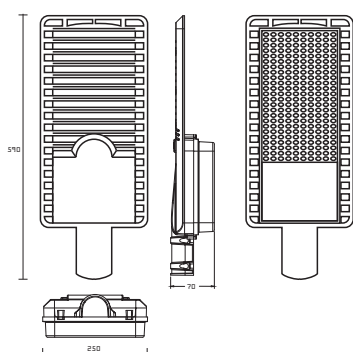
**30W  
50W**



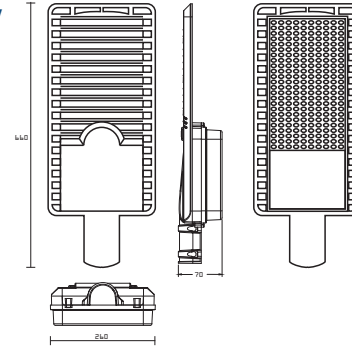
**100W**



**150W**



**200W**



# CERTIFICADO *CERTIFICATE*

**Certificado número** 6176791.31  
*Certificate number*

**Página** *Page* 1/5

**Solicitante** *Applicant* RAJIX COMERCIAL LTDA  
CNPJ No.: 46.889.684/0001-25  
Avenida República Argentina, 1505, Sala 2012, Curitiba - PR,  
CEP: 80620-010, Brasil

**Produto** *Product* LED Luminária de Iluminação Pública *Street light LED*  
**Nome comercial** RAJIX

*Trade name*  
**Família** *family*

LED Luminária de Iluminação Pública / REFOND / RF-W\*HP32DS-AF-I3 / IP66 / 50000h

**Para luminárias com Tecnologia LED** / *for luminaires with LED technology*

<b>Marca</b> <i>Brand</i>	<b>Modelo</b> <i>Model</i>	<b>Descrição Técnica do Modelo</b> <i>Technical Description of the Model</i>	<b>Código de barras</b> <i>Bar code</i>
RAJIX	RLP0305E	30W/4200lm/140lm/W/FP > 0,95/5000K	7898727311775
RAJIX	RLP0505E	50W/7000lm/140lm/W/FP > 0,97/5000K	7898727311782
RAJIX	RLP1005E	100W/14000lm/140lm/W/FP > 0,97/5000K	7898727311799
RAJIX	RLP1505E	150W/21000lm/140lm/W/FP > 0,97/5000K	7898727311805
RAJIX	RLP2005E	200W/28000lm/140lm/W/FP > 0,97/5000K	7898727311812

**Programa de certificação ou Portaria**  
*Certification program or Regulation*

Portaria INMETRO n.º 62:2022  
Portaria INMETRO n.º 200:2021 (RGCP)

**Modelo de certificação**  
*Certification model*

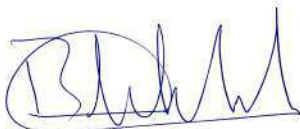
Modelo 5 - com ensaios de tipo, avaliação e aprovação dos Sistemas de Gestão do fabricante, e acompanhamento através de auditorias no fabricante e ensaio em amostras retiradas do comércio.

*Model 5: Type test, evaluation and approval of the manufacturer's Quality Management System, surveillance through audits on the factory and test on samples taken in market and on the manufacturer.*

**Emissão** *Date of issue*  
**Validade** *Expiry date*

14/12/2023  
14/12/2027

DEKRA Certification B.V.



**Bram Holtus**  
**Diretor-Gerente** *Managing Director*



**Nelson Coelho**  
**Gerente de Certificação** *Certification Manager*

© A publicação integral deste certificado e dos relatórios anexos é permitida



DEKRA Certification B.V. Av. Gerônimo de Camargo, 2000 – Recreio Estoril - Atibaia / SP - CEP 12944-000 - Brasil

Tel.: +55 11 4418-7268 Webpage: <http://dekra.com.br/PTC/> - OCP 0089

DEKRA Certification B.V. Meander 1051, 6825 MJ Amhem P.O. Box 5185, 6802 ED Amhem, The Netherlands

T +31 88 96 83000 - F +31 88 96 83100 - [www.dekra-product-safety.com](http://www.dekra-product-safety.com) - Company registration 09085396

**Certificado número** *Certificate number* 6176791.31  
**Página** *Page* 2/5  
**Emissão** *Date of issue* 14/12/2023

A DEKRA por este meio deste declara que o produto acima mencionado foi certificado com base em um ensaio de tipo de acordo com as normas acima mencionadas, uma avaliação do local de produção com base em programa de certificação e portarias do Inmetro acima mencionadas e em um contrato de certificação sob número 6157856. DEKRA hereby declares that the above mentioned product has been certified on the basis of a type test according to the above mentioned standards, an inspection of the production location on the basis of above mentioned INMETRO certification programs or regulations and an agreement under number 6157856.

A DEKRA, como um Organismo de Certificação acreditado pela CGCRE (Coordenação Geral de Acreditação do Inmetro), por este meio deste concede o direito de uso do Selo de Identificação da Conformidade conforme item 11 e Anexo III da Portaria do Inmetro n.º 62:2022. DEKRA, as a Certification Body accredited by CGCRE (Coordenação Geral de Acreditação do Inmetro), hereby grants the right to use of the Seal of Conformity Identification as item 11 and Annex III of Inmetro Regulation n.º 62:2022.

**Certificado de Conformidade válido somente acompanhado das páginas de 1 a 5.**  
*This Certificate of Conformity is only valid when accompanied by pages 1 to 5.*

#### Localização da fábrica *Factory location*

Chun'an County, Hangzhou City, Zhejiang Province, China

#### Fabricante *Manufacturer*

Não aplicável *Not applicable*

#### Representante local *Local representative*

Não aplicável *Not applicable*

#### ESPECIFICAÇÃO DO PRODUTO CERTIFICADO *SPECIFICATION OF THE CERTIFIED PRODUCT*

**Produto** *Product* LED Luminária de Iluminação Pública *Street light LED*  
**Nome comercial** *Trade name* RAJIX  
**Modelo ensaiado** *Tested model* RLP0305E; RLP0505E; RLP1005E; RLP1505E; RLP2005E  
**Normas aplicáveis** *Applicable standards* Portaria INMETRO n.º 62:2022  
 Portaria INMETRO n.º 200:2021 (RGCP)  
**Tensão nominal** *Rated voltage* 110-277V  
**Frequência nominal** *Rated frequency* 50/60Hz  
**Entrada nominal** *Rated input* Verifique a tabela na página 1. *Check table on page 1*  
**Código de barras** *Bar code* Verifique a tabela na página 1. *Check table on page 1.*

#### LISTA DOS DOCUMENTOS DE CERTIFICAÇÃO *LIST OF CERTIFICATION DOCUMENTS*

**Relatório de ensaio** *Test report* 6176790.50P (2023-12-13)  
 DEKRA Testing and Certification (Shanghai) Ltd.  
**Relatório de avaliação da conformidade** *Conformity assessment report* DEKRA arquivo 6176791.00 *DEKRA file 6176791.00*  
**Relatório de auditoria** *Audit report* 6157857 (2023-04-24)  
 DEKRA Testing and Certification (Shanghai) Ltd.



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**Certificado número** *Certificate number* 6176791.31  
**Página** *Page* 3/5  
**Emissão** *Date of issue* 14/12/2023

## HISTÓRIA CERTIFICAÇÃO *CERTIFICATION HISTORY*

### Revisão

*Revision*

### Descrição das revisões *Description of the revisions*

Revisão	Data de emissão	Descrição das revisões
00	14/12/2023	Emissão Inicial <i>Initial issuance.</i>

### OBSERVAÇÕES *REMARKS*

O produto e quaisquer variações aceitáveis no mesmo estão especificados no certificado e nos documentos aqui referidos.  
*The product and any acceptable variation thereto is specified in this certificate and the documents herein referred to.*

A validade deste Certificado de Conformidade está atrelada à realização das avaliações de manutenção e tratamento de possíveis não conformidades, de acordo com as orientações emitidas pelo Organismo de Certificação de Produtos previstas nos Requisitos de Avaliação da Conformidade específicos. Para verificação da condição atualizada de regularidade deste Certificado de Conformidade deve ser consultado o banco de dados e services certificados do INMETRO. *The validity of this Certificate is subject to the realization of "regular continuance evaluations" and the processing of any possible non-compliance in accordance with guidelines issued by the Product Certification Body and specified in the particular Compliance Evaluation Requirements. To check the current condition of validity of this Certificate of Conformity, the database of products and services certified by INMETRO must be consulted.*

A marca de certificação do INMETRO deve ser aplicada ao produto conforme especificado neste certificado, pela duração do contrato de certificação do INMETRO de número 6157856 e de acordo com as condições do contrato de certificação. *The INMETRO certification mark shall be applied to the product as specified in this certificate for the duration of the INMETRO certification agreement with number 6157856 and under the conditions of the certification agreement.*

A versão inglesa deste certificado é líder. Em caso de discrepância, prevalece a versão inglesa.  
*The English version in this certificate is leading. In case of any discrepancy, the binding version is the English text.*

### Avaliado por *Checked by*

V.Zhang




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**Anexo A/ Annex A – Planilha de Especificações Técnicas - PET /Technical Specification Sheet**

**1 - DENOMINAÇÃO COMERCIAL**

MARCA	RAJIX
FORNECEDOR	RAJIX COMERCIAL LTDA
FABRICANTE	

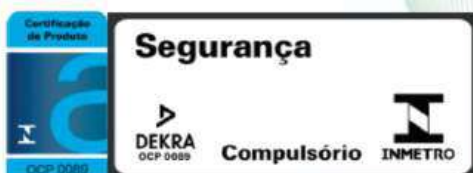
**02 - IDENTIFICAÇÃO DA FAMÍLIA**

FAMÍLIA (*)	LED Luminária de Iluminação Pública / REFOND / RF-W*HP32DS-AF-13 / IP66 / 50000h
MARCA / MODELO DO LED	LED Technology
TIPO DE LUMINÁRIA	Street light LED
VIDA DECLARADA (h)	50000h

(\*) Composição do Código da Família:

CÓDIGO DE BARRAS	MODELO	TENSÃO DE ENSAIO (V)	FREQ. (HZ)	POTÊNCIA (W)	FATOR DE POTÊNCIA	FLUXO LUMINOSO (lm)	RENDIMENTO ÓTICO (***) (%)	EE (***) (lm/W)	IRC	TCC (K)	Nº RELATÓRIO ENSAIO/ LABORATÓRIO
7898727311775	RLP0305E	110-277	50/60	30	>0.95	4200	/	140	>70	5000	6176790.50P
7898727311782	RLP0505E	110-277	50/60	50	>0.97	7000	/	140	>70	5000	6176790.50P
7898727311799	RLP1005E	110-277	50/60	100	>0.97	14000	/	140	>70	5000	6176790.50P
7898727311805	RLP1505E	110-277	50/60	150	>0.97	21000	/	140	>70	5000	6176790.50P
7898727311812	RLP2005E	110-277	50/60	200	>0.97	28000	/	140	>70	5000	6176790.50P

(\*\*) EE – Eficiência Energética. (\*\*\*) Aplicável somente para Luminárias com lâmpadas de descarga



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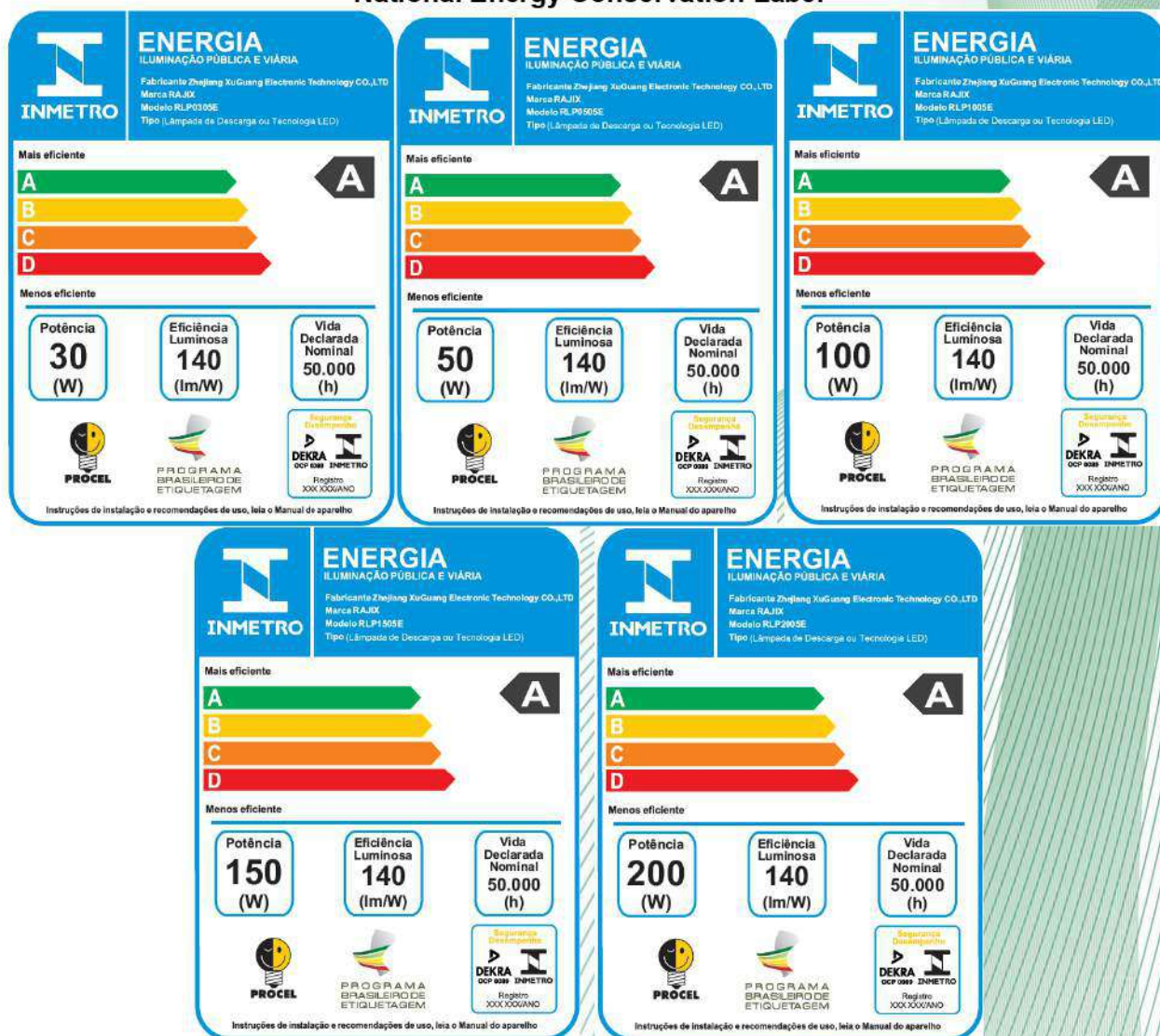
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## Anexo B/ Annex B – Etiqueta Nacional de Conservação de Energia - ENCE. / National Energy Conservation Label



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## Test Report Of ANSI/IES LM-80-15

### Approved Method for Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules

**Report Number**..... : N02A23050461L00901

**Client**..... : SHENZHEN ZHONGSHUN SEMICONDUCTOR OPTOELECTRONIC CO., LTD.

**Address**..... : Room no. 1015, 10th Floor, Yizhan Business Building, No. 8 Yizhan 4th Road,  
Shapu Community, Songgang Street, Bao'an District Shenzhen, Postal code  
518105, Guangdong Province, Republic of China

**Test Product Family** : PCT3030

**Test Part Number**..... : S-G3030

**Brand Name**..... :  **ZHONG SHUN**

**Testing Laboratory**... : Guangdong Meide Testing Technology Co., Ltd.

**Address**..... : 1st floor, B Area, Jinbaisheng Industrial Park, Headquarters 2 Road, Songshan  
Lake Hi-tech Industrial Development Zone, Dongguan City, Guangdong Pr., China.

**Testing Location**..... : As above

**Date of receipt**..... : 2021-03-22

**Date of test** ..... : 2021-04-06 to 2023-06-12

**Date of report**..... : 2023-06-12

**Tested by:**

*Jarvis Zhang*

Jarvis Zhang/ Test Engineer

**Checked by:**

*Sandy Chen*

Sandy Chen/ Project Engineer

**Approved by:**

*Jessie Li*

Jessie Li/ Technical Manager

Note 1: The test data was only valid for the test sample(s). This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or use in part without prior written consent from Guangdong Meide Testing Technology Co., Ltd. This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Note 2: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

TRF No.: 02-N005-1A  
Web: www.gtggroup.com

TRF Originator: GTG  
E-mail: info@gtggroup.com

TRF Date: 2022-07-01  
Tel.: 86-400 755 8988

**ENERGY STAR® LM-80 Cover Sheet****Administrative Information**

Tested Product Family: PCT3030

Tested Part Number: S-G3030

**DUT Identification**DUT manufacture's name: SHENZHEN ZHONGSHUN SEMICONDUCTOR  
OPTOELECTRONIC CO., LTD.

DUT identification, e.g., model number: S-G3030

Description of DUT, including if the DUT is an LED  
package or module: LED Package**DUT Characteristics**

Total input power(W): 1.2 W

Average current density per LED die(mA/mm<sup>2</sup>): 352 mA/mm<sup>2</sup>Average power density per LED die(W/mm<sup>2</sup>): 0.2816 W/mm<sup>2</sup>Representative CRI(Ra) of the tested sample set: 90  
(Indicate whether the reported value is the mean or  
Median value of the sample set, or per unit)

Minimum die edge to die edge spacing: 0.04mm



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## 1. General Information

### 1.1 Description of LED Light Sources

#### Sample Size:

225 pcs samples were received on 2021-03-22, the samples were numbered from S1 to S25, S26 to S50, S51 to S75, S76 to S100, S101 to S125, S126 to S150, S151 to S175, S176 to S200 and S201 to S225.

Manufacture: SHENZHEN ZHONGSHUN SEMICONDUCTOR OPTOELECTRONIC CO., LTD.

Product Family: PCT3030

Part Number: S-G3030

Part Type: LED Package

Drive Level: DC 90mA/160mA/200mA

Nominal CCT: 2700K

Power: 0.5W/1W/1.2W

CRI: 90

#### Sampling Method:

LED samples for IESNA LM-80 testing consist of units built from three manufacturing lots with each manufacturing lot built from different wafer lots built on non-consecutive days.

These manufacturing lots are picked to represent a wide parametric distribution.

#### Family products covered by this report:

According to ENERGY STAR® Requirements for the Use of LM-80 Data, the following products can be covered by this report base on the information and declaration provided by manufacturer. The information of these models shows that the covered products meet all section 4 requirements of ENERGY STAR® Requirements for the Use of LM-80 Data (September 28, 2017)

This report covers the following models:

Product Family	Part Number	CCT (K)	Number of dies	Current density per die (mA/mm <sup>2</sup> )	Current (mA)	Power density (W/mm <sup>2</sup> )	Power (W)	Die Spacing (mm)	Current of die (mA)
PCT3030	Test Model S-G3030	2700	6	352	200	0.0004	1.2	0.04	250
	S-G3030XXXX-0101XXX	2700	1	352	400	0.0004	1.2	0.04	250
	S-G3030XXXX-0102XXX	2700	2	352	400	0.0004	1.2	0.04	250
	S-G3030XXXX-0103XXX	2700	3	352	400	0.0004	1.2	0.04	250
	S-G3030XXXX-0104XXX	2700	4	352	400	0.0004	1.2	0.04	250
	S-G3030XXXX-0105XXX	2700	5	352	400	0.0004	1.2	0.04	250
	S-G3030XXXX-0106XXX	2700	6	352	400	0.0004	1.2	0.04	250
	S-G3030XXXX-0201XXX	2700	2	352	200	0.0004	1.2	0.04	250
	S-G3030XXXX-0202XXX	2700	4	352	200	0.0004	1.2	0.04	250
	S-G3030XXXX-0203XXX	2700	6	352	200	0.0004	1.2	0.04	250
	S-G3030XXXX-0301XXX	2700	3	352	135	0.0004	1.2	0.04	250
	S-G3030XXXX-0302XXX	2700	6	352	135	0.0004	1.2	0.04	250
	S-G3030XXXX-0401XXX	2700	4	352	100	0.0004	1.2	0.04	250
	S-G3030XXXX-0501XXX	2700	5	352	80	0.0004	1.2	0.04	250
	S-G3030XXXX-0601XXX	2700	6	352	70	0.0004	1.2	0.04	250

**Disclaimer:**

The truthfulness and accuracy of all the technical information above for the covered LED products is ensured by manufacturer of LED light source. Guangdong Meide Testing Technology Co., Ltd. isn't responsible or gives any guarantees for the truthfulness of the technical information.

**1.2 Standards Used**

- ANSI/IES LM-80-15 IES Approved Method for Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules
- ENERGY STAR® Requirements for the use of LM-80 Data (This standard was not accredited by NVLAP)

**1.3 Test equipment list**

Test Equipment	Serial No	Model No	Calibration due date
Integrating Sphere System	MD-E033	0.5m	2024/05/17
Standard Light Source	MD-E034	D062	2024/05/17
High Accuracy Array Spectroradio Meter	MD-E011	HAAS-3000	2023/09/17
Digital Power Meter	MD-E008	PF310	2023/09/17
Precision digital stabilized DC power supply	MD-E009	WY305	2023/09/17
Temperature Tester	MD-E038	UFS-D8036	2023/08/28

Statement of Traceability: Guangdong Meide Testing Technology Co., Ltd. attested that all calibration has been performed using suitable standards traceable to national primary standards and International System of Unit (SI).

**1.4 Drive Level**

Samples are driven with a constant direct current (DC) during maintenance test, photometric and electrical measurement. The current value was regulated to within  $\pm 3\%$  of the specified value of the manufacturer during maintenance test, and was within  $\pm 0.5\%$  during photometric and electrical measurement test.

**1.5 Ambient Conditions for Maintenance Test**

For lumen maintenance test, samples within one data set, were installed on cooling boards in thermal chambers with minimal ambient airflow. The case temperature and ambient temperature was monitored by thermocouples which one was soldered to the coldest DUTs' case ( $TMP_{LED}$ ) location, while the other is mounted at a distance of 5 mm above the TMP location. During life testing,  $TMP_{LED}$  of the coldest LEDs were maintained at a temperature that was greater than or equal to  $2^{\circ}\text{C}$  below the corresponding nominal case temperature. Surrounding air was maintained at a temperature that was greater than or equal to  $5^{\circ}\text{C}$  below the corresponding nominal case temperature. Thermocouples were shielded from direct DUT optical radiation

and comply with ASTM E230 Table 1 "Special Limits". Samples were connected to DC power supply in series circuits with a constant current. The forward current was regulated to within  $\pm 3\%$  of the specified value of the manufacturer. The relative humidity within chamber was kept less than 65% during test. For photometry measurement, the ambient temperature during test was set to  $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ ,  $\text{RH} < 65\%$ .

### 1.6 Photometric Measurement Method

Integrating sphere and spectroradiometer is used to measure luminous flux and chromaticity coordinate  $u'v'$ .  $2\pi$  measurement was used and sample was driven by DC power supply. The forward current was regulated to within  $\pm 0.5\%$  of the nominal value. The test system was calibrated by halogen reference lamp. The ambient temperature during test was set to  $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ , RH <65%. The temperature measurement point was located in the sphere and the temperature was detected by a temperature probe. The uncertainty of the light output (luminous flux) measurements is  $U=2.1\%$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is  $U=18\text{K}$  ( $K=2$ ), at the 95% confidence level. The uncertainty of the temperature is  $U=0.5^{\circ}\text{C}$  ( $K=2$ ), at the 95% confidence level.

**1.7 Sample Set**

<b>Data Set 1:55°C,90mA</b>	
Part number:	S-G3030
Number of Units:	25
Case Temperature( $T_S$ ):	>53°C
Ambient Temperature( $T_A$ ):	>50°C
Life Test Drive Current:	90mA
Measurement Current:	90mA

<b>Data Set 2:85°C,90mA</b>	
Part number:	S-G3030
Number of Units:	25
Case Temperature( $T_S$ ):	>83°C
Ambient Temperature( $T_A$ ):	>80°C
Life Test Drive Current:	90mA
Measurement Current:	90mA

<b>Data Set 3:105°C,90mA</b>	
Part number:	S-G3030
Number of Units:	25
Case Temperature( $T_S$ ):	>103°C
Ambient Temperature( $T_A$ ):	>100°C
Life Test Drive Current:	90mA
Measurement Current:	90mA

<b>Data Set 4:55°C,160mA</b>	
Part number:	S-G3030
Number of Units:	25
Case Temperature( $T_S$ ):	>53°C
Ambient Temperature( $T_A$ ):	>50°C
Life Test Drive Current:	160mA
Measurement Current:	160mA

<b>Data Set 5:85°C,160mA</b>	
Part number:	S-G3030
Number of Units:	25
Case Temperature( $T_S$ ):	>83°C
Ambient Temperature( $T_A$ ):	>80°C
Life Test Drive Current:	160mA
Measurement Current:	160mA

<b>Data Set 6:105°C,160mA</b>	
Part number:	S-G3030
Number of Units:	25
Case Temperature( $T_S$ ):	>103°C
Ambient Temperature( $T_A$ ):	>100°C
Life Test Drive Current:	160mA
Measurement Current:	160mA

<b>Data Set 7:55°C,200mA</b>	
Part number:	S-G3030
Number of Units:	25
Case Temperature( $T_S$ ):	>53°C
Ambient Temperature( $T_A$ ):	>50°C
Life Test Drive Current:	200mA
Measurement Current:	200mA

<b>Data Set 8:85°C,200mA</b>	
Part number:	S-G3030
Number of Units:	25
Case Temperature( $T_S$ ):	>83°C
Ambient Temperature( $T_A$ ):	>80°C
Life Test Drive Current:	200mA
Measurement Current:	200mA

<b>Data Set 9:105°C,200mA</b>	
Part number:	S-G3030
Number of Units:	25
Case Temperature( $T_S$ ):	>103°C
Ambient Temperature( $T_A$ ):	>100°C
Life Test Drive Current:	200mA
Measurement Current:	200mA

## 2. Summary of Test Result

Data Set:	Nominal Case & Ambient Temp.	Drive Current	Sample Size	Failures Observed:	Test Interval	Test Duration	Reported TM-21 L <sub>70</sub> Lifetime	Reported TM-21 L <sub>80</sub> Lifetime	Reported TM-21 L <sub>90</sub> Lifetime
1	55°C	90mA	25	0	1000hrs	18000hrs	>108000hrs	>108000hrs	>108000hrs
2	85°C	90mA	25	0	1000hrs	18000hrs	>108000hrs	>108000hrs	>108000hrs
3	105°C	90mA	25	0	1000hrs	18000hrs	>108000hrs	>108000hrs	103000hrs
4	55°C	160mA	25	0	1000hrs	18000hrs	>108000hrs	>108000hrs	>108000hrs
5	85°C	160mA	25	0	1000hrs	18000hrs	>108000hrs	>108000hrs	100000hrs
6	105°C	160mA	25	0	1000hrs	18000hrs	>108000hrs	>108000hrs	88000hrs
7	55°C	200mA	25	0	1000hrs	18000hrs	>108000hrs	>108000hrs	53000hrs
8	85°C	200mA	25	0	1000hrs	18000hrs	>108000hrs	103000hrs	48000hrs
9	105°C	200mA	25	0	1000hrs	18000hrs	>108000hrs	89000hrs	42000hrs

Data Set:	Nominal Case & Ambient Temp.	Drive Current	Sample Size	Failures Observed:	Test Interval	Test Duration	Reported TM-21 Q <sub>90</sub> Lifetime(400-700nm)	Reported TM-21 Q <sub>90</sub> Lifetime (700-800nm)
1	55°C	90mA	25	0	1000hrs	18000hrs	>108000hrs	>108000hrs
2	85°C	90mA	25	0	1000hrs	18000hrs	>108000hrs	>108000hrs
3	105°C	90mA	25	0	1000hrs	18000hrs	102000hrs	103000hrs
4	55°C	160mA	25	0	1000hrs	18000hrs	>108000hrs	>108000hrs
5	85°C	160mA	25	0	1000hrs	18000hrs	99000hrs	99000hrs
6	105°C	160mA	25	0	1000hrs	18000hrs	87000hrs	86000hrs
7	55°C	200mA	25	0	1000hrs	18000hrs	52000hrs	51000hrs
8	85°C	200mA	25	0	1000hrs	18000hrs	47000hrs	48000hrs
9	105°C	200mA	25	0	1000hrs	18000hrs	41000hrs	42000hrs

### Data Set 1:55°C,90mA:

Metric	L <sub>70</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	531000	537000	549000	556000	568000	576000	605000	618000	692000
Metric	L <sub>80</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	331000	335000	342000	347000	354000	359000	378000	385000	431000
Metric	L <sub>90</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	154000	157000	160000	163000	166000	168000	177000	179000	201000

Data Set 2:85°C,90mA:

Metric	L <sub>70</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	382000	386000	394000	402000	412000	415000	421000	429000	436000
Metric	L <sub>80</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	238000	240000	246000	250000	257000	258000	262000	267000	272000
Metric	L <sub>90</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	111000	112000	115000	116000	120000	120000	122000	125000	127000

Data Set 3:105°C,90mA:

Metric	L <sub>70</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	335000	348000	356000	358000	365000	369000	377000	379000	386000
Metric	L <sub>80</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	208000	216000	221000	222000	226000	229000	234000	235000	239000
Metric	L <sub>90</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	97000	99000	101000	102000	104000	105000	107000	108000	110000

Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
1	100.24%	100.11%	99.98%	99.85%	99.72%	99.59%	99.49%	99.39%	99.29%	99.21%	99.13%	99.06%	99.00%	98.93%	98.87%	98.83%	98.78%	98.73%
2	100.14%	100.02%	99.90%	99.75%	99.59%	99.43%	99.29%	99.14%	99.00%	98.89%	98.78%	98.67%	98.59%	98.51%	98.44%	98.36%	98.29%	98.21%
3	100.05%	99.91%	99.76%	99.57%	99.39%	99.18%	99.01%	98.84%	98.67%	98.53%	98.42%	98.32%	98.25%	98.15%	98.06%	97.98%	97.87%	97.76%

Average Photon Flux Maintenance, Photosynthetic (PFMp) (Percentage of Initial Photosynthetic Photon Flux)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
1	100.22%	100.11%	100.00%	99.86%	99.73%	99.60%	99.51%	99.42%	99.33%	99.25%	99.16%	99.08%	99.01%	98.94%	98.87%	98.80%	98.75%	98.68%
2	100.12%	100.00%	99.89%	99.70%	99.51%	99.32%	99.19%	99.07%	98.94%	98.83%	98.72%	98.61%	98.51%	98.41%	98.31%	98.25%	98.19%	98.13%
3	100.02%	99.85%	99.69%	99.47%	99.26%	99.05%	98.87%	98.72%	98.56%	98.45%	98.34%	98.22%	98.11%	98.02%	97.93%	97.85%	97.76%	97.68%

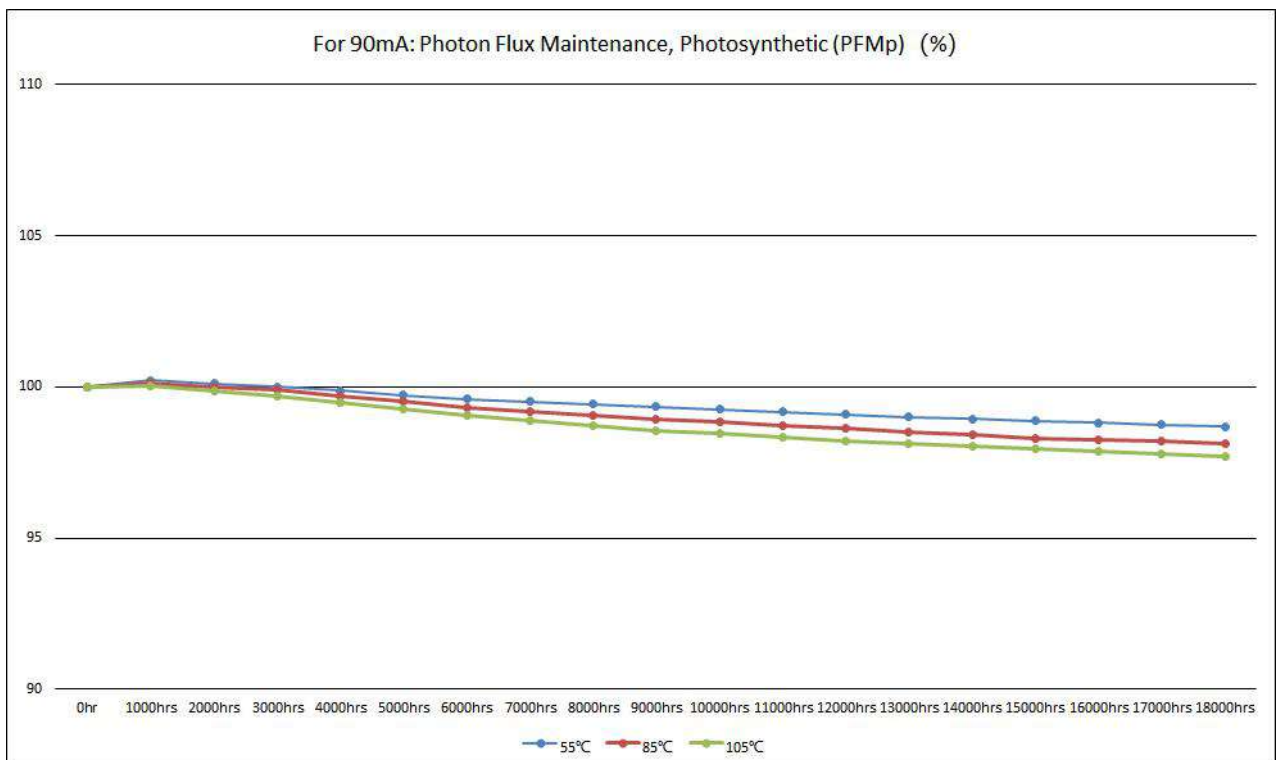
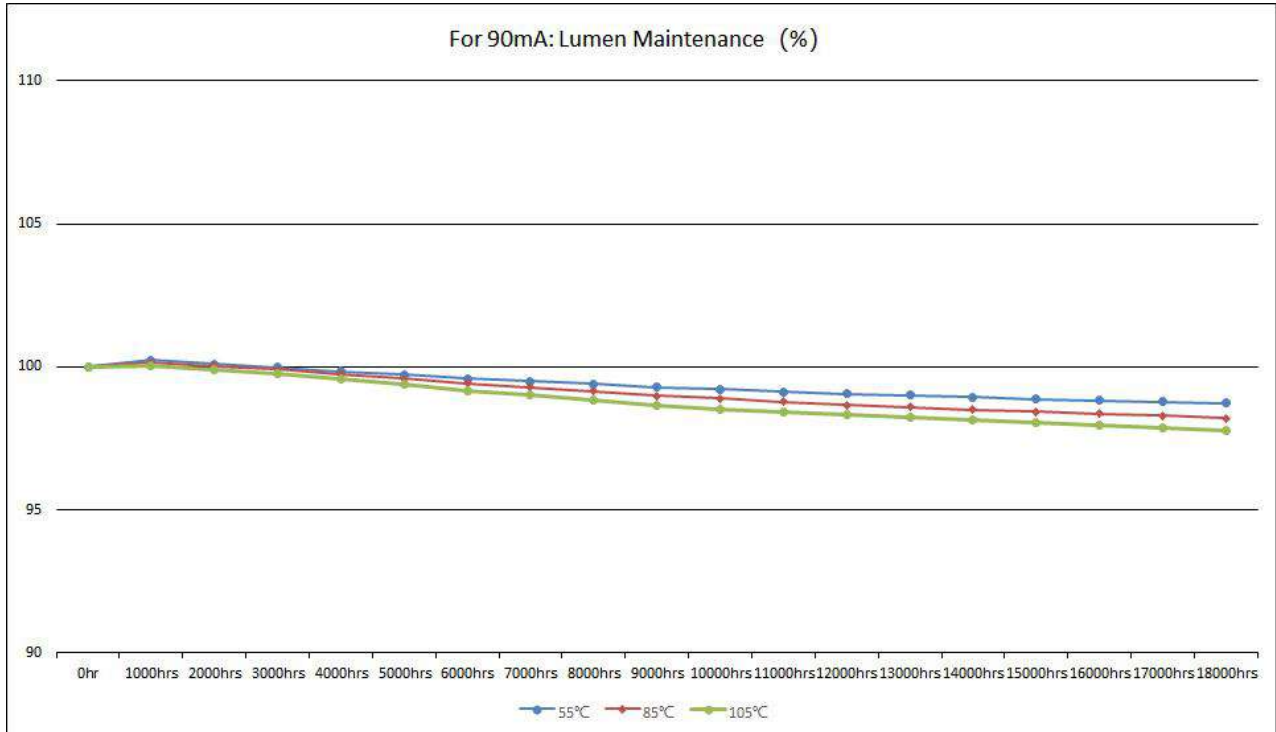
Average Photon Flux Maintenance, Far-Red (PFMR) (Percentage of Initial Far-Red Photon Flux)

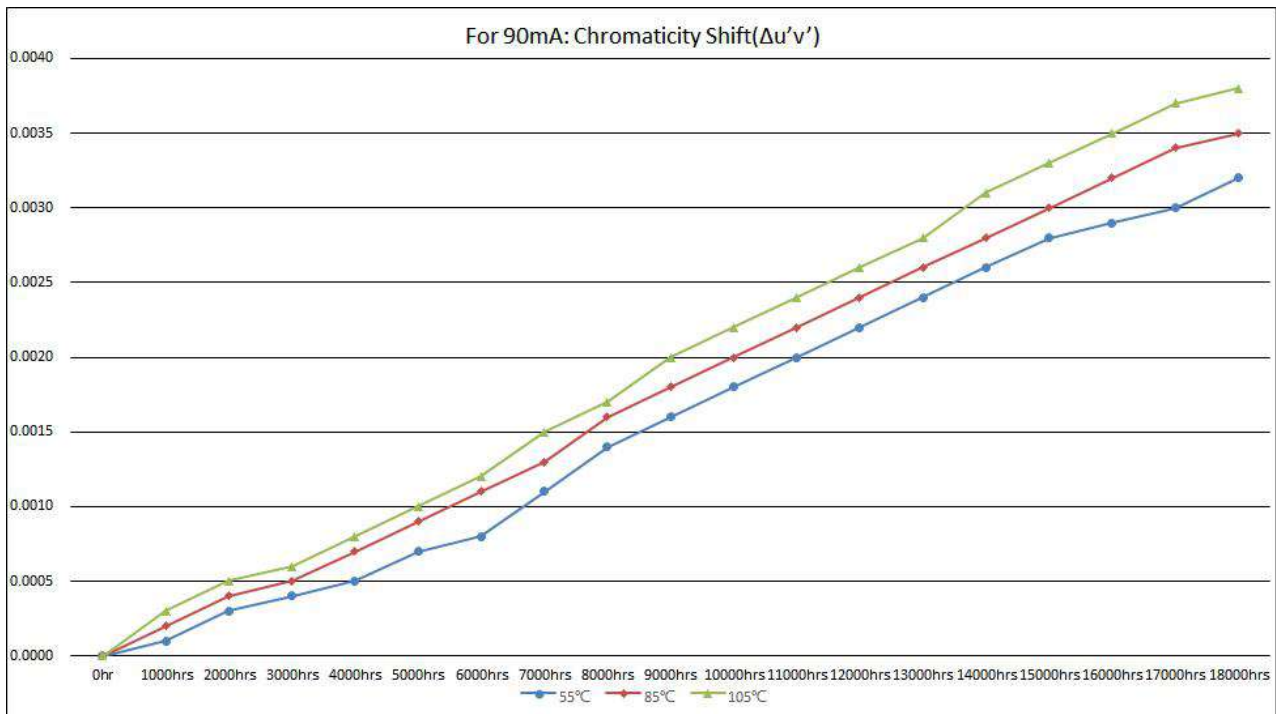
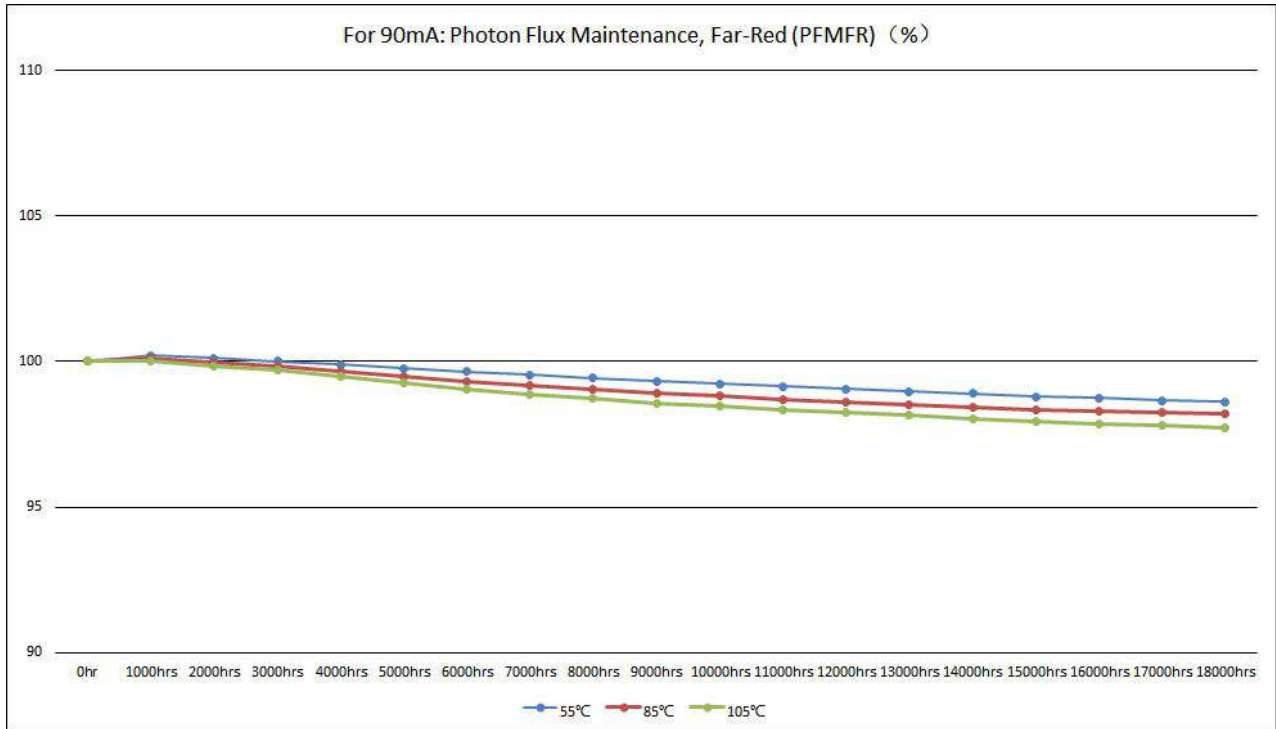
Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
1	100.20%	100.11%	100.02%	99.89%	99.77%	99.65%	99.54%	99.43%	99.33%	99.24%	99.15%	99.06%	98.98%	98.90%	98.80%	98.74%	98.67%	98.61%
2	100.09%	99.98%	99.85%	99.67%	99.49%	99.30%	99.17%	99.05%	98.93%	98.82%	98.71%	98.59%	98.51%	98.43%	98.36%	98.31%	98.25%	98.19%
3	100.01%	99.85%	99.70%	99.50%	99.28%	99.06%	98.89%	98.74%	98.58%	98.46%	98.36%	98.26%	98.15%	98.06%	97.96%	97.88%	97.80%	97.72%



Average Chromaticity Shift ( $\Delta u'v'$ )

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
1	0.0001	0.0003	0.0004	0.0005	0.0007	0.0008	0.0011	0.0014	0.0016	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0029	0.0030	0.0032
2	0.0002	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0016	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0032	0.0034	0.0035
3	0.0003	0.0005	0.0006	0.0008	0.0010	0.0012	0.0015	0.0017	0.0020	0.0022	0.0024	0.0026	0.0028	0.0031	0.0033	0.0035	0.0037	0.0038





**Data Set 4:55°C,160mA:**

Metric	L <sub>70</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	408000	413000	424000	426000	428000	434000	444000	446000	456000
Metric	L <sub>80</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	255000	258000	265000	266000	267000	271000	277000	278000	284000
Metric	L <sub>90</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	120000	121000	124000	125000	126000	127000	129000	130000	133000

**Data Set 5:85°C,160mA:**

Metric	L <sub>70</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	328000	335000	341000	344000	349000	356000	363000	366000	370000
Metric	L <sub>80</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	204000	209000	211000	214000	217000	221000	225000	228000	230000
Metric	L <sub>90</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	95000	97000	98000	100000	101000	102000	104000	105000	106000

**Data Set 6:105°C,160mA:**

Metric	L <sub>70</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	295000	296000	303000	309000	315000	317000	322000	322000	324000
Metric	L <sub>80</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	183000	184000	188000	191000	195000	196000	199000	199000	201000
Metric	L <sub>90</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	84000	85000	87000	87000	89000	90000	91000	91000	92000

**Average Lumen Maintenance (Percentage of Initial Luminous Flux)**

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
1	100.20%	100.09%	99.96%	99.82%	99.67%	99.53%	99.39%	99.25%	99.12%	99.02%	98.92%	98.82%	98.74%	98.66%	98.59%	98.52%	98.44%	98.36%
2	100.08%	99.96%	99.84%	99.64%	99.44%	99.25%	99.09%	98.93%	98.77%	98.65%	98.54%	98.45%	98.34%	98.24%	98.13%	98.04%	97.95%	97.88%
3	99.99%	99.82%	99.62%	99.42%	99.22%	99.02%	98.84%	98.66%	98.48%	98.35%	98.22%	98.08%	97.97%	97.85%	97.74%	97.65%	97.57%	97.49%

Average Photon Flux Maintenance, Photosynthetic (PFMp) (Percentage of Initial Photosynthetic Photon Flux)

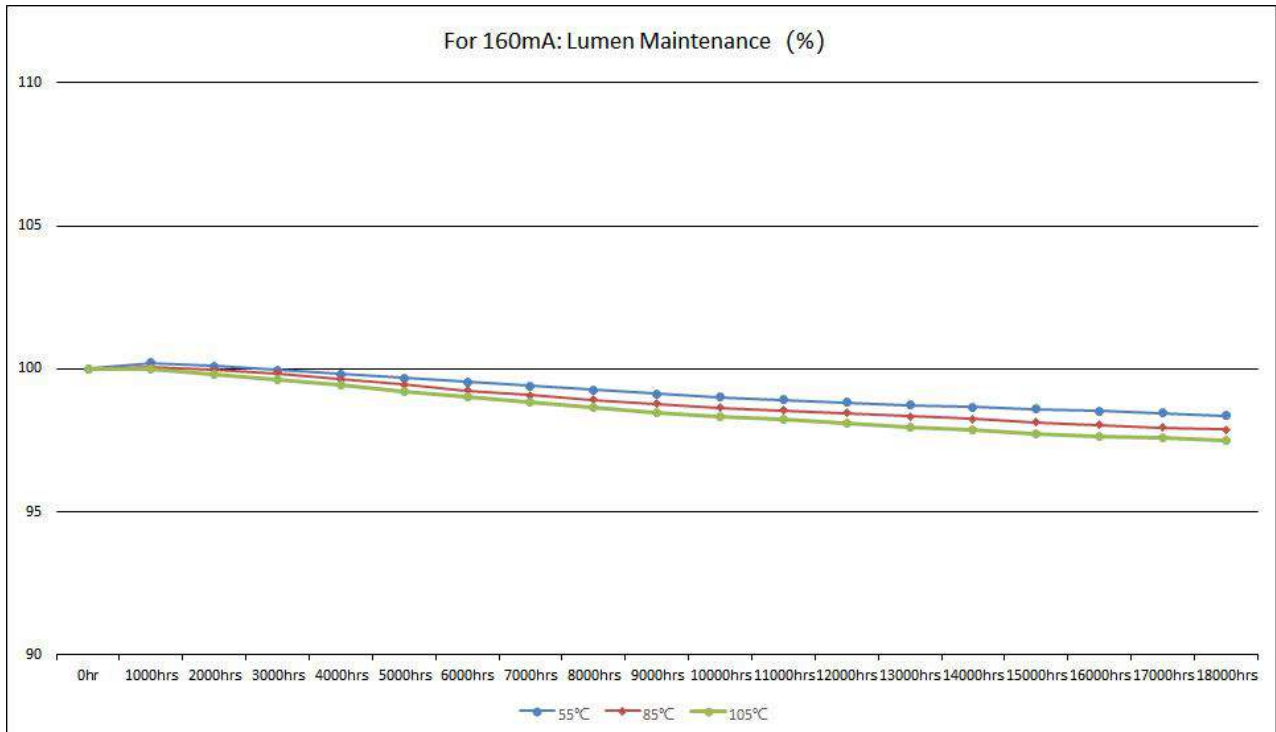
Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
1	100.18%	100.07%	99.95%	99.79%	99.63%	99.48%	99.36%	99.24%	99.13%	99.01%	98.90%	98.79%	98.70%	98.62%	98.54%	98.46%	98.39%	98.31%
2	100.06%	99.89%	99.73%	99.55%	99.38%	99.21%	99.04%	98.90%	98.74%	98.59%	98.48%	98.36%	98.26%	98.19%	98.08%	97.99%	97.90%	97.81%
3	99.98%	99.78%	99.56%	99.33%	99.10%	98.90%	98.71%	98.54%	98.39%	98.24%	98.10%	97.96%	97.86%	97.76%	97.66%	97.54%	97.45%	97.38%

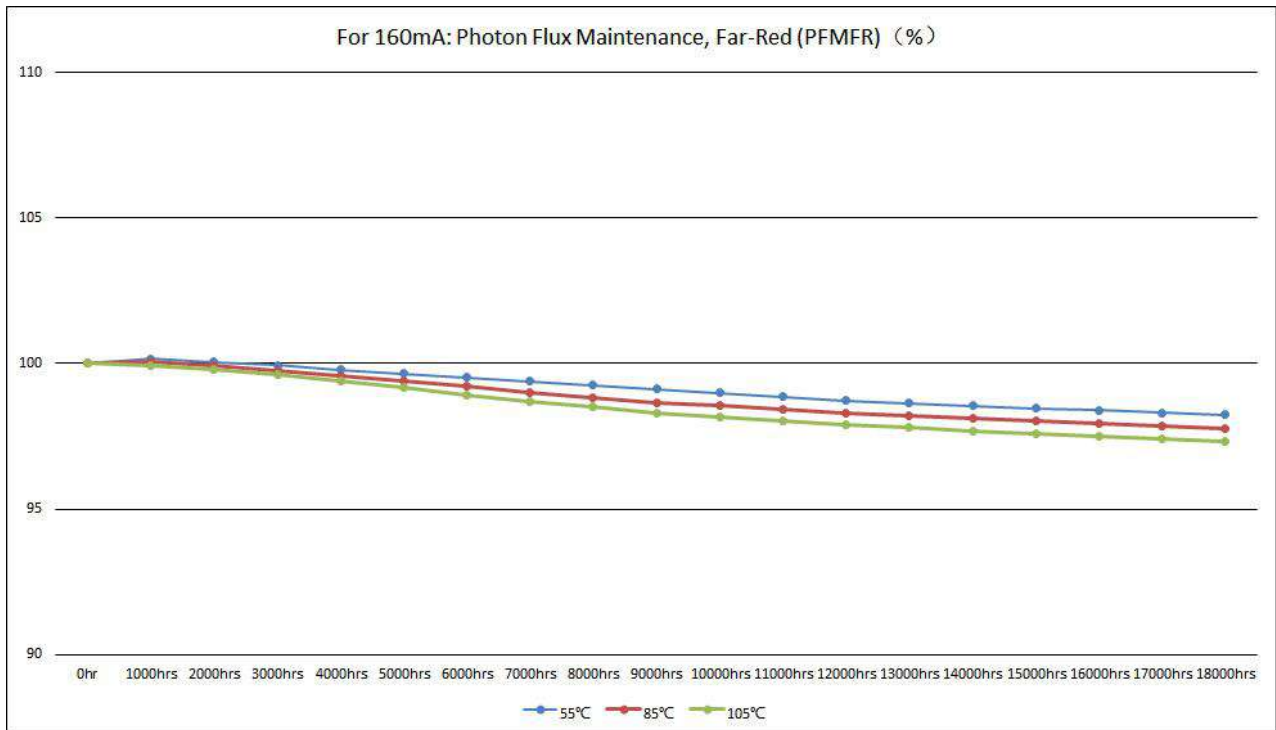
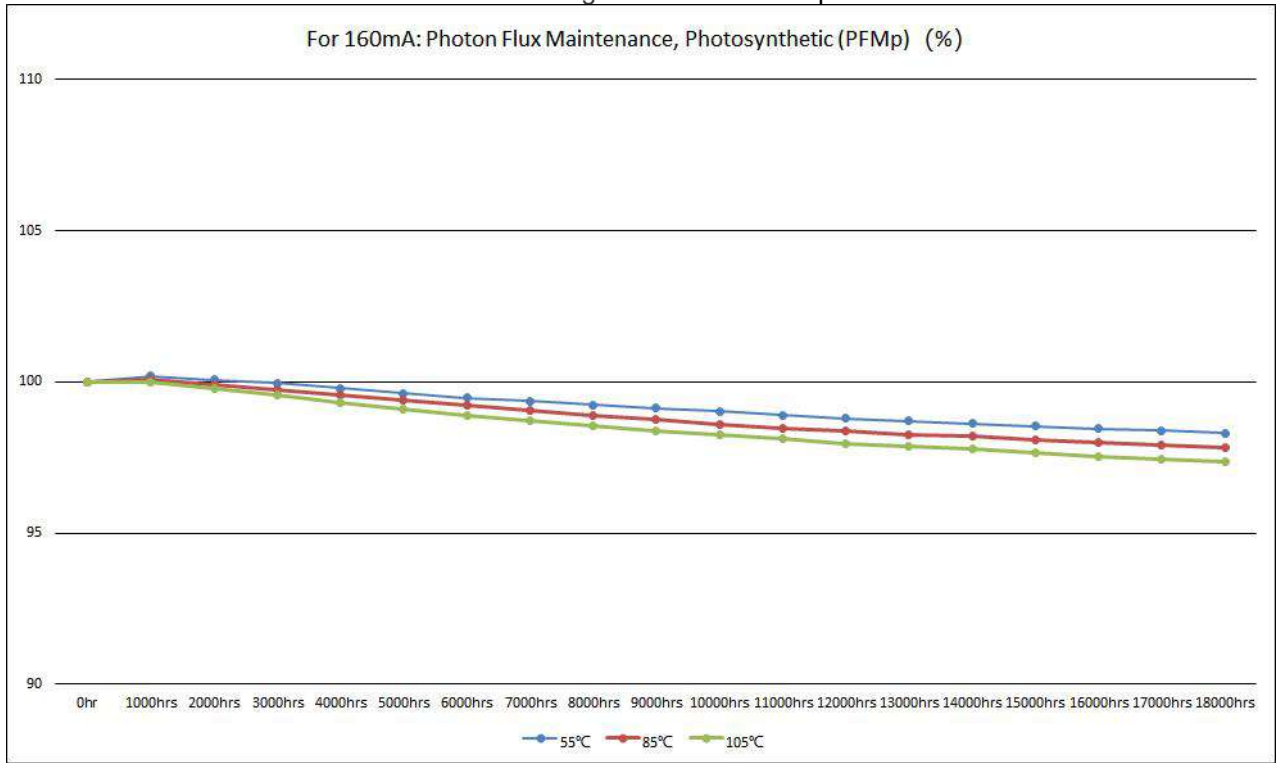
Average Photon Flux Maintenance, Far-Red (PFMR) (Percentage of Initial Far-Red Photon Flux)

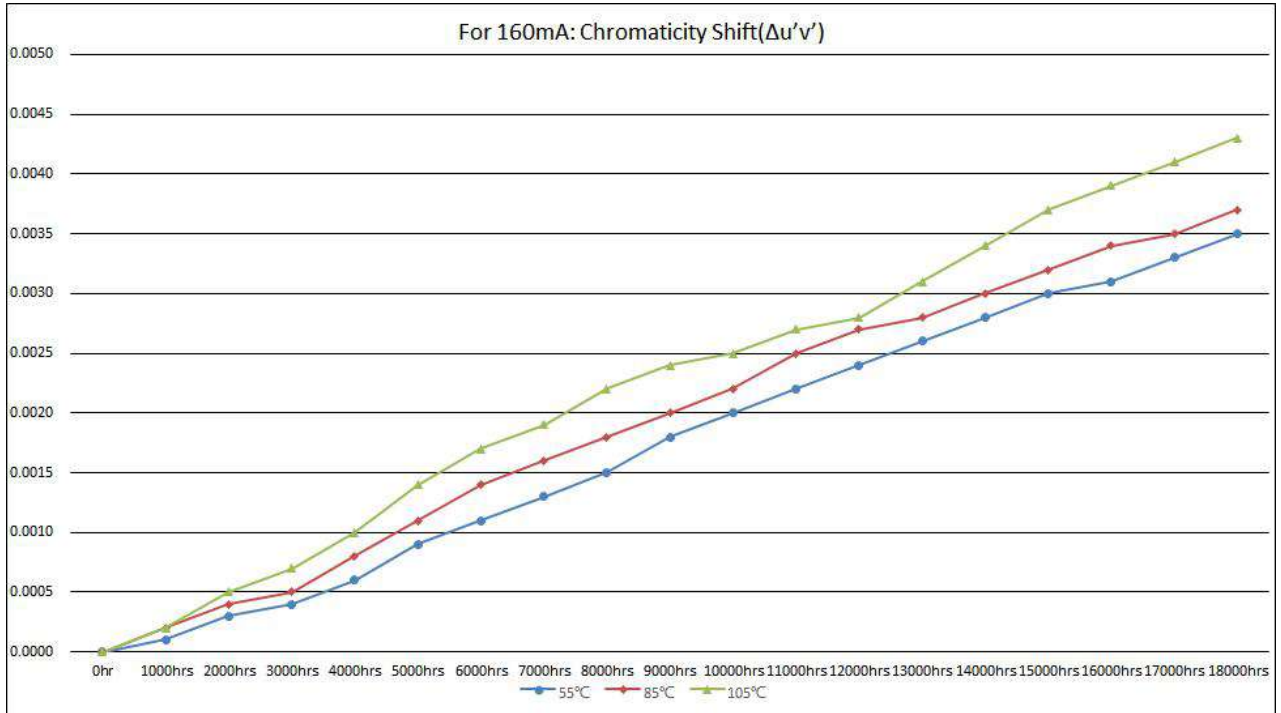
Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
1	100.16%	100.05%	99.94%	99.80%	99.66%	99.52%	99.39%	99.26%	99.12%	98.99%	98.86%	98.74%	98.65%	98.56%	98.47%	98.39%	98.31%	98.25%
2	100.05%	99.92%	99.75%	99.57%	99.40%	99.22%	99.02%	98.81%	98.67%	98.55%	98.43%	98.31%	98.23%	98.11%	98.03%	97.94%	97.86%	97.76%
3	99.95%	99.79%	99.60%	99.38%	99.17%	98.92%	98.70%	98.51%	98.32%	98.17%	98.03%	97.92%	97.81%	97.69%	97.58%	97.49%	97.40%	97.31%

Average Chromaticity Shift ( $\Delta u'v'$ )

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
1	0.0001	0.0003	0.0004	0.0006	0.0009	0.0011	0.0013	0.0015	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0031	0.0033	0.0035
2	0.0002	0.0004	0.0005	0.0008	0.0011	0.0014	0.0016	0.0018	0.0020	0.0022	0.0025	0.0027	0.0028	0.0030	0.0032	0.0034	0.0035	0.0037
3	0.0002	0.0005	0.0007	0.0010	0.0014	0.0017	0.0019	0.0022	0.0024	0.0025	0.0027	0.0028	0.0031	0.0034	0.0037	0.0039	0.0041	0.0043







**Data Set 7:55°C,200mA:**

Metric	L <sub>70</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	166000	172000	175000	176000	178000	179000	183000	185000	193000
Metric	L <sub>80</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	104000	108000	110000	110000	111000	112000	115000	116000	121000
Metric	L <sub>90</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	50000	51000	52000	53000	53000	54000	54000	55000	57000

**Data Set 8:85°C,200mA:**

Metric	L <sub>70</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	152000	157000	165000	165000	167000	169000	176000	177000	183000
Metric	L <sub>80</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	95000	98000	103000	103000	104000	105000	109000	110000	114000
Metric	L <sub>90</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	45000	46000	48000	48000	49000	49000	50000	50000	53000

**Data Set 9:105°C,200mA:**

Metric	L <sub>70</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	135000	136000	141000	144000	145000	146000	147000	150000	152000
Metric	L <sub>80</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	84000	85000	88000	89000	90000	91000	92000	93000	94000
Metric	L <sub>90</sub> B <sub>y</sub>								
y	10	20	30	40	50	60	70	80	90
hour	39000	40000	41000	42000	42000	42000	43000	43000	44000

**Average Lumen Maintenance (Percentage of Initial Luminous Flux)**

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
1	100.16%	99.97%	99.80%	99.58%	99.36%	99.13%	98.87%	98.63%	98.38%	98.15%	97.94%	97.72%	97.53%	97.34%	97.13%	96.96%	96.78%	96.59%
2	100.05%	99.85%	99.63%	99.37%	99.11%	98.84%	98.55%	98.24%	97.94%	97.64%	97.40%	97.17%	96.97%	96.75%	96.54%	96.35%	96.20%	96.07%
3	99.94%	99.73%	99.51%	99.20%	98.89%	98.59%	98.26%	97.94%	97.61%	97.33%	97.07%	96.80%	96.56%	96.33%	96.09%	95.87%	95.66%	95.47%

Average Photon Flux Maintenance, Photosynthetic (PFMp) (Percentage of Initial Photosynthetic Photon Flux)

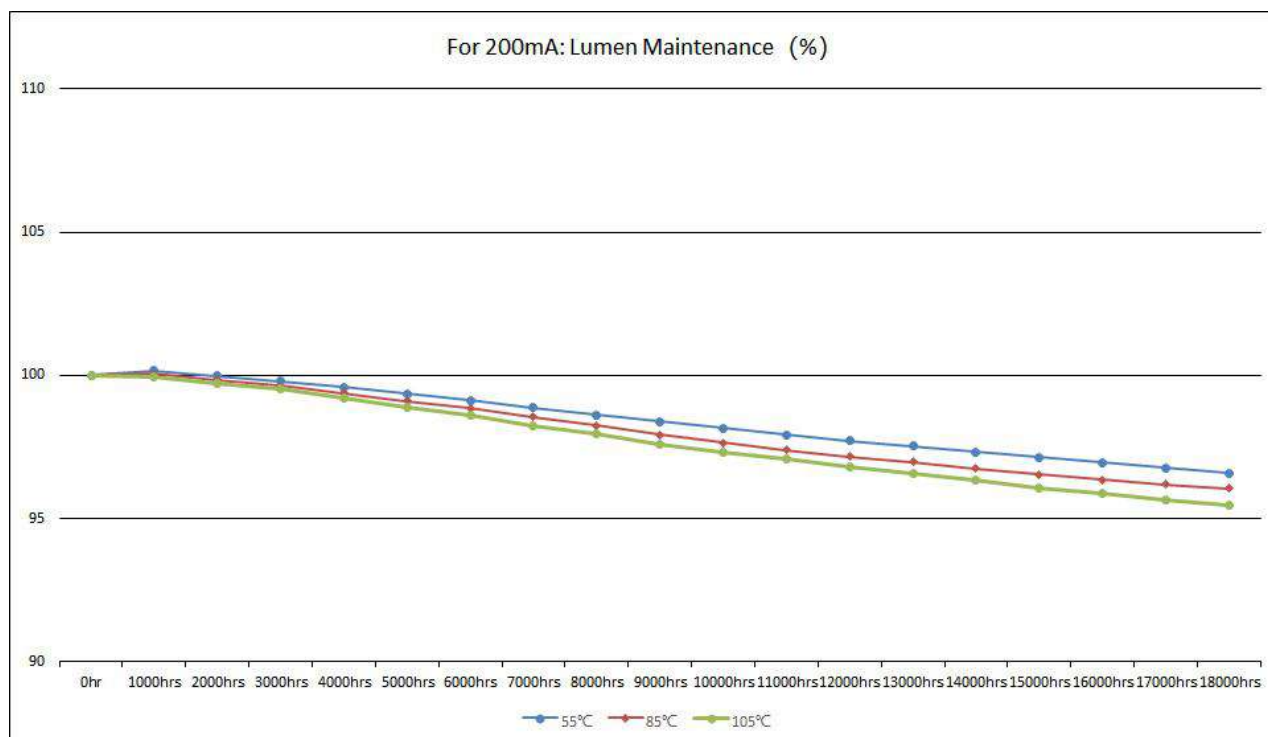
Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
1	100.12%	99.96%	99.80%	99.58%	99.35%	99.12%	98.85%	98.58%	98.30%	98.04%	97.78%	97.52%	97.34%	97.16%	96.98%	96.82%	96.66%	96.52%
2	100.03%	99.85%	99.66%	99.36%	99.08%	98.79%	98.49%	98.19%	97.88%	97.61%	97.34%	97.08%	96.87%	96.67%	96.46%	96.29%	96.13%	95.96%
3	99.93%	99.70%	99.48%	99.16%	98.85%	98.54%	98.20%	97.86%	97.52%	97.27%	97.02%	96.77%	96.52%	96.28%	96.03%	95.80%	95.57%	95.34%

Average Photon Flux Maintenance, Far-Red (PFMR) (Percentage of Initial Far-Red Photon Flux)

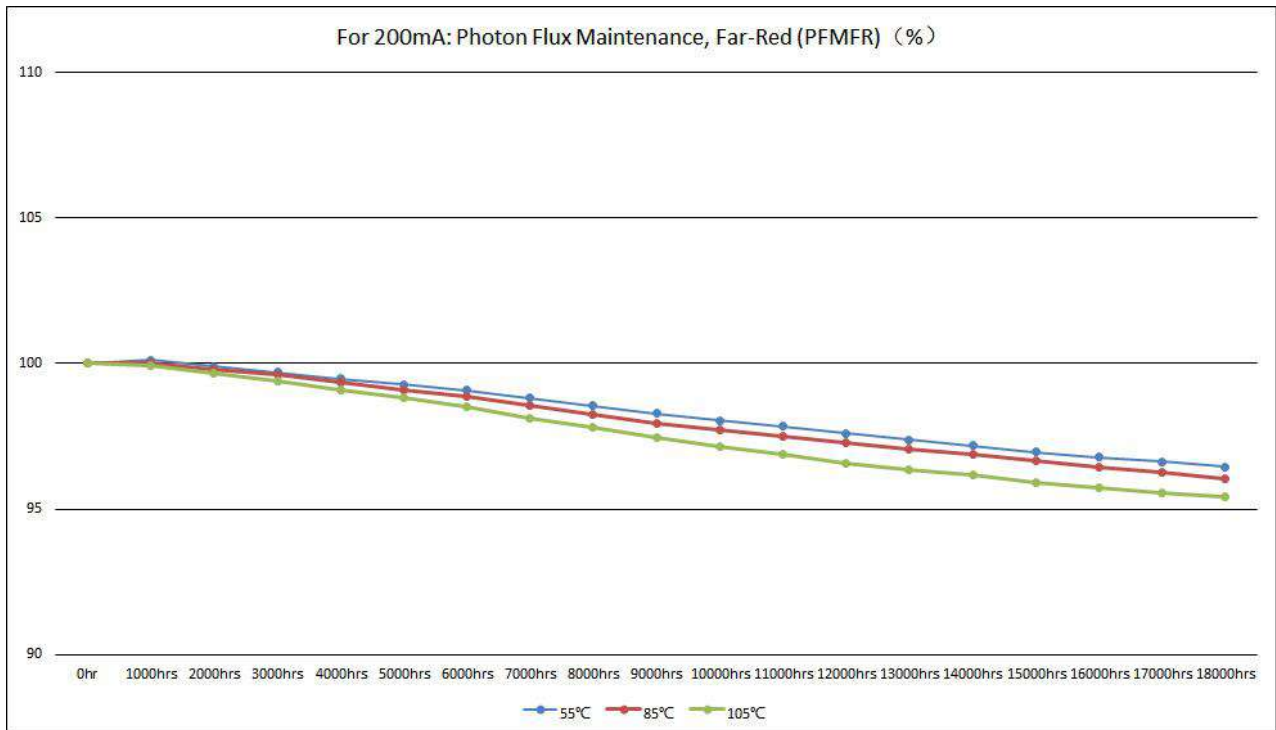
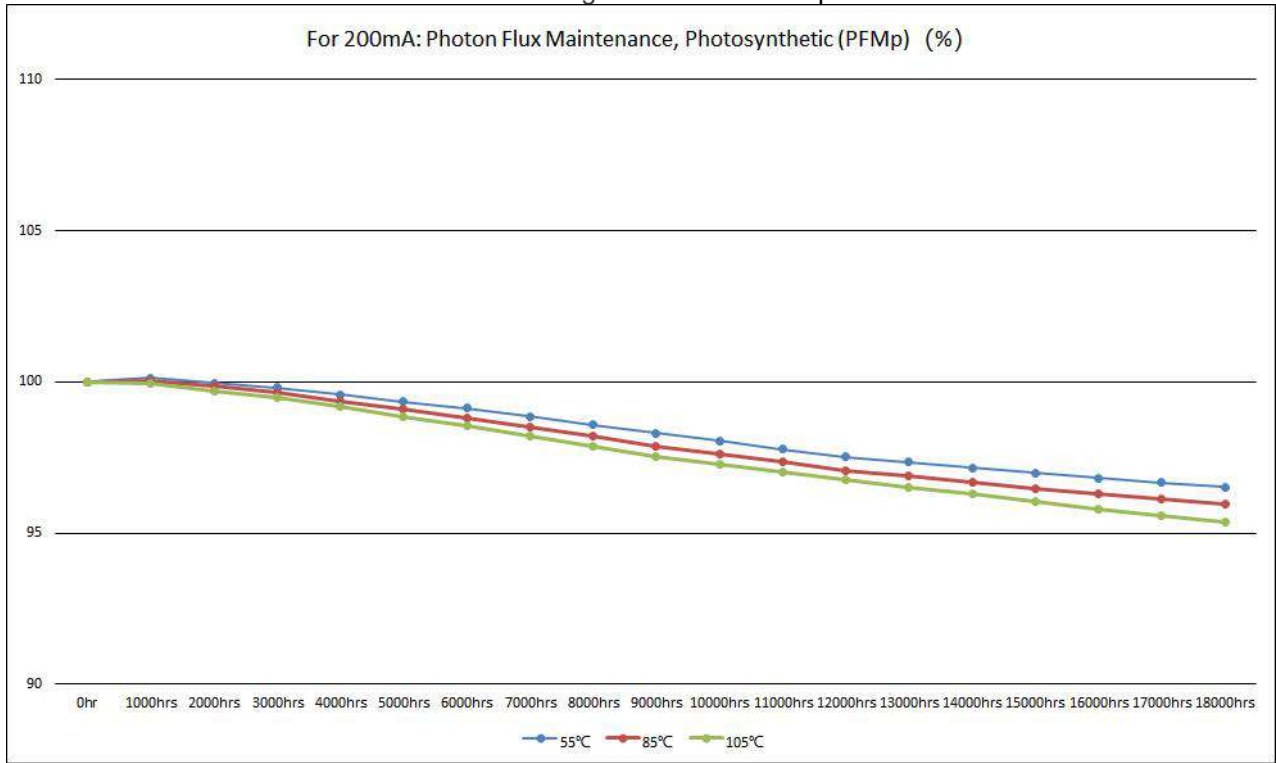
Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
1	100.13%	99.91%	99.69%	99.49%	99.28%	99.08%	98.81%	98.55%	98.29%	98.05%	97.84%	97.59%	97.39%	97.17%	96.96%	96.80%	96.64%	96.46%
2	100.04%	99.81%	99.60%	99.36%	99.11%	98.87%	98.56%	98.26%	97.96%	97.73%	97.51%	97.28%	97.08%	96.88%	96.67%	96.46%	96.25%	96.03%
3	99.92%	99.67%	99.42%	99.11%	98.81%	98.50%	98.14%	97.81%	97.45%	97.17%	96.88%	96.58%	96.37%	96.16%	95.91%	95.75%	95.58%	95.41%

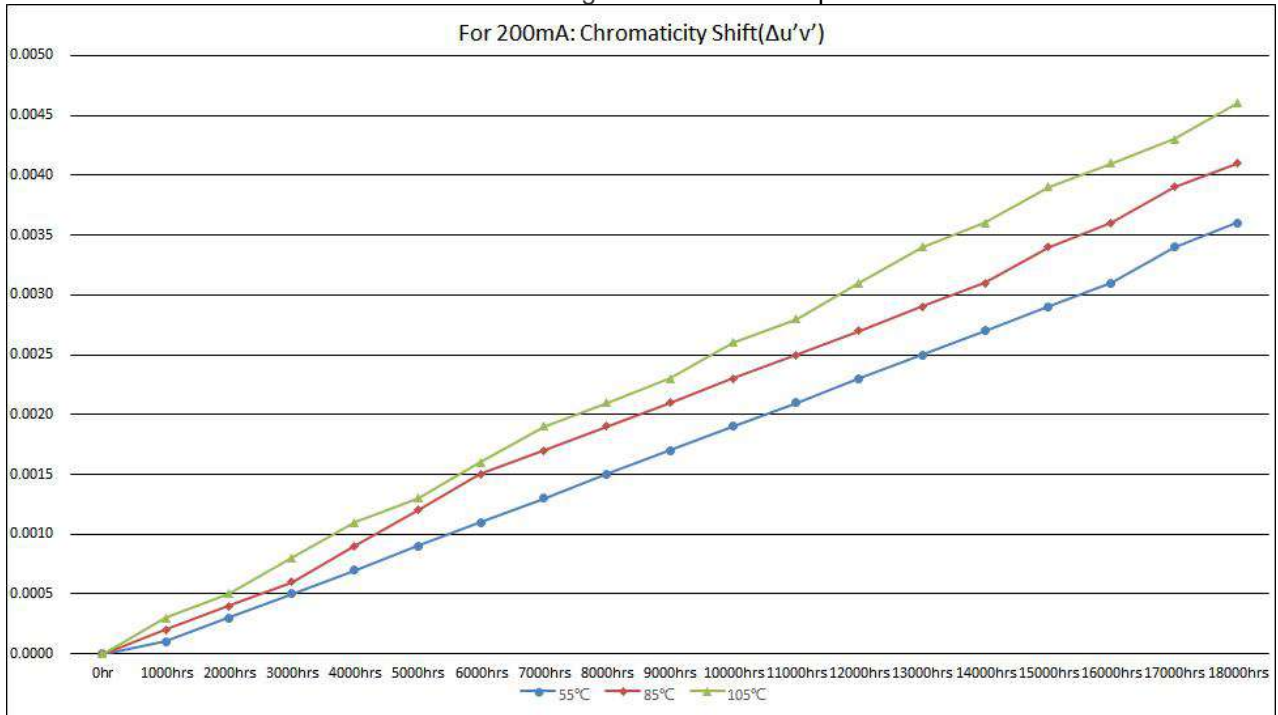
Average Chromaticity Shift ( $\Delta u'v'$ )

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs	18000hrs
1	0.0001	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0031	0.0034	0.0036
2	0.0002	0.0004	0.0006	0.0009	0.0012	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0031	0.0034	0.0036	0.0039	0.0041
3	0.0003	0.0005	0.0008	0.0011	0.0013	0.0016	0.0019	0.0021	0.0023	0.0026	0.0028	0.0031	0.0034	0.0036	0.0039	0.0041	0.0043	0.0046









3. Test Data

3.1 Data Set 1, 55°C, 90mA (Lumen Maintenance)

Sample Number	Φ(lm)	Lumen Maintenance (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S1	82.10	100.28	100.15	100.02	99.91	99.77	99.64	99.56	99.45	99.37	99.28	99.21	99.14	99.09	99.00	98.96	98.93	98.89	98.86
S2	81.87	100.20	100.07	99.94	99.82	99.69	99.57	99.50	99.38	99.27	99.20	99.11	99.02	98.98	98.89	98.84	98.80	98.75	98.69
S3	81.84	100.26	100.13	100.01	99.89	99.75	99.62	99.54	99.43	99.32	99.23	99.14	99.07	99.02	98.93	98.89	98.82	98.77	98.74
S4	81.59	100.29	100.16	100.03	99.92	99.78	99.66	99.55	99.44	99.36	99.27	99.20	99.13	99.08	99.03	98.99	98.95	98.92	98.89
S5	81.59	100.26	100.14	100.01	99.89	99.75	99.62	99.54	99.43	99.32	99.25	99.18	99.10	99.05	98.96	98.87	98.84	98.81	98.77
S6	81.69	100.26	100.13	100.00	99.87	99.73	99.60	99.48	99.40	99.33	99.26	99.17	99.08	99.03	98.99	98.90	98.87	98.83	98.79
S7	81.95	100.24	100.11	99.97	99.84	99.70	99.57	99.49	99.38	99.30	99.21	99.13	99.06	99.00	98.95	98.90	98.83	98.78	98.73
S8	82.03	100.23	100.10	99.98	99.86	99.74	99.60	99.49	99.38	99.26	99.17	99.10	99.03	98.99	98.95	98.90	98.87	98.84	98.80
S9	81.74	100.27	100.14	100.01	99.88	99.74	99.61	99.53	99.42	99.30	99.21	99.14	99.07	98.98	98.89	98.84	98.77	98.71	98.66
S10	81.54	100.19	100.07	99.94	99.80	99.67	99.53	99.42	99.30	99.19	99.12	99.05	98.96	98.87	98.83	98.74	98.69	98.66	98.62
S11	81.93	100.21	100.08	99.95	99.82	99.68	99.54	99.47	99.39	99.28	99.19	99.12	99.05	99.00	98.91	98.82	98.79	98.74	98.69
S12	82.09	100.20	100.07	99.94	99.83	99.69	99.57	99.46	99.35	99.23	99.16	99.09	99.02	98.97	98.92	98.87	98.80	98.73	98.67
S13	81.75	100.23	100.10	99.97	99.86	99.72	99.60	99.49	99.41	99.34	99.27	99.20	99.11	99.06	98.97	98.92	98.89	98.82	98.77
S14	82.19	100.19	100.06	99.93	99.80	99.68	99.54	99.43	99.32	99.20	99.12	99.03	98.96	98.91	98.82	98.78	98.71	98.68	98.63
S15	81.94	100.18	100.05	99.92	99.79	99.65	99.52	99.44	99.33	99.21	99.13	99.06	98.98	98.93	98.84	98.79	98.76	98.69	98.66
S16	81.72	100.21	100.08	99.95	99.83	99.72	99.58	99.50	99.39	99.31	99.22	99.14	99.06	99.01	98.92	98.83	98.76	98.70	98.65
S17	82.27	100.19	100.06	99.94	99.80	99.66	99.55	99.43	99.36	99.24	99.17	99.08	98.99	98.95	98.86	98.81	98.76	98.71	98.66
S18	81.99	100.29	100.16	100.03	99.90	99.76	99.63	99.55	99.47	99.36	99.27	99.20	99.13	99.09	99.03	98.98	98.93	98.86	98.82
S19	81.87	100.25	100.12	100.00	99.86	99.73	99.59	99.48	99.40	99.29	99.22	99.14	99.07	98.98	98.94	98.89	98.84	98.79	98.72
S20	82.05	100.28	100.15	100.02	99.89	99.77	99.64	99.52	99.45	99.33	99.26	99.19	99.12	99.07	99.03	98.94	98.89	98.86	98.81
S21	81.94	100.21	100.08	99.95	99.83	99.70	99.56	99.45	99.37	99.26	99.19	99.10	99.03	98.98	98.94	98.89	98.84	98.78	98.73
S22	82.25	100.21	100.08	99.95	99.84	99.70	99.58	99.51	99.43	99.32	99.23	99.16	99.09	99.00	98.91	98.82	98.75	98.70	98.63
S23	81.93	100.27	100.15	100.02	99.89	99.77	99.63	99.52	99.41	99.33	99.24	99.17	99.10	99.05	99.00	98.96	98.93	98.89	98.84
S24	82.34	100.21	100.08	99.95	99.81	99.68	99.54	99.43	99.31	99.24	99.15	99.08	99.01	98.92	98.83	98.77	98.74	98.71	98.64
S25	82.03	100.28	100.15	100.02	99.91	99.77	99.64	99.52	99.41	99.33	99.26	99.17	99.10	99.05	99.00	98.95	98.90	98.85	98.79
Ave.	81.93	100.24	100.11	99.98	99.85	99.72	99.59	99.49	99.39	99.29	99.21	99.13	99.06	99.00	98.93	98.87	98.83	98.78	98.73
Med.	81.94	100.23	100.10	99.97	99.86	99.72	99.59	99.49	99.40	99.30	99.22	99.14	99.07	99.00	98.94	98.89	98.83	98.78	98.73
St dev	0.2156	0.0354	0.0362	0.0369	0.0387	0.0394	0.0390	0.0427	0.0448	0.0504	0.0499	0.0513	0.0527	0.0580	0.0658	0.0689	0.0736	0.0766	0.0799
Min.	81.54	100.18	100.05	99.92	99.79	99.65	99.52	99.42	99.30	99.19	99.12	99.03	98.96	98.87	98.82	98.74	98.69	98.66	98.62
Max.	82.34	100.29	100.16	100.03	99.92	99.78	99.66	99.56	99.47	99.37	99.28	99.21	99.14	99.09	99.03	98.99	98.95	98.92	98.89

## 3.2 Data Set 1, 55°C, 90mA (Photon Flux Maintenance, Photosynthetic (PFMp) )

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Photosynthetic (PFMp) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S1	1.292	100.19	100.06	99.98	99.83	99.74	99.64	99.57	99.48	99.40	99.30	99.20	99.13	99.04	98.95	98.88	98.79	98.75	98.69
S2	1.291	100.24	100.11	100.03	99.89	99.74	99.60	99.51	99.40	99.33	99.23	99.15	99.08	98.99	98.92	98.85	98.81	98.75	98.70
S3	1.285	100.24	100.11	99.97	99.83	99.66	99.56	99.47	99.38	99.29	99.22	99.14	99.04	98.97	98.91	98.84	98.79	98.73	98.64
S4	1.285	100.24	100.11	100.03	99.93	99.76	99.62	99.51	99.41	99.32	99.21	99.15	99.08	99.00	98.93	98.88	98.82	98.73	98.68
S5	1.286	100.22	100.14	100.06	99.91	99.75	99.65	99.56	99.49	99.40	99.32	99.24	99.13	99.08	99.02	98.95	98.89	98.80	98.75
S6	1.286	100.21	100.13	100.05	99.91	99.81	99.66	99.57	99.48	99.41	99.33	99.25	99.17	99.10	99.01	98.94	98.90	98.85	98.80
S7	1.286	100.26	100.13	100.05	99.95	99.78	99.64	99.55	99.44	99.37	99.27	99.20	99.13	99.06	98.97	98.88	98.84	98.78	98.74
S8	1.286	100.17	100.09	100.01	99.91	99.77	99.67	99.57	99.50	99.39	99.32	99.22	99.14	99.08	99.03	98.95	98.91	98.82	98.73
S9	1.286	100.16	100.03	99.89	99.75	99.61	99.46	99.37	99.28	99.19	99.11	99.03	98.96	98.89	98.84	98.77	98.67	98.63	98.59
S10	1.287	100.27	100.19	100.06	99.91	99.74	99.57	99.50	99.40	99.31	99.20	99.12	99.06	99.00	98.94	98.85	98.81	98.77	98.72
S11	1.285	100.26	100.18	100.05	99.88	99.78	99.68	99.58	99.51	99.44	99.36	99.28	99.21	99.15	99.06	98.97	98.88	98.84	98.79
S12	1.285	100.20	100.12	100.04	99.87	99.77	99.63	99.52	99.42	99.34	99.27	99.20	99.13	99.07	99.01	98.96	98.91	98.87	98.78
S13	1.285	100.17	100.09	100.01	99.91	99.74	99.64	99.54	99.47	99.36	99.29	99.21	99.14	99.07	98.98	98.91	98.87	98.82	98.78
S14	1.285	100.22	100.14	100.06	99.96	99.86	99.69	99.59	99.50	99.43	99.32	99.22	99.14	99.05	99.00	98.94	98.85	98.79	98.75
S15	1.285	100.21	100.08	99.95	99.81	99.64	99.47	99.36	99.29	99.20	99.12	99.04	98.94	98.88	98.81	98.75	98.66	98.62	98.58
S16	1.285	100.23	100.10	99.97	99.82	99.65	99.48	99.39	99.29	99.20	99.13	99.03	98.92	98.83	98.75	98.69	98.63	98.54	98.49
S17	1.285	100.23	100.10	99.97	99.82	99.72	99.63	99.55	99.46	99.37	99.27	99.17	99.09	99.00	98.93	98.84	98.75	98.70	98.61
S18	1.285	100.25	100.12	99.99	99.84	99.75	99.58	99.49	99.38	99.28	99.21	99.14	99.03	98.95	98.87	98.80	98.71	98.66	98.57
S19	1.285	100.24	100.10	99.97	99.80	99.70	99.61	99.52	99.42	99.32	99.24	99.17	99.07	99.01	98.92	98.87	98.78	98.73	98.64
S20	1.286	100.21	100.13	100.00	99.86	99.72	99.55	99.48	99.41	99.30	99.23	99.16	99.06	98.99	98.90	98.83	98.77	98.73	98.64
S21	1.286	100.19	100.06	99.93	99.83	99.69	99.52	99.45	99.38	99.29	99.21	99.14	99.06	98.99	98.93	98.87	98.78	98.73	98.67
S22	1.286	100.24	100.16	100.03	99.88	99.74	99.60	99.49	99.42	99.33	99.26	99.16	99.09	99.03	98.96	98.90	98.81	98.72	98.63
S23	1.286	100.16	100.08	99.94	99.85	99.75	99.65	99.56	99.45	99.38	99.28	99.18	99.10	99.01	98.95	98.89	98.85	98.80	98.74
S24	1.286	100.17	100.09	100.01	99.84	99.75	99.60	99.53	99.43	99.36	99.29	99.18	99.10	99.02	98.94	98.89	98.84	98.80	98.74
S25	1.286	100.22	100.09	99.96	99.79	99.69	99.52	99.45	99.36	99.29	99.21	99.14	99.04	98.98	98.91	98.86	98.76	98.67	98.63
Ave.	1.286	100.22	100.11	100.00	99.86	99.73	99.60	99.51	99.42	99.33	99.25	99.16	99.08	99.01	98.94	98.87	98.80	98.75	98.68
Med.	1.286	100.22	100.11	100.01	99.86	99.74	99.61	99.52	99.42	99.33	99.26	99.17	99.09	99.01	98.94	98.88	98.81	98.75	98.69
St dev	0.0017	0.0327	0.0368	0.0455	0.0528	0.0552	0.0654	0.0628	0.0639	0.0682	0.0648	0.0626	0.0684	0.0708	0.0706	0.0682	0.0760	0.0781	0.0804
Min.	1.285	100.16	100.03	99.89	99.75	99.61	99.46	99.36	99.28	99.19	99.11	99.03	98.92	98.83	98.75	98.69	98.63	98.54	98.49
Max.	1.292	100.27	100.19	100.06	99.96	99.86	99.69	99.59	99.51	99.44	99.36	99.28	99.21	99.15	99.06	98.97	98.91	98.87	98.80

## 3.3 Data Set 1, 55°C, 90mA (Photon Flux Maintenance, Far-Red (PFMR))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Far-Red (PFMR) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S1	0.0946	100.16	100.06	99.97	99.86	99.76	99.65	99.50	99.43	99.36	99.28	99.19	99.10	98.99	98.94	98.89	98.84	98.79	98.75
S2	0.0945	100.15	100.06	99.97	99.80	99.64	99.47	99.32	99.18	99.08	98.98	98.90	98.79	98.74	98.69	98.59	98.54	98.48	98.43
S3	0.0941	100.21	100.12	100.03	99.87	99.70	99.59	99.50	99.43	99.35	99.24	99.15	99.08	99.03	98.92	98.81	98.72	98.63	98.53
S4	0.0941	100.25	100.16	100.06	99.96	99.85	99.68	99.59	99.52	99.37	99.26	99.19	99.10	99.05	98.95	98.84	98.75	98.70	98.61
S5	0.0941	100.22	100.13	100.04	99.93	99.83	99.73	99.65	99.56	99.41	99.32	99.21	99.12	99.07	98.97	98.87	98.78	98.72	98.67
S6	0.0941	100.19	100.10	100.00	99.84	99.73	99.56	99.41	99.27	99.19	99.12	99.03	98.96	98.91	98.86	98.76	98.71	98.62	98.57
S7	0.0942	100.13	100.04	99.95	99.78	99.67	99.51	99.36	99.29	99.21	99.14	99.05	98.96	98.86	98.81	98.70	98.65	98.60	98.55
S8	0.0942	100.26	100.17	100.08	99.97	99.80	99.64	99.55	99.45	99.36	99.29	99.22	99.14	99.09	99.04	98.94	98.89	98.84	98.78
S9	0.0942	100.17	100.07	99.98	99.81	99.71	99.60	99.51	99.37	99.29	99.18	99.07	98.98	98.87	98.77	98.67	98.61	98.52	98.47
S10	0.0943	100.20	100.11	100.01	99.91	99.74	99.64	99.49	99.40	99.32	99.21	99.12	99.05	98.94	98.89	98.79	98.74	98.65	98.59
S11	0.0939	100.27	100.18	100.08	99.92	99.75	99.64	99.55	99.40	99.33	99.22	99.13	99.02	98.91	98.86	98.76	98.71	98.66	98.61
S12	0.0939	100.24	100.15	100.06	99.95	99.85	99.68	99.53	99.46	99.37	99.28	99.17	99.08	98.97	98.87	98.76	98.71	98.61	98.56
S13	0.0939	100.24	100.14	100.05	99.94	99.84	99.73	99.66	99.59	99.44	99.37	99.28	99.21	99.10	99.00	98.90	98.85	98.76	98.71
S14	0.0940	100.22	100.13	100.03	99.93	99.76	99.65	99.51	99.41	99.27	99.18	99.07	99.00	98.89	98.84	98.73	98.67	98.63	98.58
S15	0.0939	100.16	100.07	99.97	99.87	99.76	99.66	99.51	99.44	99.34	99.27	99.18	99.09	98.98	98.88	98.77	98.68	98.59	98.49
S16	0.0940	100.26	100.17	100.07	99.96	99.86	99.75	99.66	99.51	99.44	99.34	99.24	99.14	99.04	98.99	98.89	98.83	98.79	98.74
S17	0.0940	100.23	100.13	100.04	99.93	99.83	99.73	99.58	99.43	99.36	99.29	99.18	99.07	99.02	98.97	98.87	98.78	98.68	98.64
S18	0.0941	100.12	100.03	99.94	99.83	99.72	99.55	99.40	99.33	99.24	99.17	99.08	98.97	98.86	98.81	98.71	98.65	98.61	98.55
S19	0.0939	100.23	100.14	100.04	99.93	99.83	99.72	99.57	99.50	99.41	99.30	99.19	99.12	99.07	98.97	98.87	98.81	98.72	98.67
S20	0.0941	100.24	100.15	100.06	99.95	99.84	99.74	99.67	99.57	99.48	99.37	99.26	99.19	99.08	98.98	98.92	98.88	98.79	98.69
S21	0.0940	100.14	100.05	99.95	99.78	99.62	99.51	99.44	99.34	99.20	99.13	99.02	98.92	98.82	98.71	98.60	98.55	98.50	98.41
S22	0.0939	100.21	100.12	100.03	99.92	99.81	99.70	99.61	99.54	99.46	99.37	99.30	99.19	99.14	99.03	98.93	98.89	98.83	98.78
S23	0.0940	100.14	100.04	99.95	99.84	99.74	99.63	99.55	99.41	99.32	99.22	99.15	99.06	99.01	98.96	98.86	98.80	98.75	98.70
S24	0.0940	100.26	100.17	100.08	99.97	99.86	99.75	99.66	99.59	99.44	99.33	99.26	99.17	99.07	98.97	98.86	98.77	98.68	98.63
S25	0.0940	100.16	100.07	99.98	99.88	99.77	99.67	99.60	99.45	99.30	99.20	99.10	99.03	98.93	98.83	98.73	98.69	98.59	98.50
Ave.	0.0941	100.20	100.11	100.02	99.89	99.77	99.65	99.54	99.43	99.33	99.24	99.15	99.06	98.98	98.90	98.80	98.74	98.67	98.61
Med.	0.0940	100.21	100.12	100.03	99.92	99.76	99.65	99.55	99.43	99.35	99.26	99.17	99.08	98.99	98.92	98.81	98.74	98.66	98.61
St dev	0.0002	0.0474	0.0471	0.0468	0.0609	0.0702	0.0801	0.0953	0.1030	0.0958	0.0943	0.0938	0.0967	0.1010	0.0947	0.0993	0.0972	0.0987	0.1052
Min.	0.0939	100.12	100.03	99.94	99.78	99.62	99.47	99.32	99.18	99.08	98.98	98.90	98.79	98.74	98.69	98.59	98.54	98.48	98.41
Max.	0.0946	100.27	100.18	100.08	99.97	99.86	99.75	99.67	99.59	99.48	99.37	99.30	99.21	99.14	99.04	98.94	98.89	98.84	98.78

## 3.4 Data Set 1, 55°C, 90mA (Forward Voltage)

Sample Number	Forward Voltage(V)																		
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S1	5.493	5.482	5.478	5.482	5.478	5.469	5.473	5.464	5.466	5.467	5.461	5.463	5.459	5.462	5.454	5.462	5.457	5.451	5.451
S2	5.503	5.470	5.470	5.468	5.467	5.470	5.470	5.456	5.461	5.451	5.461	5.457	5.455	5.454	5.454	5.446	5.445	5.442	5.446
S3	5.454	5.489	5.485	5.484	5.488	5.478	5.485	5.471	5.479	5.472	5.468	5.466	5.463	5.469	5.463	5.458	5.457	5.454	5.455
S4	5.490	5.481	5.478	5.473	5.476	5.477	5.469	5.471	5.463	5.463	5.462	5.459	5.456	5.461	5.455	5.452	5.446	5.455	5.452
S5	5.497	5.479	5.475	5.471	5.471	5.468	5.475	5.468	5.461	5.459	5.462	5.451	5.457	5.459	5.453	5.448	5.450	5.455	5.445
S6	5.490	5.476	5.477	5.471	5.471	5.470	5.470	5.467	5.463	5.464	5.460	5.452	5.459	5.446	5.451	5.446	5.442	5.442	5.449
S7	5.482	5.443	5.445	5.441	5.436	5.435	5.434	5.429	5.427	5.428	5.423	5.420	5.417	5.425	5.425	5.414	5.415	5.414	5.414
S8	5.487	5.475	5.472	5.469	5.475	5.462	5.466	5.457	5.456	5.456	5.454	5.457	5.449	5.447	5.444	5.443	5.446	5.446	5.441
S9	5.486	5.495	5.490	5.494	5.489	5.490	5.481	5.484	5.476	5.474	5.471	5.476	5.470	5.467	5.463	5.465	5.460	5.465	5.460
S10	5.503	5.483	5.482	5.481	5.479	5.476	5.474	5.467	5.468	5.465	5.464	5.462	5.466	5.456	5.458	5.457	5.461	5.451	5.447
S11	5.498	5.476	5.474	5.478	5.474	5.469	5.472	5.469	5.466	5.466	5.458	5.455	5.451	5.448	5.448	5.448	5.444	5.449	5.446
S12	5.458	5.505	5.505	5.498	5.501	5.494	5.495	5.491	5.486	5.491	5.487	5.485	5.478	5.473	5.473	5.484	5.472	5.473	5.466
S13	5.502	5.491	5.495	5.491	5.488	5.481	5.490	5.483	5.478	5.481	5.474	5.477	5.468	5.474	5.468	5.465	5.470	5.463	5.463
S14	5.487	5.464	5.464	5.457	5.455	5.459	5.452	5.453	5.446	5.451	5.451	5.447	5.440	5.444	5.438	5.437	5.435	5.429	5.438
S15	5.490	5.502	5.501	5.494	5.496	5.496	5.487	5.488	5.482	5.485	5.487	5.475	5.475	5.474	5.474	5.469	5.476	5.465	5.466
S16	5.507	5.508	5.508	5.507	5.502	5.501	5.495	5.498	5.497	5.495	5.487	5.484	5.486	5.479	5.488	5.477	5.474	5.483	5.482
S17	5.492	5.497	5.500	5.497	5.494	5.496	5.492	5.489	5.488	5.482	5.479	5.479	5.480	5.475	5.481	5.472	5.469	5.466	5.470
S18	5.495	5.493	5.494	5.493	5.488	5.488	5.489	5.482	5.480	5.480	5.475	5.467	5.470	5.461	5.464	5.473	5.461	5.463	5.455
S19	5.494	5.494	5.494	5.497	5.494	5.491	5.485	5.487	5.487	5.485	5.481	5.473	5.479	5.467	5.469	5.471	5.469	5.463	5.463
S20	5.488	5.496	5.493	5.496	5.491	5.484	5.485	5.484	5.478	5.474	5.479	5.477	5.470	5.469	5.468	5.476	5.467	5.462	5.460
S21	5.498	5.514	5.514	5.513	5.505	5.508	5.499	5.499	5.500	5.495	5.498	5.494	5.490	5.481	5.485	5.482	5.478	5.479	5.482
S22	5.487	5.501	5.501	5.495	5.496	5.492	5.492	5.485	5.490	5.487	5.484	5.481	5.487	5.484	5.472	5.478	5.481	5.469	5.468
S23	5.494	5.497	5.495	5.496	5.492	5.487	5.488	5.481	5.482	5.480	5.480	5.482	5.478	5.469	5.469	5.473	5.474	5.468	5.464
S24	5.492	5.495	5.495	5.488	5.489	5.487	5.481	5.480	5.482	5.474	5.471	5.469	5.475	5.463	5.468	5.463	5.460	5.465	5.458
S25	5.495	5.499	5.496	5.494	5.493	5.489	5.488	5.483	5.492	5.484	5.481	5.484	5.483	5.470	5.475	5.472	5.466	5.467	5.466
Ave.	5.490	5.488	5.487	5.485	5.484	5.481	5.479	5.476	5.474	5.473	5.470	5.468	5.466	5.463	5.462	5.461	5.459	5.458	5.456
Med.	5.492	5.493	5.493	5.491	5.488	5.484	5.485	5.481	5.478	5.474	5.471	5.469	5.470	5.467	5.464	5.465	5.461	5.463	5.458
St dev	0.0120	0.0155	0.0156	0.0161	0.0156	0.0158	0.0146	0.0158	0.0166	0.0158	0.0155	0.0159	0.0165	0.0136	0.0147	0.0164	0.0156	0.0152	0.0144
Min.	5.454	5.443	5.445	5.441	5.436	5.435	5.434	5.429	5.427	5.428	5.423	5.420	5.417	5.425	5.425	5.414	5.415	5.414	5.414
Max.	5.507	5.514	5.514	5.513	5.505	5.508	5.499	5.499	5.500	5.495	5.498	5.494	5.490	5.484	5.488	5.484	5.481	5.483	5.482

## 3.5 Data Set 1, 55°C, 90mA (Chromaticity Shift)

Sample Number	u'	v'	CCT(K)	Chromaticity Shift (Au'v')																	
				0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000hrs	12000hrs	18000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs
S1	0.2560	0.5271	2840	0.0001	0.0003	0.0004	0.0006	0.0007	0.0008	0.0010	0.0012	0.0015	0.0016	0.0018	0.0020	0.0022	0.0023	0.0024	0.0025	0.0027	0.0028
S2	0.2557	0.5268	2850	0.0001	0.0003	0.0004	0.0006	0.0007	0.0009	0.0011	0.0013	0.0016	0.0018	0.0020	0.0022	0.0025	0.0026	0.0028	0.0029	0.0030	0.0032
S3	0.2562	0.5268	2839	0.0002	0.0003	0.0004	0.0006	0.0007	0.0009	0.0011	0.0013	0.0016	0.0018	0.0019	0.0020	0.0023	0.0025	0.0026	0.0027	0.0028	0.0030
S4	0.2562	0.5273	2836	0.0001	0.0002	0.0004	0.0005	0.0006	0.0008	0.0010	0.0012	0.0014	0.0016	0.0017	0.0019	0.0020	0.0022	0.0023	0.0024	0.0025	0.0027
S5	0.2564	0.5276	2831	0.0001	0.0002	0.0003	0.0005	0.0006	0.0008	0.0011	0.0014	0.0017	0.0019	0.0021	0.0024	0.0027	0.0028	0.0029	0.0031	0.0032	0.0033
S6	0.2560	0.5266	2843	0.0002	0.0003	0.0004	0.0005	0.0007	0.0008	0.0011	0.0014	0.0016	0.0018	0.0021	0.0023	0.0026	0.0027	0.0029	0.0030	0.0031	0.0032
S7	0.2568	0.5279	2819	0.0001	0.0003	0.0004	0.0005	0.0006	0.0008	0.0010	0.0013	0.0016	0.0018	0.0020	0.0021	0.0024	0.0027	0.0028	0.0029	0.0031	0.0032
S8	0.2562	0.5283	2830	0.0001	0.0003	0.0004	0.0006	0.0007	0.0009	0.0012	0.0014	0.0017	0.0019	0.0021	0.0022	0.0025	0.0026	0.0029	0.0031	0.0032	0.0033
S9	0.2565	0.5284	2824	0.0001	0.0002	0.0004	0.0006	0.0008	0.0009	0.0012	0.0014	0.0016	0.0018	0.0019	0.0020	0.0023	0.0026	0.0028	0.0029	0.0030	0.0032
S10	0.2559	0.5267	2846	0.0002	0.0003	0.0004	0.0005	0.0007	0.0008	0.0010	0.0012	0.0016	0.0018	0.0019	0.0021	0.0024	0.0025	0.0028	0.0030	0.0031	0.0033
S11	0.2567	0.5280	2821	0.0001	0.0003	0.0004	0.0006	0.0007	0.0008	0.0010	0.0013	0.0016	0.0019	0.0021	0.0023	0.0024	0.0025	0.0027	0.0028	0.0030	0.0031
S12	0.2568	0.5278	2820	0.0001	0.0003	0.0004	0.0006	0.0008	0.0009	0.0012	0.0014	0.0017	0.0018	0.0020	0.0023	0.0024	0.0025	0.0027	0.0028	0.0029	0.0030
S13	0.2569	0.5285	2814	0.0001	0.0003	0.0004	0.0006	0.0008	0.0009	0.0012	0.0015	0.0019	0.0020	0.0022	0.0024	0.0027	0.0030	0.0032	0.0033	0.0035	0.0036
S14	0.2574	0.5291	2802	0.0001	0.0002	0.0004	0.0005	0.0007	0.0009	0.0012	0.0015	0.0017	0.0018	0.0019	0.0020	0.0021	0.0024	0.0026	0.0027	0.0029	0.0030
S15	0.2570	0.5294	2807	0.0002	0.0003	0.0004	0.0006	0.0007	0.0008	0.0012	0.0014	0.0017	0.0019	0.0021	0.0023	0.0025	0.0028	0.0031	0.0032	0.0033	0.0034
S16	0.2564	0.5277	2829	0.0001	0.0003	0.0004	0.0005	0.0007	0.0008	0.0011	0.0014	0.0017	0.0019	0.0021	0.0023	0.0026	0.0029	0.0030	0.0032	0.0033	0.0034
S17	0.2568	0.5293	2814	0.0002	0.0003	0.0004	0.0005	0.0007	0.0009	0.0012	0.0015	0.0017	0.0019	0.0021	0.0023	0.0026	0.0027	0.0028	0.0030	0.0031	0.0033
S18	0.2565	0.5275	2828	0.0001	0.0003	0.0004	0.0006	0.0007	0.0008	0.0012	0.0015	0.0018	0.0020	0.0022	0.0023	0.0026	0.0029	0.0032	0.0033	0.0035	0.0036
S19	0.2567	0.5282	2819	0.0001	0.0003	0.0004	0.0006	0.0008	0.0009	0.0012	0.0015	0.0018	0.0020	0.0022	0.0023	0.0025	0.0026	0.0027	0.0029	0.0030	0.0032
S20	0.2564	0.5278	2828	0.0001	0.0002	0.0004	0.0005	0.0007	0.0008	0.0010	0.0012	0.0015	0.0016	0.0017	0.0019	0.0021	0.0022	0.0023	0.0025	0.0026	0.0027
S21	0.2567	0.5280	2820	0.0002	0.0003	0.0004	0.0005	0.0007	0.0008	0.0011	0.0014	0.0016	0.0018	0.0020	0.0021	0.0023	0.0024	0.0027	0.0028	0.0030	0.0031
S22	0.2573	0.5291	2803	0.0001	0.0002	0.0004	0.0005	0.0006	0.0008	0.0011	0.0013	0.0015	0.0017	0.0019	0.0022	0.0023	0.0024	0.0027	0.0029	0.0030	0.0031
S23	0.2567	0.5283	2821	0.0002	0.0003	0.0004	0.0005	0.0007	0.0008	0.0011	0.0013	0.0016	0.0019	0.0021	0.0023	0.0024	0.0026	0.0027	0.0028	0.0029	0.0031
S24	0.2567	0.5293	2814	0.0001	0.0002	0.0004	0.0005	0.0007	0.0008	0.0010	0.0013	0.0015	0.0016	0.0019	0.0020	0.0023	0.0024	0.0025	0.0027	0.0028	0.0030
S25	0.2565	0.5276	2827	0.0001	0.0003	0.0004	0.0005	0.0006	0.0008	0.0010	0.0013	0.0016	0.0019	0.0021	0.0023	0.0026	0.0029	0.0030	0.0031	0.0033	0.0034
Ave.	0.2565	0.5280	2825	0.0001	0.0003	0.0004	0.0005	0.0007	0.0008	0.0011	0.0014	0.0016	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0029	0.0030	0.0032
Med.	0.2565	0.5279	2824	0.0001	0.0003	0.0004	0.0005	0.0007	0.0008	0.0011	0.0014	0.0016	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0029	0.0030	0.0032
St dev	0.0004	0.0008	12.7246	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	0.2557	0.5266	2802	0.0001	0.0002	0.0003	0.0005	0.0006	0.0008	0.0010	0.0012	0.0014	0.0016	0.0017	0.0019	0.0020	0.0022	0.0023	0.0024	0.0025	0.0027
Max.	0.2574	0.5294	2850	0.0002	0.0003	0.0004	0.0006	0.0008	0.0009	0.0012	0.0015	0.0019	0.0020	0.0022	0.0024	0.0027	0.0030	0.0032	0.0033	0.0035	0.0036

## 3.6 Data Set 2, 85°C, 90mA (Lumen Maintenance)

Sample Number	Φ(lm) 0hr (Initial)	Lumen Maintenance (%)																	
		1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S26	81.60	100.14	100.01	99.87	99.70	99.58	99.45	99.32	99.16	98.99	98.91	98.77	98.64	98.58	98.52	98.41	98.35	98.29	98.18
S27	81.87	100.18	100.07	99.94	99.81	99.64	99.46	99.32	99.19	99.05	98.92	98.78	98.70	98.63	98.52	98.45	98.38	98.32	98.21
S28	81.48	100.12	99.99	99.86	99.68	99.50	99.33	99.16	99.00	98.85	98.77	98.66	98.53	98.43	98.35	98.29	98.18	98.11	98.04
S29	81.57	100.13	100.00	99.89	99.77	99.59	99.41	99.27	99.14	98.97	98.86	98.75	98.61	98.54	98.46	98.40	98.33	98.27	98.21
S30	81.92	100.17	100.04	99.93	99.75	99.59	99.41	99.27	99.10	98.96	98.85	98.76	98.63	98.55	98.45	98.37	98.27	98.20	98.10
S31	81.64	100.18	100.07	99.94	99.76	99.64	99.46	99.33	99.19	99.05	98.97	98.86	98.74	98.68	98.58	98.50	98.39	98.33	98.26
S32	81.78	100.12	100.01	99.91	99.78	99.66	99.49	99.32	99.15	98.98	98.90	98.82	98.69	98.61	98.55	98.48	98.42	98.31	98.25
S33	81.73	100.19	100.08	99.97	99.80	99.62	99.45	99.31	99.14	98.97	98.84	98.71	98.59	98.53	98.45	98.39	98.32	98.26	98.19
S34	81.40	100.17	100.04	99.93	99.81	99.64	99.46	99.32	99.19	99.06	98.92	98.81	98.70	98.64	98.57	98.50	98.43	98.32	98.26
S35	81.64	100.17	100.03	99.90	99.78	99.60	99.48	99.34	99.21	99.06	98.93	98.82	98.74	98.68	98.57	98.50	98.39	98.28	98.22
S36	81.97	100.10	100.00	99.89	99.71	99.59	99.47	99.33	99.20	99.05	98.97	98.89	98.76	98.68	98.58	98.52	98.45	98.38	98.32
S37	81.89	100.19	100.08	99.95	99.83	99.70	99.53	99.38	99.22	99.07	98.96	98.85	98.72	98.64	98.58	98.51	98.45	98.39	98.32
S38	82.13	100.13	99.99	99.88	99.71	99.53	99.35	99.19	99.06	98.91	98.81	98.73	98.60	98.53	98.43	98.37	98.26	98.15	98.09
S39	82.25	100.14	100.01	99.88	99.76	99.58	99.41	99.24	99.07	98.91	98.79	98.71	98.58	98.52	98.42	98.31	98.25	98.18	98.08
S40	82.02	100.18	100.08	99.97	99.79	99.67	99.49	99.35	99.21	99.04	98.93	98.85	98.77	98.67	98.60	98.53	98.46	98.40	98.29
S41	81.95	100.11	99.98	99.85	99.68	99.50	99.38	99.21	99.08	98.94	98.86	98.74	98.63	98.56	98.49	98.39	98.33	98.27	98.16
S42	82.10	100.12	99.98	99.88	99.70	99.53	99.41	99.26	99.13	98.99	98.88	98.75	98.64	98.57	98.47	98.39	98.29	98.22	98.15
S43	82.36	100.11	99.98	99.87	99.70	99.52	99.34	99.21	99.08	98.95	98.82	98.74	98.61	98.53	98.45	98.37	98.31	98.24	98.18
S44	82.40	100.13	100.00	99.87	99.69	99.52	99.35	99.18	99.05	98.91	98.82	98.69	98.58	98.52	98.44	98.37	98.26	98.19	98.13
S45	82.12	100.11	100.00	99.87	99.75	99.57	99.44	99.28	99.11	98.94	98.81	98.67	98.59	98.52	98.44	98.38	98.31	98.24	98.13
S46	81.93	100.17	100.04	99.93	99.81	99.63	99.51	99.37	99.23	99.10	98.99	98.90	98.77	98.69	98.63	98.55	98.49	98.43	98.36
S47	82.19	100.19	100.06	99.95	99.78	99.60	99.48	99.35	99.22	99.08	99.00	98.92	98.84	98.73	98.63	98.57	98.46	98.39	98.33
S48	82.05	100.09	99.99	99.86	99.73	99.61	99.44	99.31	99.18	99.05	98.96	98.85	98.77	98.71	98.65	98.57	98.46	98.39	98.33
S49	82.26	100.15	100.04	99.91	99.79	99.66	99.49	99.36	99.23	99.06	98.92	98.84	98.73	98.63	98.55	98.49	98.43	98.36	98.29
S50	82.16	100.10	99.99	99.86	99.68	99.56	99.39	99.22	99.09	98.95	98.83	98.72	98.61	98.51	98.41	98.34	98.28	98.22	98.11
Ave.	81.94	100.14	100.02	99.90	99.75	99.59	99.43	99.29	99.14	99.00	98.89	98.78	98.67	98.59	98.51	98.44	98.36	98.29	98.21
Med.	81.95	100.14	100.01	99.89	99.76	99.59	99.45	99.31	99.15	98.99	98.90	98.77	98.64	98.58	98.52	98.41	98.35	98.28	98.21
St dev	0.2757	0.0323	0.0347	0.0375	0.0474	0.0552	0.0550	0.0638	0.0651	0.0664	0.0665	0.0737	0.0802	0.0790	0.0816	0.0822	0.0855	0.0853	0.0915
Min.	81.40	100.09	99.98	99.85	99.68	99.50	99.33	99.16	99.00	98.85	98.77	98.66	98.53	98.43	98.35	98.29	98.18	98.11	98.04
Max.	82.40	100.19	100.08	99.97	99.83	99.70	99.53	99.38	99.23	99.10	99.00	98.92	98.84	98.73	98.65	98.57	98.49	98.43	98.36



## 3.7 Data Set 2, 85°C, 90mA (Photon Flux Maintenance, Photosynthetic (PFMp))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Photosynthetic (PFMp) (%)																	
	Ohr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S26	1.296	100.12	100.02	99.93	99.72	99.56	99.35	99.24	99.11	98.97	98.88	98.79	98.68	98.59	98.50	98.39	98.31	98.26	98.18
S27	1.296	100.07	99.98	99.84	99.68	99.52	99.32	99.18	99.04	98.93	98.80	98.69	98.57	98.47	98.38	98.27	98.23	98.18	98.10
S28	1.296	100.14	100.00	99.87	99.66	99.50	99.34	99.23	99.12	99.01	98.92	98.82	98.70	98.59	98.48	98.37	98.33	98.28	98.20
S29	1.296	100.15	100.06	99.92	99.76	99.56	99.40	99.26	99.12	99.01	98.89	98.78	98.68	98.59	98.50	98.40	98.35	98.27	98.19
S30	1.296	100.11	100.02	99.92	99.71	99.55	99.35	99.24	99.10	98.99	98.86	98.75	98.62	98.52	98.41	98.30	98.25	98.20	98.12
S31	1.297	100.15	100.01	99.92	99.71	99.50	99.29	99.16	99.02	98.89	98.78	98.66	98.55	98.45	98.36	98.25	98.17	98.12	98.08
S32	1.296	100.13	99.99	99.90	99.74	99.53	99.37	99.26	99.12	98.99	98.87	98.78	98.67	98.57	98.46	98.36	98.32	98.27	98.23
S33	1.297	100.09	100.00	99.90	99.74	99.53	99.32	99.19	99.05	98.92	98.80	98.68	98.59	98.49	98.38	98.28	98.23	98.19	98.14
S34	1.297	100.14	100.00	99.86	99.70	99.54	99.34	99.23	99.12	99.01	98.90	98.79	98.69	98.60	98.51	98.42	98.34	98.26	98.21
S35	1.297	100.12	99.98	99.89	99.73	99.52	99.36	99.25	99.14	99.03	98.94	98.81	98.68	98.57	98.48	98.37	98.33	98.24	98.16
S36	1.297	100.08	99.99	99.85	99.65	99.44	99.23	99.10	98.96	98.82	98.71	98.62	98.49	98.39	98.28	98.17	98.12	98.08	97.99
S37	1.294	100.10	100.00	99.86	99.70	99.49	99.29	99.15	99.04	98.91	98.82	98.73	98.63	98.54	98.43	98.34	98.26	98.22	98.17
S38	1.297	100.13	100.04	99.94	99.74	99.53	99.37	99.23	99.12	98.99	98.88	98.79	98.66	98.57	98.48	98.37	98.32	98.28	98.23
S39	1.297	100.07	99.94	99.84	99.63	99.42	99.22	99.08	98.95	98.81	98.68	98.57	98.44	98.35	98.25	98.14	98.06	98.01	97.93
S40	1.298	100.12	99.98	99.85	99.64	99.43	99.23	99.12	98.98	98.87	98.78	98.69	98.56	98.45	98.34	98.25	98.20	98.16	98.11
S41	1.298	100.11	100.02	99.93	99.72	99.56	99.40	99.26	99.15	99.02	98.91	98.78	98.65	98.56	98.45	98.34	98.30	98.26	98.21
S42	1.298	100.12	100.03	99.89	99.68	99.48	99.32	99.18	99.07	98.94	98.81	98.70	98.57	98.48	98.37	98.26	98.18	98.14	98.09
S43	1.298	100.13	100.04	99.94	99.73	99.57	99.37	99.23	99.10	98.99	98.86	98.75	98.66	98.55	98.46	98.35	98.27	98.22	98.18
S44	1.298	100.08	99.98	99.84	99.64	99.48	99.27	99.14	99.00	98.89	98.78	98.69	98.56	98.47	98.38	98.27	98.23	98.14	98.10
S45	1.298	100.12	100.03	99.93	99.73	99.57	99.36	99.22	99.09	98.95	98.82	98.73	98.60	98.51	98.40	98.30	98.21	98.13	98.09
S46	1.298	100.14	100.00	99.90	99.74	99.53	99.33	99.19	99.08	98.97	98.86	98.75	98.66	98.55	98.45	98.34	98.29	98.21	98.13
S47	1.298	100.14	100.00	99.86	99.70	99.49	99.33	99.19	99.06	98.95	98.82	98.69	98.60	98.49	98.40	98.31	98.26	98.22	98.17
S48	1.298	100.16	100.02	99.88	99.72	99.52	99.31	99.20	99.07	98.96	98.83	98.70	98.61	98.50	98.39	98.28	98.24	98.16	98.11
S49	1.299	100.11	99.97	99.83	99.62	99.46	99.26	99.12	98.99	98.85	98.72	98.63	98.54	98.43	98.32	98.22	98.17	98.09	98.04
S50	1.299	100.08	99.99	99.85	99.69	99.48	99.27	99.14	99.03	98.92	98.83	98.70	98.59	98.48	98.39	98.30	98.25	98.21	98.16
Ave.	1.297	100.12	100.00	99.89	99.70	99.51	99.32	99.19	99.07	98.94	98.83	98.72	98.61	98.51	98.41	98.31	98.25	98.19	98.13
Med.	1.297	100.12	100.00	99.89	99.71	99.52	99.33	99.19	99.07	98.95	98.83	98.73	98.61	98.51	98.40	98.30	98.25	98.21	98.14
St dev	0.0011	0.0253	0.0259	0.0361	0.0393	0.0425	0.0502	0.0532	0.0575	0.0611	0.0641	0.0627	0.0652	0.0659	0.0687	0.0700	0.0721	0.0708	0.0726
Min.	1.294	100.07	99.94	99.83	99.62	99.42	99.22	99.08	98.95	98.81	98.68	98.57	98.44	98.35	98.25	98.14	98.06	98.01	97.93
Max.	1.299	100.16	100.06	99.94	99.76	99.57	99.40	99.26	99.15	99.03	98.94	98.82	98.70	98.60	98.51	98.42	98.35	98.28	98.23

## 3.8 Data Set 2, 85°C, 90mA (Photon Flux Maintenance, Far-Red (PFMR))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Far-Red (PFMR) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S26	0.0944	100.14	99.99	99.85	99.67	99.49	99.31	99.18	99.03	98.93	98.80	98.71	98.58	98.51	98.45	98.34	98.28	98.23	98.17
S27	0.0944	100.08	100.00	99.86	99.67	99.49	99.31	99.16	99.06	98.91	98.81	98.68	98.59	98.52	98.42	98.31	98.25	98.19	98.13
S28	0.0944	100.08	99.99	99.85	99.67	99.49	99.31	99.21	99.05	98.93	98.83	98.74	98.61	98.51	98.44	98.37	98.32	98.27	98.21
S29	0.0944	100.10	99.96	99.88	99.69	99.51	99.32	99.20	99.10	99.00	98.88	98.79	98.67	98.60	98.50	98.44	98.37	98.32	98.26
S30	0.0943	100.06	99.92	99.78	99.60	99.42	99.24	99.09	98.99	98.86	98.77	98.68	98.56	98.49	98.43	98.36	98.32	98.27	98.20
S31	0.0944	100.06	99.98	99.83	99.65	99.46	99.28	99.15	99.05	98.90	98.81	98.71	98.62	98.51	98.45	98.39	98.34	98.29	98.23
S32	0.0944	100.08	99.94	99.86	99.67	99.49	99.31	99.16	99.03	98.93	98.84	98.71	98.59	98.49	98.38	98.32	98.26	98.20	98.14
S33	0.0944	100.14	100.05	99.97	99.79	99.60	99.41	99.29	99.13	99.04	98.92	98.82	98.73	98.67	98.61	98.55	98.49	98.43	98.38
S34	0.0944	100.13	99.99	99.85	99.66	99.48	99.29	99.20	99.04	98.94	98.82	98.72	98.63	98.57	98.46	98.36	98.31	98.24	98.18
S35	0.0944	100.08	99.94	99.85	99.67	99.48	99.29	99.19	99.04	98.89	98.80	98.67	98.54	98.47	98.41	98.30	98.24	98.18	98.12
S36	0.0944	100.04	99.89	99.81	99.63	99.45	99.27	99.15	99.00	98.90	98.77	98.64	98.51	98.40	98.34	98.27	98.21	98.15	98.09
S37	0.0929	100.10	99.96	99.81	99.63	99.45	99.27	99.14	98.99	98.84	98.71	98.62	98.50	98.39	98.33	98.27	98.21	98.16	98.09
S38	0.0930	100.06	99.98	99.89	99.71	99.52	99.34	99.24	99.14	99.02	98.92	98.83	98.71	98.65	98.58	98.52	98.47	98.40	98.34
S39	0.0930	100.08	99.94	99.86	99.67	99.48	99.30	99.17	99.07	98.97	98.86	98.73	98.60	98.53	98.43	98.36	98.30	98.25	98.20
S40	0.0930	100.14	100.06	99.91	99.73	99.54	99.36	99.21	99.06	98.96	98.83	98.74	98.62	98.51	98.45	98.39	98.33	98.26	98.20
S41	0.0930	100.13	99.99	99.85	99.66	99.48	99.30	99.14	99.02	98.89	98.80	98.71	98.61	98.51	98.40	98.33	98.27	98.21	98.15
S42	0.0931	100.09	100.01	99.87	99.69	99.50	99.33	99.20	99.10	99.00	98.88	98.75	98.64	98.57	98.50	98.44	98.38	98.32	98.26
S43	0.0931	100.11	99.97	99.83	99.64	99.46	99.28	99.16	99.06	98.96	98.83	98.71	98.59	98.53	98.43	98.37	98.31	98.26	98.19
S44	0.0930	100.07	99.93	99.85	99.67	99.48	99.30	99.15	98.99	98.90	98.77	98.64	98.51	98.40	98.30	98.23	98.18	98.12	98.07
S45	0.0931	100.08	99.94	99.79	99.61	99.43	99.25	99.12	99.02	98.87	98.74	98.61	98.49	98.43	98.36	98.30	98.24	98.18	98.12
S46	0.0931	100.13	100.04	99.90	99.72	99.54	99.35	99.20	99.10	98.95	98.83	98.71	98.59	98.53	98.47	98.40	98.35	98.29	98.23
S47	0.0931	100.14	100.00	99.85	99.67	99.48	99.30	99.15	99.05	98.92	98.80	98.71	98.58	98.52	98.45	98.38	98.32	98.26	98.21
S48	0.0931	100.09	100.01	99.86	99.68	99.50	99.32	99.22	99.10	99.00	98.90	98.78	98.67	98.61	98.54	98.43	98.38	98.33	98.28
S49	0.0931	100.05	99.97	99.83	99.64	99.46	99.28	99.15	99.05	98.93	98.81	98.69	98.57	98.47	98.40	98.33	98.28	98.22	98.17
S50	0.0931	100.04	99.96	99.82	99.63	99.45	99.26	99.14	99.01	98.89	98.77	98.65	98.52	98.41	98.35	98.29	98.23	98.18	98.12
Ave.	0.0936	100.09	99.98	99.85	99.67	99.49	99.30	99.17	99.05	98.93	98.82	98.71	98.59	98.51	98.43	98.36	98.31	98.25	98.19
Med.	0.0931	100.08	99.98	99.85	99.67	99.48	99.30	99.16	99.05	98.93	98.81	98.71	98.59	98.51	98.43	98.36	98.31	98.25	98.19
St dev	0.0007	0.0319	0.0405	0.0396	0.0395	0.0384	0.0373	0.0419	0.0424	0.0509	0.0534	0.0576	0.0622	0.0730	0.0743	0.0748	0.0756	0.0759	0.0761
Min.	0.0929	100.04	99.89	99.78	99.60	99.42	99.24	99.09	98.99	98.84	98.71	98.61	98.49	98.39	98.30	98.23	98.18	98.12	98.07
Max.	0.0944	100.14	100.06	99.97	99.79	99.60	99.41	99.29	99.14	99.04	98.92	98.83	98.73	98.67	98.61	98.55	98.49	98.43	98.38

## 3.9 Data Set 2, 85°C, 90mA (Forward Voltage)

Sample Number	Forward Voltage(V)																		
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S26	5.487	5.483	5.480	5.478	5.484	5.481	5.469	5.469	5.470	5.465	5.469	5.461	5.455	5.455	5.451	5.456	5.454	5.458	5.455
S27	5.479	5.475	5.474	5.476	5.473	5.473	5.463	5.467	5.456	5.456	5.454	5.452	5.454	5.447	5.447	5.443	5.440	5.448	5.438
S28	5.494	5.492	5.494	5.491	5.488	5.483	5.476	5.484	5.481	5.477	5.475	5.474	5.469	5.462	5.458	5.458	5.466	5.459	5.453
S29	5.486	5.481	5.484	5.480	5.477	5.476	5.473	5.476	5.471	5.472	5.459	5.467	5.465	5.453	5.453	5.454	5.449	5.445	5.444
S30	5.484	5.483	5.482	5.478	5.474	5.477	5.474	5.473	5.464	5.471	5.466	5.459	5.459	5.452	5.456	5.456	5.449	5.455	5.440
S31	5.482	5.480	5.480	5.473	5.479	5.476	5.472	5.464	5.468	5.459	5.455	5.457	5.450	5.450	5.458	5.453	5.443	5.447	5.439
S32	5.450	5.450	5.450	5.444	5.445	5.443	5.440	5.432	5.434	5.427	5.425	5.424	5.417	5.418	5.420	5.417	5.413	5.414	5.417
S33	5.480	5.476	5.476	5.474	5.475	5.469	5.470	5.470	5.458	5.463	5.453	5.462	5.456	5.452	5.454	5.450	5.445	5.444	5.444
S34	5.499	5.500	5.495	5.493	5.496	5.491	5.487	5.485	5.483	5.476	5.482	5.480	5.467	5.467	5.475	5.466	5.468	5.464	5.455
S35	5.490	5.488	5.485	5.488	5.485	5.483	5.474	5.472	5.476	5.475	5.464	5.463	5.465	5.464	5.460	5.454	5.450	5.454	5.448
S36	5.484	5.482	5.480	5.481	5.481	5.477	5.475	5.468	5.470	5.462	5.465	5.458	5.460	5.459	5.456	5.451	5.444	5.444	5.452
S37	5.509	5.507	5.504	5.506	5.504	5.496	5.500	5.499	5.493	5.487	5.483	5.490	5.479	5.480	5.481	5.478	5.469	5.470	5.467
S38	5.499	5.497	5.494	5.491	5.490	5.492	5.489	5.489	5.477	5.486	5.472	5.474	5.472	5.466	5.475	5.471	5.471	5.466	5.458
S39	5.469	5.467	5.464	5.466	5.463	5.463	5.456	5.460	5.452	5.447	5.443	5.444	5.440	5.442	5.445	5.433	5.433	5.428	5.427
S40	5.505	5.500	5.500	5.499	5.496	5.494	5.495	5.487	5.492	5.483	5.487	5.479	5.480	5.479	5.481	5.469	5.465	5.466	5.473
S41	5.513	5.508	5.514	5.507	5.505	5.500	5.495	5.501	5.499	5.491	5.486	5.488	5.487	5.481	5.477	5.480	5.476	5.474	5.481
S42	5.506	5.504	5.505	5.503	5.498	5.494	5.496	5.488	5.490	5.483	5.479	5.481	5.481	5.479	5.470	5.470	5.478	5.465	5.474
S43	5.498	5.493	5.494	5.491	5.491	5.485	5.488	5.480	5.481	5.476	5.480	5.471	5.466	5.470	5.469	5.466	5.461	5.461	5.454
S44	5.503	5.498	5.498	5.496	5.498	5.494	5.491	5.493	5.486	5.487	5.478	5.484	5.473	5.479	5.470	5.468	5.470	5.466	5.460
S45	5.501	5.499	5.496	5.496	5.498	5.488	5.491	5.491	5.486	5.479	5.481	5.474	5.474	5.473	5.472	5.475	5.464	5.462	5.469
S46	5.518	5.513	5.516	5.511	5.512	5.505	5.505	5.507	5.501	5.496	5.498	5.492	5.493	5.490	5.482	5.482	5.487	5.487	5.476
S47	5.509	5.510	5.507	5.506	5.503	5.499	5.498	5.497	5.492	5.486	5.489	5.491	5.482	5.476	5.473	5.473	5.476	5.469	5.467
S48	5.505	5.506	5.503	5.500	5.497	5.496	5.491	5.495	5.485	5.482	5.486	5.478	5.484	5.475	5.481	5.476	5.470	5.464	5.464
S49	5.499	5.497	5.495	5.496	5.493	5.490	5.485	5.487	5.486	5.482	5.480	5.472	5.471	5.467	5.468	5.467	5.464	5.458	5.456
S50	5.506	5.501	5.501	5.501	5.503	5.495	5.494	5.492	5.486	5.489	5.486	5.479	5.473	5.482	5.477	5.470	5.473	5.466	5.470
Ave.	5.494	5.492	5.491	5.489	5.488	5.485	5.482	5.481	5.477	5.474	5.472	5.470	5.467	5.465	5.464	5.461	5.459	5.457	5.455
Med.	5.499	5.497	5.494	5.491	5.491	5.488	5.487	5.485	5.481	5.477	5.478	5.474	5.469	5.467	5.469	5.466	5.464	5.461	5.455
St dev	0.0153	0.0151	0.0154	0.0154	0.0151	0.0137	0.0153	0.0164	0.0159	0.0155	0.0165	0.0159	0.0162	0.0161	0.0148	0.0153	0.0167	0.0149	0.0158
Min.	5.450	5.450	5.450	5.444	5.445	5.443	5.440	5.432	5.434	5.427	5.425	5.424	5.417	5.418	5.420	5.417	5.413	5.414	5.417
Max.	5.518	5.513	5.516	5.511	5.512	5.505	5.505	5.507	5.501	5.496	5.498	5.492	5.493	5.490	5.482	5.482	5.487	5.487	5.481

## 3.10 Data Set 2, 85°C, 90mA (Chromaticity Shift)

Sample Number	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')																	
				0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs
S26	0.2571	0.5231	2836	0.0002	0.0003	0.0005	0.0006	0.0008	0.0010	0.0013	0.0015	0.0018	0.0020	0.0022	0.0024	0.0025	0.0028	0.0031	0.0033	0.0036	0.0037
S27	0.2579	0.5245	2811	0.0002	0.0003	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0016	0.0018	0.0020	0.0022	0.0023	0.0026	0.0028	0.0030	0.0031	0.0033
S28	0.2575	0.5240	2823	0.0003	0.0005	0.0007	0.0008	0.0010	0.0012	0.0015	0.0017	0.0020	0.0022	0.0024	0.0026	0.0028	0.0029	0.0031	0.0033	0.0034	0.0036
S29	0.2572	0.5238	2830	0.0002	0.0004	0.0005	0.0007	0.0009	0.0010	0.0013	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0031	0.0033	0.0035
S30	0.2573	0.5248	2823	0.0003	0.0004	0.0005	0.0007	0.0008	0.0010	0.0013	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0031	0.0032	0.0034
S31	0.2576	0.5250	2815	0.0001	0.0004	0.0005	0.0007	0.0009	0.0010	0.0013	0.0015	0.0017	0.0019	0.0021	0.0023	0.0026	0.0028	0.0029	0.0031	0.0032	0.0034
S32	0.2572	0.5233	2832	0.0002	0.0004	0.0007	0.0008	0.0011	0.0012	0.0015	0.0017	0.0020	0.0022	0.0023	0.0026	0.0027	0.0030	0.0032	0.0035	0.0037	0.0038
S33	0.2570	0.5232	2838	0.0002	0.0003	0.0005	0.0008	0.0010	0.0012	0.0014	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0030	0.0033	0.0034	0.0036
S34	0.2570	0.5232	2837	0.0003	0.0004	0.0006	0.0008	0.0010	0.0013	0.0015	0.0018	0.0020	0.0022	0.0024	0.0026	0.0029	0.0031	0.0034	0.0035	0.0038	0.0040
S35	0.2573	0.5235	2830	0.0003	0.0004	0.0006	0.0008	0.0011	0.0013	0.0016	0.0018	0.0021	0.0022	0.0025	0.0026	0.0028	0.0031	0.0033	0.0034	0.0035	0.0038
S36	0.2573	0.5248	2822	0.0002	0.0004	0.0007	0.0008	0.0011	0.0012	0.0015	0.0017	0.0020	0.0021	0.0023	0.0025	0.0027	0.0029	0.0031	0.0032	0.0034	0.0036
S37	0.2574	0.5235	2827	0.0001	0.0003	0.0004	0.0006	0.0008	0.0010	0.0013	0.0016	0.0018	0.0020	0.0022	0.0024	0.0027	0.0028	0.0030	0.0031	0.0034	0.0035
S38	0.2571	0.5232	2835	0.0001	0.0003	0.0005	0.0006	0.0008	0.0010	0.0013	0.0015	0.0018	0.0020	0.0022	0.0024	0.0025	0.0027	0.0029	0.0030	0.0031	0.0033
S39	0.2574	0.5232	2828	0.0002	0.0003	0.0005	0.0007	0.0009	0.0010	0.0013	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0028	0.0031	0.0032	0.0033	0.0034
S40	0.2573	0.5237	2828	0.0001	0.0002	0.0003	0.0006	0.0007	0.0009	0.0011	0.0014	0.0016	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0033	0.0034
S41	0.2575	0.5240	2822	0.0003	0.0004	0.0005	0.0008	0.0010	0.0012	0.0014	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0031	0.0032	0.0035	0.0037
S42	0.2571	0.5229	2837	0.0002	0.0003	0.0005	0.0006	0.0009	0.0010	0.0013	0.0015	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0031	0.0034	0.0036
S43	0.2579	0.5244	2811	0.0002	0.0003	0.0004	0.0005	0.0007	0.0009	0.0012	0.0014	0.0016	0.0018	0.0020	0.0022	0.0024	0.0027	0.0029	0.0032	0.0034	0.0037
S44	0.2575	0.5247	2820	0.0003	0.0004	0.0005	0.0006	0.0008	0.0009	0.0012	0.0014	0.0016	0.0018	0.0020	0.0022	0.0024	0.0026	0.0027	0.0030	0.0031	0.0032
S45	0.2577	0.5249	2814	0.0003	0.0005	0.0007	0.0008	0.0010	0.0012	0.0015	0.0017	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0032	0.0034	0.0037	0.0039
S46	0.2570	0.5232	2837	0.0002	0.0003	0.0004	0.0005	0.0008	0.0010	0.0013	0.0015	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0029	0.0031	0.0032	0.0033
S47	0.2573	0.5235	2829	0.0003	0.0004	0.0005	0.0007	0.0008	0.0010	0.0012	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0030	0.0031	0.0033
S48	0.2574	0.5237	2827	0.0002	0.0003	0.0006	0.0008	0.0010	0.0012	0.0014	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0032	0.0033	0.0034	0.0036
S49	0.2570	0.5232	2837	0.0002	0.0003	0.0005	0.0006	0.0009	0.0011	0.0013	0.0016	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0032	0.0034	0.0036
S50	0.2572	0.5230	2835	0.0002	0.0003	0.0005	0.0007	0.0008	0.0010	0.0012	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0028	0.0030	0.0032	0.0034
Ave.	0.2573	0.5238	2827	0.0002	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0016	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0032	0.0034	0.0035
Med.	0.2573	0.5235	2828	0.0002	0.0003	0.0005	0.0007	0.0009	0.0010	0.0013	0.0015	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0032	0.0034	0.0036
St dev	0.0003	0.0007	8.4945	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002
Min.	0.2570	0.5229	2811	0.0001	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0016	0.0018	0.0020	0.0022	0.0023	0.0026	0.0027	0.0030	0.0031	0.0032
Max.	0.2579	0.5250	2838	0.0003	0.0005	0.0007	0.0008	0.0011	0.0013	0.0016	0.0018	0.0021	0.0022	0.0025	0.0026	0.0029	0.0031	0.0034	0.0035	0.0038	0.0040

## 3.11 Data Set 3, 105°C, 90mA (Lumen Maintenance)

Sample Number	Φ(lm) 0hr (Initial)	Lumen Maintenance (%)																	
		1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S51	81.80	100.07	99.91	99.76	99.58	99.39	99.15	99.01	98.83	98.69	98.57	98.48	98.39	98.29	98.21	98.13	98.06	97.96	97.86
S52	81.60	100.07	99.92	99.77	99.58	99.39	99.20	99.01	98.83	98.69	98.54	98.41	98.31	98.22	98.14	98.06	97.99	97.87	97.77
S53	82.14	100.02	99.87	99.72	99.53	99.34	99.11	98.92	98.74	98.56	98.43	98.35	98.22	98.17	98.05	97.97	97.88	97.78	97.66
S54	81.85	100.05	99.90	99.75	99.54	99.34	99.15	98.96	98.82	98.64	98.52	98.43	98.30	98.20	98.08	98.00	97.91	97.81	97.70
S55	81.77	100.08	99.93	99.78	99.57	99.38	99.16	98.98	98.80	98.61	98.50	98.40	98.28	98.23	98.10	98.02	97.95	97.85	97.74
S56	81.96	100.10	99.95	99.80	99.60	99.41	99.19	99.05	98.91	98.73	98.57	98.48	98.39	98.34	98.22	98.14	98.06	97.96	97.86
S57	82.05	100.06	99.91	99.76	99.60	99.44	99.25	99.07	98.93	98.79	98.66	98.54	98.41	98.32	98.24	98.11	98.04	97.94	97.83
S58	81.72	100.09	99.94	99.79	99.59	99.38	99.15	98.97	98.79	98.60	98.48	98.35	98.26	98.17	98.09	97.97	97.89	97.79	97.69
S59	82.15	100.08	99.93	99.78	99.62	99.43	99.21	99.03	98.89	98.70	98.59	98.46	98.37	98.28	98.16	98.08	97.99	97.89	97.79
S60	81.87	100.04	99.90	99.75	99.57	99.38	99.19	99.01	98.82	98.68	98.57	98.44	98.31	98.26	98.18	98.10	98.01	97.91	97.79
S61	81.72	100.01	99.87	99.72	99.55	99.37	99.18	98.99	98.81	98.63	98.47	98.34	98.25	98.16	98.04	97.96	97.87	97.75	97.64
S62	82.23	100.01	99.87	99.72	99.52	99.36	99.17	99.03	98.89	98.75	98.59	98.50	98.41	98.32	98.19	98.11	98.02	97.92	97.82
S63	81.90	100.10	99.95	99.81	99.65	99.44	99.21	99.07	98.89	98.70	98.54	98.42	98.32	98.27	98.19	98.12	98.03	97.92	97.81
S64	82.57	100.01	99.86	99.71	99.52	99.32	99.08	98.90	98.76	98.58	98.46	98.33	98.20	98.11	98.03	97.95	97.88	97.76	97.66
S65	82.43	100.00	99.86	99.71	99.52	99.36	99.17	98.99	98.81	98.63	98.47	98.37	98.28	98.23	98.15	98.07	97.98	97.86	97.76
S66	82.07	100.06	99.92	99.77	99.57	99.38	99.19	99.05	98.86	98.68	98.52	98.40	98.31	98.26	98.13	98.05	97.98	97.88	97.78
S67	82.02	100.05	99.91	99.76	99.57	99.38	99.19	99.01	98.83	98.64	98.52	98.43	98.35	98.30	98.17	98.09	98.02	97.90	97.78
S68	82.38	100.09	99.95	99.80	99.64	99.45	99.26	99.12	98.94	98.75	98.60	98.47	98.34	98.29	98.21	98.13	98.04	97.94	97.83
S69	82.18	100.10	99.95	99.80	99.61	99.41	99.19	99.01	98.83	98.65	98.53	98.44	98.36	98.26	98.19	98.11	98.03	97.93	97.81
S70	82.23	100.04	99.90	99.75	99.55	99.39	99.17	98.99	98.80	98.62	98.50	98.40	98.27	98.22	98.14	98.02	97.95	97.83	97.71
S71	82.49	100.08	99.93	99.78	99.62	99.46	99.24	99.06	98.92	98.74	98.58	98.49	98.40	98.30	98.18	98.06	97.98	97.86	97.76
S72	82.27	100.00	99.85	99.70	99.51	99.35	99.12	98.93	98.75	98.57	98.45	98.37	98.27	98.22	98.10	98.02	97.93	97.83	97.73
S73	82.27	100.05	99.91	99.76	99.55	99.39	99.17	98.99	98.81	98.67	98.51	98.42	98.29	98.24	98.16	98.03	97.96	97.86	97.74
S74	82.23	99.99	99.85	99.70	99.51	99.35	99.12	98.94	98.80	98.61	98.49	98.40	98.28	98.18	98.10	98.02	97.95	97.85	97.75
S75	82.49	100.08	99.94	99.79	99.59	99.40	99.18	99.04	98.86	98.72	98.60	98.51	98.41	98.36	98.24	98.16	98.08	97.97	97.85
Ave.	82.10	100.05	99.91	99.76	99.57	99.39	99.18	99.01	98.84	98.67	98.53	98.42	98.32	98.25	98.15	98.06	97.98	97.87	97.76
Med.	82.14	100.06	99.91	99.76	99.57	99.38	99.18	99.01	98.83	98.67	98.52	98.42	98.31	98.26	98.16	98.06	97.98	97.87	97.77
St dev	0.2703	0.0350	0.0337	0.0336	0.0392	0.0366	0.0424	0.0507	0.0544	0.0616	0.0568	0.0561	0.0606	0.0613	0.0605	0.0613	0.0614	0.0628	0.0626
Min.	81.60	99.99	99.85	99.70	99.51	99.32	99.08	98.90	98.74	98.56	98.43	98.33	98.20	98.11	98.03	97.95	97.87	97.75	97.64
Max.	82.57	100.10	99.95	99.81	99.65	99.46	99.26	99.12	98.94	98.79	98.66	98.54	98.41	98.36	98.24	98.16	98.08	97.97	97.86

## 3.12 Data Set 3, 105°C, 90mA (Photon Flux Maintenance, Photosynthetic (PFMp))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Photosynthetic (PFMp) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S51	1.295	100.00	99.83	99.66	99.47	99.28	99.07	98.91	98.77	98.62	98.52	98.40	98.29	98.22	98.16	98.04	97.92	97.87	97.80
S52	1.296	100.03	99.86	99.69	99.50	99.29	99.10	98.92	98.75	98.60	98.49	98.38	98.26	98.12	98.06	97.95	97.83	97.71	97.64
S53	1.296	99.97	99.80	99.63	99.44	99.23	99.04	98.86	98.72	98.54	98.42	98.31	98.21	98.07	98.00	97.90	97.85	97.78	97.66
S54	1.296	100.02	99.85	99.68	99.45	99.21	99.00	98.82	98.69	98.56	98.44	98.33	98.23	98.16	98.03	97.93	97.86	97.73	97.61
S55	1.296	100.03	99.86	99.69	99.48	99.29	99.10	98.94	98.80	98.63	98.52	98.40	98.28	98.15	98.01	97.91	97.84	97.72	97.65
S56	1.296	100.01	99.84	99.67	99.48	99.25	99.03	98.86	98.72	98.58	98.47	98.35	98.25	98.11	98.04	98.00	97.93	97.81	97.74
S57	1.296	100.05	99.88	99.72	99.48	99.25	99.01	98.81	98.67	98.49	98.38	98.27	98.17	98.10	98.03	98.00	97.93	97.86	97.80
S58	1.296	100.00	99.83	99.66	99.47	99.28	99.09	98.88	98.73	98.56	98.45	98.34	98.22	98.16	98.09	97.97	97.90	97.78	97.66
S59	1.296	100.04	99.88	99.71	99.47	99.28	99.09	98.93	98.80	98.65	98.54	98.42	98.32	98.25	98.18	98.07	98.01	97.96	97.91
S60	1.296	100.01	99.84	99.67	99.48	99.27	99.03	98.87	98.72	98.59	98.47	98.36	98.24	98.11	98.04	98.00	97.93	97.81	97.76
S61	1.296	100.02	99.84	99.68	99.47	99.23	99.02	98.86	98.68	98.55	98.44	98.34	98.23	98.16	98.09	97.98	97.85	97.73	97.66
S62	1.297	100.07	99.90	99.74	99.50	99.27	99.05	98.85	98.70	98.55	98.45	98.33	98.21	98.08	98.01	97.91	97.86	97.80	97.73
S63	1.290	99.99	99.82	99.66	99.42	99.23	99.02	98.86	98.68	98.53	98.42	98.31	98.19	98.06	97.93	97.89	97.82	97.70	97.63
S64	1.295	100.08	99.90	99.73	99.50	99.29	99.08	98.91	98.77	98.59	98.47	98.35	98.23	98.09	97.94	97.83	97.78	97.66	97.60
S65	1.294	99.99	99.83	99.66	99.43	99.24	99.03	98.82	98.68	98.51	98.40	98.28	98.17	98.03	97.89	97.85	97.73	97.68	97.55
S66	1.294	100.05	99.88	99.72	99.53	99.34	99.10	98.93	98.78	98.60	98.50	98.38	98.26	98.19	98.13	98.09	98.02	97.95	97.88
S67	1.295	100.07	99.90	99.73	99.49	99.26	99.07	98.90	98.77	98.64	98.52	98.41	98.31	98.24	98.11	97.99	97.87	97.82	97.77
S68	1.295	100.03	99.86	99.69	99.48	99.27	99.04	98.83	98.65	98.50	98.39	98.27	98.16	98.09	97.94	97.83	97.78	97.65	97.53
S69	1.295	99.98	99.81	99.64	99.45	99.24	99.03	98.82	98.65	98.50	98.38	98.27	98.15	98.01	97.94	97.82	97.75	97.69	97.56
S70	1.295	100.07	99.90	99.73	99.52	99.30	99.07	98.86	98.68	98.54	98.42	98.31	98.19	98.04	97.98	97.87	97.75	97.63	97.51
S71	1.295	100.01	99.83	99.67	99.46	99.22	99.03	98.82	98.69	98.51	98.39	98.28	98.17	98.03	97.88	97.85	97.79	97.72	97.67
S72	1.295	100.00	99.84	99.66	99.45	99.24	99.05	98.84	98.71	98.58	98.46	98.35	98.25	98.11	97.97	97.87	97.80	97.75	97.63
S73	1.295	99.97	99.81	99.64	99.40	99.21	99.00	98.84	98.66	98.51	98.41	98.30	98.19	98.04	97.97	97.86	97.74	97.67	97.62
S74	1.295	100.08	99.91	99.74	99.55	99.32	99.11	98.90	98.72	98.57	98.46	98.34	98.23	98.16	98.02	97.91	97.84	97.77	97.70
S75	1.295	99.99	99.83	99.66	99.47	99.28	99.07	98.91	98.73	98.55	98.45	98.33	98.22	98.08	98.02	97.98	97.93	97.87	97.75
Ave.	1.295	100.02	99.85	99.69	99.47	99.26	99.05	98.87	98.72	98.56	98.45	98.34	98.22	98.11	98.02	97.93	97.85	97.76	97.68
Med.	1.295	100.02	99.84	99.68	99.47	99.27	99.05	98.86	98.72	98.56	98.45	98.34	98.23	98.11	98.02	97.91	97.85	97.75	97.66
St dev	0.0013	0.0334	0.0330	0.0326	0.0332	0.0328	0.0331	0.0401	0.0452	0.0451	0.0466	0.0453	0.0462	0.0666	0.0776	0.0769	0.0797	0.0893	0.1024
Min.	1.290	99.97	99.80	99.63	99.40	99.21	99.00	98.81	98.65	98.49	98.38	98.27	98.15	98.01	97.88	97.82	97.73	97.63	97.51
Max.	1.297	100.08	99.91	99.74	99.55	99.34	99.11	98.94	98.80	98.65	98.54	98.42	98.32	98.25	98.18	98.09	98.02	97.96	97.91

## 3.13 Data Set 3, 105°C, 90mA (Photon Flux Maintenance, Far-Red (PFMFR))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Far-Red (PFMFR) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S51	0.0948	100.04	99.91	99.77	99.59	99.37	99.16	98.97	98.83	98.65	98.52	98.42	98.31	98.23	98.16	98.04	97.93	97.84	97.80
S52	0.0948	99.96	99.83	99.65	99.45	99.23	99.01	98.86	98.68	98.49	98.37	98.27	98.16	98.02	97.89	97.83	97.77	97.68	97.64
S53	0.0949	99.99	99.81	99.68	99.49	99.27	99.04	98.90	98.75	98.57	98.45	98.34	98.24	98.15	98.08	97.96	97.91	97.81	97.78
S54	0.0948	100.03	99.85	99.72	99.51	99.30	99.08	98.90	98.72	98.57	98.45	98.34	98.26	98.17	98.10	98.05	97.93	97.84	97.75
S55	0.0949	99.98	99.80	99.67	99.48	99.27	99.05	98.87	98.68	98.53	98.43	98.32	98.21	98.12	98.00	97.94	97.88	97.84	97.75
S56	0.0949	100.02	99.84	99.70	99.52	99.29	99.05	98.87	98.69	98.50	98.38	98.28	98.19	98.04	97.98	97.86	97.75	97.65	97.56
S57	0.0949	100.03	99.85	99.71	99.51	99.27	99.06	98.91	98.77	98.58	98.48	98.39	98.29	98.14	98.07	98.01	97.90	97.81	97.71
S58	0.0949	100.02	99.89	99.71	99.53	99.31	99.09	98.94	98.76	98.61	98.50	98.39	98.29	98.14	98.08	98.02	97.90	97.87	97.77
S59	0.0948	99.96	99.82	99.65	99.44	99.21	98.99	98.84	98.70	98.52	98.41	98.31	98.21	98.12	97.99	97.87	97.82	97.72	97.63
S60	0.0950	100.03	99.85	99.71	99.51	99.27	99.06	98.92	98.78	98.62	98.50	98.39	98.29	98.14	98.07	97.96	97.90	97.81	97.77
S61	0.0949	100.03	99.85	99.68	99.47	99.26	99.05	98.86	98.72	98.54	98.43	98.33	98.24	98.10	98.03	97.96	97.85	97.76	97.67
S62	0.0949	100.02	99.89	99.71	99.51	99.29	99.05	98.91	98.73	98.59	98.46	98.35	98.27	98.18	98.11	98.05	97.99	97.96	97.87
S63	0.0936	100.00	99.83	99.69	99.50	99.27	99.06	98.90	98.76	98.58	98.47	98.37	98.27	98.12	98.05	97.94	97.82	97.73	97.69
S64	0.0937	99.98	99.80	99.67	99.48	99.24	99.03	98.84	98.66	98.51	98.40	98.30	98.22	98.13	98.00	97.94	97.88	97.79	97.70
S65	0.0938	99.98	99.84	99.67	99.48	99.27	99.05	98.91	98.76	98.61	98.49	98.38	98.28	98.19	98.12	98.00	97.95	97.85	97.76
S66	0.0937	100.04	99.86	99.68	99.50	99.29	99.07	98.89	98.74	98.59	98.49	98.38	98.28	98.19	98.06	97.94	97.89	97.85	97.82
S67	0.0937	100.04	99.90	99.77	99.58	99.35	99.11	98.93	98.75	98.60	98.49	98.40	98.30	98.21	98.08	98.02	97.91	97.82	97.73
S68	0.0936	99.99	99.86	99.72	99.54	99.31	99.09	98.94	98.80	98.66	98.53	98.43	98.34	98.20	98.07	97.95	97.84	97.75	97.65
S69	0.0938	100.04	99.87	99.73	99.55	99.31	99.08	98.90	98.74	98.60	98.48	98.37	98.28	98.19	98.07	97.95	97.84	97.80	97.71
S70	0.0937	100.02	99.84	99.66	99.47	99.24	99.00	98.82	98.67	98.52	98.41	98.32	98.22	98.13	98.06	98.00	97.89	97.80	97.71
S71	0.0937	100.03	99.85	99.67	99.49	99.26	99.02	98.88	98.74	98.59	98.47	98.37	98.27	98.18	98.05	97.99	97.88	97.79	97.75
S72	0.0937	100.01	99.83	99.69	99.51	99.29	99.07	98.93	98.79	98.60	98.50	98.39	98.28	98.20	98.13	98.01	97.95	97.86	97.77
S73	0.0937	100.03	99.90	99.72	99.54	99.32	99.11	98.96	98.82	98.64	98.52	98.43	98.32	98.18	98.11	97.99	97.94	97.84	97.75
S74	0.0937	100.01	99.87	99.69	99.51	99.29	99.06	98.88	98.69	98.55	98.43	98.34	98.23	98.14	98.07	97.96	97.84	97.75	97.66
S75	0.0937	100.01	99.84	99.66	99.45	99.22	98.98	98.83	98.68	98.54	98.43	98.35	98.24	98.09	97.97	97.85	97.74	97.70	97.61
Ave.	0.0943	100.01	99.85	99.70	99.50	99.28	99.06	98.89	98.74	98.58	98.46	98.36	98.26	98.15	98.06	97.96	97.88	97.80	97.72
Med.	0.0938	100.02	99.85	99.69	99.51	99.27	99.06	98.90	98.74	98.58	98.47	98.37	98.27	98.14	98.07	97.96	97.89	97.81	97.73
St dev	0.0006	0.0248	0.0297	0.0333	0.0363	0.0374	0.0393	0.0397	0.0471	0.0460	0.0437	0.0444	0.0433	0.0502	0.0593	0.0610	0.0636	0.0676	0.0700
Min.	0.0936	99.96	99.80	99.65	99.44	99.21	98.98	98.82	98.66	98.49	98.37	98.27	98.16	98.02	97.89	97.83	97.74	97.65	97.56
Max.	0.0950	100.04	99.91	99.77	99.59	99.37	99.16	98.97	98.83	98.66	98.53	98.43	98.34	98.23	98.16	98.05	97.99	97.96	97.87

## 3.14 Data Set 3, 105°C, 90mA (Forward Voltage)

Sample Number	Forward Voltage(V)																		
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S51	5.495	5.478	5.481	5.471	5.476	5.471	5.464	5.466	5.462	5.455	5.457	5.457	5.458	5.456	5.453	5.458	5.454	5.456	5.446
S52	5.504	5.467	5.466	5.465	5.463	5.460	5.465	5.459	5.454	5.458	5.457	5.444	5.448	5.444	5.450	5.440	5.439	5.444	5.438
S53	5.489	5.487	5.486	5.479	5.476	5.473	5.477	5.474	5.473	5.470	5.464	5.469	5.470	5.464	5.466	5.464	5.461	5.450	5.458
S54	5.492	5.480	5.480	5.470	5.471	5.473	5.467	5.464	5.465	5.453	5.465	5.455	5.456	5.451	5.450	5.447	5.442	5.442	5.446
S55	5.491	5.478	5.471	5.474	5.474	5.467	5.465	5.462	5.459	5.456	5.462	5.455	5.453	5.449	5.448	5.455	5.451	5.445	5.443
S56	5.485	5.476	5.472	5.465	5.472	5.467	5.458	5.460	5.457	5.457	5.456	5.458	5.447	5.450	5.446	5.442	5.443	5.438	5.436
S57	5.455	5.439	5.440	5.440	5.440	5.433	5.431	5.429	5.429	5.425	5.424	5.421	5.426	5.421	5.410	5.409	5.406	5.418	5.410
S58	5.499	5.471	5.467	5.469	5.468	5.463	5.466	5.462	5.459	5.456	5.459	5.449	5.448	5.445	5.441	5.448	5.441	5.436	5.444
S59	5.484	5.493	5.493	5.481	5.485	5.478	5.481	5.479	5.481	5.469	5.473	5.468	5.469	5.468	5.459	5.459	5.460	5.461	5.453
S60	5.487	5.482	5.478	5.476	5.474	5.474	5.469	5.468	5.469	5.460	5.458	5.461	5.458	5.455	5.461	5.454	5.455	5.457	5.453
S61	5.499	5.472	5.477	5.474	5.468	5.470	5.461	5.463	5.466	5.459	5.458	5.453	5.449	5.453	5.445	5.444	5.448	5.448	5.445
S62	5.489	5.500	5.496	5.499	5.493	5.496	5.495	5.488	5.488	5.479	5.484	5.485	5.481	5.481	5.479	5.477	5.474	5.472	5.476
S63	5.500	5.490	5.486	5.487	5.481	5.485	5.478	5.479	5.479	5.478	5.470	5.471	5.475	5.470	5.470	5.465	5.466	5.459	5.455
S64	5.494	5.460	5.456	5.453	5.453	5.446	5.446	5.446	5.448	5.444	5.437	5.434	5.438	5.445	5.440	5.441	5.438	5.437	5.433
S65	5.460	5.499	5.498	5.494	5.487	5.492	5.486	5.483	5.482	5.475	5.481	5.474	5.473	5.475	5.469	5.465	5.473	5.465	5.465
S66	5.504	5.501	5.501	5.496	5.496	5.495	5.496	5.495	5.490	5.492	5.483	5.478	5.488	5.478	5.480	5.472	5.477	5.469	5.467
S67	5.509	5.501	5.498	5.496	5.490	5.489	5.490	5.483	5.486	5.481	5.473	5.481	5.482	5.471	5.474	5.471	5.467	5.471	5.461
S68	5.490	5.487	5.485	5.484	5.483	5.475	5.481	5.476	5.477	5.472	5.465	5.463	5.467	5.468	5.458	5.465	5.456	5.459	5.458
S69	5.496	5.494	5.490	5.492	5.488	5.486	5.490	5.478	5.483	5.471	5.479	5.474	5.468	5.474	5.473	5.475	5.468	5.472	5.458
S70	5.497	5.492	5.489	5.486	5.483	5.483	5.478	5.477	5.480	5.471	5.473	5.470	5.473	5.466	5.470	5.461	5.470	5.466	5.459
S71	5.489	5.507	5.505	5.502	5.507	5.497	5.495	5.498	5.495	5.494	5.494	5.490	5.487	5.487	5.486	5.489	5.487	5.485	5.482
S72	5.492	5.497	5.496	5.498	5.499	5.488	5.492	5.486	5.484	5.476	5.483	5.485	5.474	5.474	5.478	5.478	5.478	5.465	5.463
S73	5.500	5.498	5.496	5.494	5.489	5.491	5.489	5.485	5.482	5.480	5.475	5.474	5.473	5.473	5.477	5.464	5.472	5.469	5.464
S74	5.497	5.493	5.487	5.483	5.489	5.476	5.483	5.481	5.475	5.474	5.473	5.471	5.471	5.469	5.467	5.467	5.467	5.461	5.467
S75	5.460	5.500	5.497	5.492	5.488	5.493	5.485	5.485	5.488	5.484	5.476	5.474	5.481	5.481	5.476	5.473	5.468	5.462	5.474
Ave.	5.490	5.486	5.484	5.481	5.480	5.477	5.475	5.473	5.472	5.468	5.467	5.465	5.464	5.463	5.461	5.459	5.458	5.456	5.454
Med.	5.492	5.490	5.486	5.483	5.483	5.476	5.478	5.477	5.477	5.471	5.470	5.469	5.469	5.468	5.466	5.464	5.461	5.459	5.458
St dev	0.0135	0.0156	0.0154	0.0153	0.0146	0.0157	0.0162	0.0155	0.0155	0.0154	0.0151	0.0162	0.0158	0.0153	0.0174	0.0166	0.0173	0.0150	0.0157
Min.	5.455	5.439	5.440	5.440	5.440	5.433	5.431	5.429	5.429	5.425	5.424	5.421	5.426	5.421	5.410	5.409	5.406	5.418	5.410
Max.	5.509	5.507	5.505	5.502	5.507	5.497	5.496	5.498	5.495	5.494	5.494	5.490	5.488	5.487	5.486	5.489	5.487	5.485	5.482



## 3.15 Data Set 3, 105°C, 90mA (Chromaticity Shift)

Sample Number	u'	v'	CCT(K)	Chromaticity Shift (Au'v')																	
				0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs
S51	0.2575	0.5244	2821	0.0002	0.0004	0.0006	0.0007	0.0009	0.0012	0.0015	0.0017	0.0020	0.0022	0.0025	0.0027	0.0029	0.0032	0.0034	0.0036	0.0037	0.0038
S52	0.2572	0.5241	2830	0.0003	0.0004	0.0006	0.0008	0.0011	0.0012	0.0013	0.0017	0.0019	0.0022	0.0024	0.0027	0.0029	0.0032	0.0034	0.0037	0.0038	0.0039
S53	0.2576	0.5256	2814	0.0003	0.0006	0.0007	0.0010	0.0013	0.0014	0.0018	0.0021	0.0024	0.0026	0.0029	0.0032	0.0035	0.0037	0.0040	0.0042	0.0044	0.0043
S54	0.2572	0.5239	2829	0.0002	0.0004	0.0005	0.0007	0.0008	0.0010	0.0013	0.0016	0.0017	0.0020	0.0021	0.0022	0.0025	0.0027	0.0030	0.0031	0.0032	0.0033
S55	0.2575	0.5247	2820	0.0002	0.0005	0.0006	0.0008	0.0009	0.0010	0.0012	0.0013	0.0016	0.0018	0.0019	0.0021	0.0023	0.0026	0.0029	0.0030	0.0033	0.0033
S56	0.2571	0.5241	2831	0.0002	0.0005	0.0006	0.0008	0.0009	0.0012	0.0015	0.0017	0.0020	0.0023	0.0024	0.0027	0.0030	0.0032	0.0034	0.0036	0.0037	0.0038
S57	0.2575	0.5242	2822	0.0003	0.0006	0.0007	0.0010	0.0011	0.0014	0.0017	0.0018	0.0020	0.0022	0.0023	0.0026	0.0028	0.0031	0.0034	0.0035	0.0037	0.0038
S58	0.2576	0.5249	2816	0.0002	0.0004	0.0006	0.0009	0.0011	0.0013	0.0015	0.0018	0.0021	0.0022	0.0024	0.0026	0.0029	0.0031	0.0033	0.0036	0.0038	0.0038
S59	0.2581	0.5254	2803	0.0003	0.0006	0.0007	0.0010	0.0011	0.0014	0.0016	0.0019	0.0020	0.0021	0.0023	0.0025	0.0028	0.0031	0.0033	0.0035	0.0037	0.0038
S60	0.2578	0.5258	2808	0.0002	0.0003	0.0005	0.0007	0.0008	0.0009	0.0010	0.0014	0.0015	0.0018	0.0020	0.0023	0.0025	0.0028	0.0030	0.0033	0.0035	0.0035
S61	0.2576	0.5248	2816	0.0003	0.0004	0.0006	0.0009	0.0011	0.0014	0.0017	0.0019	0.0022	0.0025	0.0027	0.0029	0.0031	0.0034	0.0037	0.0039	0.0041	0.0041
S62	0.2574	0.5256	2816	0.0003	0.0004	0.0007	0.0008	0.0009	0.0012	0.0015	0.0019	0.0020	0.0022	0.0023	0.0025	0.0027	0.0030	0.0032	0.0034	0.0036	0.0036
S63	0.2570	0.5262	2823	0.0002	0.0003	0.0005	0.0008	0.0011	0.0013	0.0016	0.0017	0.0019	0.0022	0.0023	0.0025	0.0028	0.0030	0.0033	0.0035	0.0037	0.0038
S64	0.2567	0.5274	2824	0.0002	0.0006	0.0007	0.0009	0.0011	0.0013	0.0015	0.0017	0.0018	0.0019	0.0020	0.0022	0.0024	0.0027	0.0030	0.0032	0.0033	0.0034
S65	0.2566	0.5259	2832	0.0003	0.0004	0.0006	0.0008	0.0010	0.0011	0.0014	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0028	0.0030	0.0032	0.0034	0.0035
S66	0.2568	0.5266	2824	0.0002	0.0005	0.0006	0.0008	0.0011	0.0014	0.0015	0.0018	0.0021	0.0023	0.0025	0.0028	0.0030	0.0032	0.0035	0.0037	0.0040	0.0039
S67	0.2563	0.5258	2840	0.0002	0.0004	0.0006	0.0009	0.0012	0.0014	0.0017	0.0020	0.0024	0.0027	0.0029	0.0031	0.0033	0.0035	0.0038	0.0040	0.0041	0.0042
S68	0.2563	0.5259	2841	0.0003	0.0005	0.0007	0.0010	0.0011	0.0014	0.0017	0.0020	0.0022	0.0024	0.0027	0.0029	0.0032	0.0035	0.0037	0.0040	0.0042	0.0042
S69	0.2566	0.5264	2831	0.0003	0.0005	0.0007	0.0008	0.0011	0.0013	0.0014	0.0017	0.0020	0.0021	0.0023	0.0025	0.0028	0.0031	0.0033	0.0035	0.0037	0.0037
S70	0.2564	0.5257	2838	0.0002	0.0004	0.0006	0.0008	0.0011	0.0014	0.0015	0.0018	0.0022	0.0024	0.0026	0.0028	0.0030	0.0033	0.0035	0.0037	0.0039	0.0039
S71	0.2572	0.5271	2814	0.0003	0.0004	0.0006	0.0007	0.0008	0.0011	0.0015	0.0018	0.0021	0.0022	0.0024	0.0025	0.0028	0.0030	0.0033	0.0035	0.0036	0.0037
S72	0.2570	0.5275	2818	0.0003	0.0006	0.0007	0.0008	0.0009	0.0011	0.0012	0.0014	0.0016	0.0018	0.0019	0.0021	0.0023	0.0026	0.0029	0.0031	0.0033	0.0033
S73	0.2567	0.5261	2830	0.0002	0.0005	0.0006	0.0008	0.0011	0.0014	0.0017	0.0020	0.0021	0.0024	0.0026	0.0028	0.0030	0.0033	0.0035	0.0037	0.0039	0.0039
S74	0.2565	0.5257	2837	0.0003	0.0004	0.0006	0.0009	0.0012	0.0013	0.0014	0.0016	0.0019	0.0021	0.0024	0.0026	0.0029	0.0031	0.0034	0.0036	0.0038	0.0039
S75	0.2566	0.5260	2834	0.0003	0.0005	0.0006	0.0009	0.0010	0.0011	0.0015	0.0018	0.0021	0.0022	0.0024	0.0025	0.0028	0.0030	0.0033	0.0034	0.0036	0.0037
Ave.	0.2571	0.5256	2824	0.0003	0.0005	0.0006	0.0008	0.0010	0.0012	0.0015	0.0017	0.0020	0.0022	0.0024	0.0026	0.0028	0.0031	0.0033	0.0035	0.0037	0.0038
Med.	0.2571	0.5257	2824	0.0003	0.0004	0.0006	0.0008	0.0011	0.0013	0.0015	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0031	0.0033	0.0035	0.0037	0.0038
St dev	0.0005	0.0010	10.0379	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
Min.	0.2563	0.5239	2803	0.0002	0.0003	0.0005	0.0007	0.0008	0.0009	0.0010	0.0013	0.0015	0.0018	0.0019	0.0021	0.0023	0.0026	0.0029	0.0030	0.0032	0.0033
Max.	0.2581	0.5275	2841	0.0003	0.0006	0.0007	0.0010	0.0013	0.0014	0.0018	0.0021	0.0024	0.0027	0.0029	0.0032	0.0035	0.0037	0.0040	0.0042	0.0044	0.0043

## 3.16 Data Set 4, 55°C, 160mA (Lumen Maintenance)

Sample Number	Φ(lm)	Lumen Maintenance (%)																	
		0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs
S76	141.1	100.23	100.13	99.98	99.85	99.71	99.56	99.41	99.30	99.15	99.03	98.95	98.84	98.76	98.68	98.59	98.54	98.48	98.42
S77	141.5	100.17	100.06	99.96	99.81	99.66	99.51	99.37	99.22	99.07	98.96	98.86	98.74	98.68	98.60	98.51	98.40	98.34	98.27
S78	141.3	100.15	100.05	99.90	99.76	99.61	99.46	99.31	99.17	99.02	98.94	98.83	98.75	98.66	98.57	98.51	98.44	98.39	98.32
S79	141.4	100.20	100.09	99.99	99.84	99.69	99.54	99.40	99.26	99.14	99.04	98.92	98.84	98.78	98.69	98.63	98.56	98.45	98.39
S80	141.8	100.21	100.10	100.00	99.85	99.70	99.55	99.40	99.26	99.11	99.00	98.92	98.84	98.77	98.71	98.62	98.55	98.49	98.38
S81	140.9	100.21	100.11	99.96	99.81	99.67	99.54	99.39	99.24	99.09	98.99	98.87	98.77	98.69	98.62	98.53	98.48	98.43	98.32
S82	141.2	100.24	100.14	99.99	99.84	99.69	99.56	99.42	99.27	99.13	99.01	98.93	98.85	98.76	98.70	98.63	98.52	98.47	98.42
S83	141.1	100.22	100.12	100.02	99.89	99.74	99.61	99.46	99.31	99.20	99.10	98.99	98.89	98.80	98.74	98.65	98.59	98.53	98.47
S84	140.8	100.21	100.06	99.92	99.77	99.62	99.48	99.36	99.21	99.06	98.98	98.87	98.76	98.68	98.61	98.53	98.48	98.37	98.26
S85	141.6	100.21	100.06	99.92	99.79	99.64	99.49	99.34	99.23	99.08	99.00	98.92	98.81	98.75	98.66	98.59	98.49	98.43	98.38
S86	141.2	100.25	100.15	100.04	99.91	99.77	99.62	99.48	99.36	99.22	99.14	99.03	98.93	98.84	98.78	98.71	98.66	98.55	98.45
S87	141.0	100.16	100.06	99.92	99.79	99.64	99.49	99.38	99.26	99.15	99.05	98.97	98.85	98.76	98.68	98.59	98.54	98.47	98.42
S88	140.4	100.25	100.14	100.00	99.85	99.70	99.57	99.43	99.31	99.17	99.05	98.94	98.82	98.73	98.67	98.60	98.54	98.47	98.36
S89	140.7	100.24	100.10	100.00	99.85	99.70	99.55	99.43	99.32	99.20	99.10	99.02	98.91	98.83	98.75	98.66	98.55	98.50	98.44
S90	140.3	100.24	100.14	99.99	99.85	99.70	99.55	99.43	99.29	99.18	99.07	98.97	98.85	98.79	98.72	98.63	98.57	98.51	98.41
S91	140.0	100.20	100.09	99.95	99.82	99.67	99.52	99.40	99.29	99.15	99.07	98.98	98.90	98.82	98.73	98.66	98.59	98.53	98.42
S92	140.8	100.22	100.08	99.93	99.78	99.64	99.49	99.34	99.20	99.05	98.93	98.85	98.77	98.70	98.64	98.55	98.50	98.45	98.34
S93	140.4	100.19	100.08	99.98	99.85	99.72	99.57	99.43	99.28	99.13	99.02	98.90	98.82	98.73	98.67	98.60	98.53	98.47	98.40
S94	140.2	100.15	100.00	99.86	99.71	99.58	99.45	99.30	99.15	99.00	98.92	98.81	98.71	98.62	98.56	98.49	98.44	98.33	98.22
S95	140.3	100.24	100.13	100.03	99.88	99.75	99.60	99.46	99.32	99.17	99.06	98.94	98.86	98.80	98.71	98.62	98.57	98.46	98.41
S96	140.8	100.21	100.11	100.00	99.86	99.73	99.60	99.48	99.33	99.22	99.14	99.03	98.93	98.86	98.77	98.71	98.64	98.53	98.47
S97	139.9	100.19	100.04	99.90	99.75	99.62	99.49	99.34	99.19	99.05	98.96	98.88	98.80	98.72	98.64	98.55	98.44	98.39	98.28
S98	139.3	100.16	100.06	99.92	99.77	99.62	99.49	99.34	99.19	99.05	98.93	98.82	98.74	98.65	98.57	98.50	98.45	98.39	98.34
S99	139.9	100.17	100.07	99.97	99.82	99.67	99.52	99.37	99.22	99.11	99.00	98.88	98.77	98.68	98.61	98.55	98.44	98.33	98.22
S100	140.4	100.16	100.01	99.87	99.74	99.59	99.44	99.29	99.15	99.01	98.92	98.84	98.74	98.65	98.56	98.48	98.41	98.34	98.29
Ave.	140.7	100.20	100.09	99.96	99.82	99.67	99.53	99.39	99.25	99.12	99.02	98.92	98.82	98.74	98.66	98.59	98.52	98.44	98.36
Med.	140.8	100.21	100.09	99.97	99.82	99.67	99.54	99.40	99.26	99.13	99.01	98.92	98.82	98.75	98.67	98.59	98.53	98.46	98.38
St dev	0.6135	0.0322	0.0395	0.0500	0.0507	0.0505	0.0505	0.0537	0.0589	0.0660	0.0639	0.0653	0.0637	0.0660	0.0657	0.0662	0.0692	0.0679	0.0731
Min.	139.3	100.15	100.00	99.86	99.71	99.58	99.44	99.29	99.15	99.00	98.92	98.81	98.71	98.62	98.56	98.48	98.40	98.33	98.22
Max.	141.8	100.25	100.15	100.04	99.91	99.77	99.62	99.48	99.36	99.22	99.14	99.03	98.93	98.86	98.78	98.71	98.66	98.55	98.47

## 3.17 Data Set 4, 55°C, 160mA (Photon Flux Maintenance, Photosynthetic (PFMp) )

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Photosynthetic (PFMp) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S76	2.194	100.16	100.03	99.89	99.74	99.58	99.43	99.30	99.17	99.06	98.93	98.79	98.67	98.59	98.51	98.43	98.34	98.28	98.20
S77	2.194	100.21	100.08	99.94	99.79	99.59	99.45	99.32	99.22	99.10	99.02	98.93	98.84	98.76	98.67	98.59	98.51	98.42	98.36
S78	2.194	100.14	100.01	99.91	99.77	99.58	99.43	99.30	99.19	99.08	98.94	98.82	98.70	98.62	98.54	98.46	98.40	98.35	98.26
S79	2.193	100.19	100.05	99.92	99.73	99.59	99.43	99.32	99.21	99.08	98.96	98.85	98.73	98.64	98.56	98.48	98.39	98.30	98.21
S80	2.194	100.23	100.14	100.04	99.90	99.75	99.61	99.48	99.35	99.24	99.15	99.03	98.91	98.83	98.75	98.67	98.58	98.52	98.44
S81	2.194	100.21	100.08	99.94	99.75	99.61	99.47	99.36	99.25	99.12	99.03	98.90	98.78	98.70	98.62	98.53	98.44	98.39	98.30
S82	2.194	100.11	99.98	99.88	99.74	99.60	99.46	99.35	99.24	99.11	99.02	98.91	98.82	98.73	98.65	98.57	98.51	98.45	98.37
S83	2.194	100.15	100.05	99.91	99.77	99.62	99.47	99.34	99.21	99.10	98.98	98.86	98.74	98.66	98.58	98.50	98.42	98.36	98.27
S84	2.194	100.15	100.06	99.96	99.76	99.61	99.47	99.36	99.25	99.12	98.99	98.90	98.78	98.70	98.62	98.54	98.45	98.36	98.31
S85	2.194	100.19	100.10	100.00	99.85	99.65	99.50	99.39	99.28	99.17	99.08	98.94	98.83	98.74	98.66	98.58	98.52	98.47	98.41
S86	2.194	100.22	100.09	99.95	99.81	99.62	99.47	99.36	99.25	99.12	99.03	98.91	98.79	98.71	98.62	98.54	98.45	98.39	98.34
S87	2.195	100.20	100.06	99.92	99.77	99.63	99.44	99.31	99.20	99.09	98.95	98.87	98.75	98.67	98.58	98.50	98.41	98.32	98.24
S88	2.186	100.21	100.11	99.98	99.82	99.63	99.48	99.35	99.22	99.11	98.99	98.90	98.76	98.68	98.60	98.52	98.43	98.35	98.26
S89	2.185	100.14	100.04	99.94	99.79	99.60	99.46	99.35	99.24	99.11	98.97	98.84	98.72	98.64	98.56	98.48	98.39	98.30	98.22
S90	2.184	100.22	100.08	99.99	99.79	99.64	99.50	99.39	99.28	99.17	99.04	98.92	98.78	98.70	98.62	98.54	98.45	98.37	98.28
S91	2.184	100.11	100.01	99.88	99.72	99.57	99.38	99.27	99.14	99.03	98.89	98.80	98.72	98.63	98.55	98.47	98.38	98.32	98.23
S92	2.185	100.21	100.11	99.98	99.82	99.63	99.44	99.31	99.18	99.07	98.95	98.81	98.73	98.64	98.56	98.48	98.39	98.30	98.24
S93	2.185	100.17	100.08	99.94	99.79	99.63	99.49	99.36	99.25	99.14	99.05	98.94	98.82	98.73	98.65	98.57	98.48	98.42	98.37
S94	2.185	100.19	100.09	99.96	99.80	99.65	99.51	99.38	99.27	99.16	99.07	98.95	98.86	98.78	98.70	98.62	98.53	98.44	98.35
S95	2.185	100.20	100.10	99.97	99.83	99.68	99.48	99.37	99.26	99.15	99.02	98.93	98.79	98.71	98.63	98.55	98.49	98.43	98.34
S96	2.184	100.24	100.14	100.04	99.89	99.69	99.54	99.43	99.32	99.21	99.08	98.94	98.85	98.77	98.69	98.60	98.52	98.46	98.38
S97	2.185	100.19	100.05	99.96	99.76	99.62	99.49	99.38	99.27	99.14	99.02	98.88	98.76	98.68	98.60	98.52	98.43	98.38	98.32
S98	2.175	100.24	100.14	100.01	99.85	99.70	99.56	99.45	99.34	99.23	99.11	99.02	98.90	98.82	98.73	98.65	98.57	98.48	98.40
S99	2.179	100.17	100.04	99.90	99.76	99.61	99.47	99.36	99.25	99.14	99.05	98.91	98.80	98.72	98.63	98.55	98.49	98.44	98.35
S100	2.180	100.15	100.01	99.92	99.78	99.62	99.47	99.36	99.25	99.14	99.05	98.93	98.81	98.73	98.65	98.56	98.48	98.39	98.31
Ave.	2.188	100.18	100.07	99.95	99.79	99.63	99.48	99.36	99.24	99.13	99.01	98.90	98.79	98.70	98.62	98.54	98.46	98.39	98.31
Med.	2.186	100.19	100.08	99.94	99.79	99.62	99.47	99.36	99.25	99.12	99.02	98.91	98.78	98.70	98.62	98.54	98.45	98.39	98.31
St dev	0.0060	0.0371	0.0432	0.0442	0.0463	0.0409	0.0464	0.0477	0.0500	0.0507	0.0600	0.0600	0.0603	0.0603	0.0597	0.0599	0.0618	0.0646	0.0673
Min.	2.175	100.11	99.98	99.88	99.72	99.57	99.38	99.27	99.14	99.03	98.89	98.79	98.67	98.59	98.51	98.43	98.34	98.28	98.20
Max.	2.195	100.24	100.14	100.04	99.90	99.75	99.61	99.48	99.35	99.24	99.15	99.03	98.91	98.83	98.75	98.67	98.58	98.52	98.44

## 3.18 Data Set 4, 55°C, 160mA (Photon Flux Maintenance, Far-Red (PFMFR))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Far-Red (PFMFR) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S76	0.1564	100.16	100.04	99.93	99.81	99.69	99.53	99.40	99.25	99.12	99.00	98.86	98.74	98.66	98.54	98.47	98.41	98.36	98.30
S77	0.1564	100.15	100.04	99.93	99.78	99.66	99.50	99.35	99.22	99.07	98.96	98.82	98.68	98.61	98.54	98.42	98.37	98.31	98.24
S78	0.1565	100.18	100.07	99.96	99.80	99.68	99.53	99.38	99.25	99.10	98.96	98.85	98.72	98.60	98.53	98.45	98.35	98.30	98.24
S79	0.1566	100.15	100.04	99.92	99.77	99.62	99.46	99.33	99.22	99.07	98.95	98.82	98.71	98.63	98.51	98.43	98.33	98.23	98.20
S80	0.1565	100.20	100.09	99.98	99.86	99.71	99.57	99.44	99.31	99.17	99.06	98.92	98.80	98.72	98.65	98.58	98.53	98.44	98.41
S81	0.1565	100.17	100.06	99.95	99.83	99.67	99.55	99.40	99.28	99.13	99.01	98.89	98.78	98.66	98.53	98.46	98.36	98.27	98.20
S82	0.1566	100.18	100.07	99.96	99.84	99.71	99.59	99.44	99.33	99.18	99.04	98.92	98.78	98.66	98.58	98.46	98.37	98.27	98.20
S83	0.1565	100.20	100.09	99.97	99.82	99.66	99.51	99.40	99.27	99.12	99.00	98.86	98.75	98.67	98.55	98.47	98.38	98.32	98.30
S84	0.1566	100.17	100.06	99.95	99.81	99.68	99.56	99.45	99.34	99.19	99.06	98.94	98.83	98.70	98.63	98.56	98.47	98.38	98.35
S85	0.1565	100.10	99.99	99.88	99.73	99.58	99.46	99.34	99.23	99.12	99.00	98.86	98.74	98.67	98.59	98.47	98.41	98.32	98.26
S86	0.1565	100.15	100.04	99.93	99.81	99.65	99.53	99.42	99.31	99.19	99.06	98.92	98.80	98.67	98.55	98.48	98.38	98.28	98.22
S87	0.1566	100.19	100.07	99.96	99.82	99.66	99.54	99.43	99.28	99.15	99.01	98.87	98.75	98.63	98.55	98.47	98.42	98.33	98.26
S88	0.1595	100.22	100.11	100.00	99.85	99.69	99.57	99.44	99.33	99.20	99.08	98.96	98.84	98.71	98.64	98.52	98.42	98.36	98.29
S89	0.1593	100.13	100.02	99.91	99.79	99.67	99.51	99.38	99.27	99.15	99.03	98.89	98.76	98.68	98.60	98.48	98.39	98.34	98.26
S90	0.1594	100.16	100.05	99.94	99.78	99.62	99.46	99.31	99.16	99.05	98.93	98.80	98.66	98.54	98.47	98.34	98.29	98.19	98.13
S91	0.1595	100.19	100.08	99.97	99.82	99.70	99.58	99.43	99.30	99.15	99.03	98.90	98.79	98.72	98.64	98.52	98.46	98.36	98.30
S92	0.1595	100.15	100.04	99.93	99.77	99.63	99.48	99.33	99.20	99.05	98.93	98.79	98.67	98.54	98.42	98.30	98.21	98.15	98.08
S93	0.1595	100.22	100.11	99.99	99.84	99.68	99.52	99.41	99.26	99.13	98.99	98.87	98.75	98.68	98.61	98.54	98.45	98.35	98.27
S94	0.1594	100.14	100.03	99.92	99.76	99.64	99.52	99.40	99.25	99.10	98.96	98.85	98.73	98.66	98.53	98.46	98.35	98.25	98.18
S95	0.1594	100.14	100.03	99.92	99.80	99.68	99.53	99.42	99.27	99.14	99.00	98.86	98.73	98.66	98.58	98.50	98.41	98.32	98.25
S96	0.1594	100.13	100.02	99.91	99.76	99.62	99.47	99.36	99.21	99.08	98.96	98.84	98.73	98.65	98.58	98.46	98.40	98.30	98.24
S97	0.1594	100.14	100.02	99.91	99.77	99.61	99.45	99.30	99.17	99.02	98.91	98.77	98.63	98.56	98.48	98.41	98.35	98.26	98.20
S98	0.1587	100.14	100.03	99.92	99.76	99.64	99.52	99.37	99.22	99.09	98.98	98.85	98.73	98.66	98.54	98.46	98.37	98.31	98.25
S99	0.1590	100.15	100.04	99.93	99.78	99.62	99.47	99.32	99.20	99.09	98.95	98.84	98.70	98.62	98.55	98.48	98.37	98.32	98.25
S100	0.1590	100.17	100.05	99.94	99.80	99.65	99.50	99.38	99.25	99.10	98.97	98.83	98.69	98.62	98.55	98.47	98.42	98.36	98.30
Ave.	0.1580	100.16	100.05	99.94	99.80	99.66	99.52	99.39	99.26	99.12	98.99	98.86	98.74	98.65	98.56	98.47	98.39	98.31	98.25
Med.	0.1587	100.16	100.04	99.93	99.80	99.66	99.52	99.40	99.25	99.12	99.00	98.86	98.74	98.66	98.55	98.47	98.38	98.32	98.25
St dev	0.0014	0.0280	0.0284	0.0284	0.0310	0.0343	0.0408	0.0444	0.0476	0.0478	0.0469	0.0471	0.0505	0.0485	0.0551	0.0592	0.0613	0.0611	0.0673
Min.	0.1564	100.10	99.99	99.88	99.73	99.58	99.45	99.30	99.16	99.02	98.91	98.77	98.63	98.54	98.42	98.30	98.21	98.15	98.08
Max.	0.1595	100.22	100.11	100.00	99.86	99.71	99.59	99.45	99.34	99.20	99.08	98.96	98.84	98.72	98.65	98.58	98.53	98.44	98.41

## 3.19 Data Set 4, 55°C, 160mA (Forward Voltage)

Sample Number	Forward Voltage(V)																		
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S76	5.677	5.678	5.671	5.675	5.673	5.665	5.664	5.668	5.661	5.657	5.664	5.646	5.659	5.648	5.653	5.637	5.646	5.644	5.650
S77	5.666	5.659	5.660	5.663	5.657	5.654	5.656	5.655	5.650	5.655	5.649	5.635	5.641	5.648	5.636	5.626	5.635	5.628	5.628
S78	5.667	5.668	5.668	5.665	5.660	5.653	5.656	5.649	5.656	5.646	5.644	5.637	5.646	5.649	5.631	5.636	5.644	5.641	5.634
S79	5.637	5.640	5.631	5.630	5.633	5.624	5.627	5.626	5.622	5.618	5.619	5.612	5.616	5.605	5.614	5.607	5.597	5.596	5.596
S80	5.671	5.666	5.664	5.664	5.663	5.657	5.658	5.653	5.660	5.657	5.658	5.640	5.644	5.638	5.647	5.631	5.641	5.639	5.637
S81	5.681	5.676	5.679	5.675	5.674	5.674	5.672	5.666	5.668	5.654	5.660	5.666	5.663	5.649	5.645	5.658	5.641	5.654	5.643
S82	5.669	5.670	5.670	5.667	5.665	5.656	5.658	5.654	5.658	5.646	5.641	5.655	5.640	5.637	5.639	5.639	5.629	5.636	5.625
S83	5.672	5.669	5.669	5.670	5.665	5.662	5.659	5.661	5.656	5.655	5.659	5.646	5.651	5.650	5.639	5.639	5.632	5.631	5.631
S84	5.686	5.679	5.680	5.684	5.678	5.676	5.680	5.671	5.670	5.669	5.663	5.656	5.665	5.665	5.646	5.656	5.646	5.659	5.645
S85	5.666	5.660	5.659	5.659	5.659	5.653	5.653	5.651	5.655	5.647	5.653	5.638	5.645	5.633	5.635	5.630	5.631	5.632	5.628
S86	5.676	5.674	5.677	5.669	5.669	5.666	5.668	5.663	5.667	5.653	5.658	5.648	5.643	5.658	5.645	5.652	5.653	5.643	5.637
S87	5.673	5.674	5.674	5.669	5.667	5.662	5.660	5.662	5.655	5.657	5.642	5.643	5.651	5.655	5.650	5.640	5.637	5.634	5.634
S88	5.667	5.669	5.662	5.665	5.660	5.657	5.654	5.654	5.649	5.655	5.654	5.654	5.647	5.635	5.636	5.634	5.636	5.633	5.633
S89	5.627	5.620	5.620	5.626	5.619	5.617	5.615	5.612	5.612	5.613	5.604	5.606	5.594	5.606	5.604	5.604	5.587	5.589	5.595
S90	5.658	5.659	5.653	5.655	5.648	5.652	5.645	5.647	5.649	5.641	5.630	5.641	5.629	5.622	5.634	5.622	5.628	5.624	5.620
S91	5.670	5.663	5.664	5.663	5.663	5.663	5.658	5.659	5.654	5.650	5.652	5.644	5.649	5.643	5.639	5.647	5.640	5.636	5.643
S92	5.655	5.656	5.650	5.651	5.646	5.646	5.643	5.642	5.644	5.629	5.629	5.638	5.630	5.619	5.632	5.624	5.615	5.611	5.617
S93	5.657	5.655	5.655	5.650	5.648	5.645	5.645	5.642	5.644	5.637	5.632	5.644	5.621	5.639	5.626	5.632	5.627	5.619	5.630
S94	5.662	5.660	5.657	5.654	5.654	5.652	5.649	5.651	5.651	5.640	5.645	5.636	5.640	5.630	5.632	5.639	5.622	5.629	5.623
S95	5.663	5.665	5.660	5.655	5.656	5.649	5.657	5.648	5.648	5.636	5.648	5.638	5.642	5.643	5.630	5.632	5.627	5.631	5.619
S96	5.660	5.654	5.654	5.656	5.654	5.652	5.653	5.651	5.645	5.643	5.643	5.634	5.638	5.638	5.637	5.625	5.620	5.636	5.616
S97	5.675	5.676	5.676	5.665	5.667	5.663	5.663	5.664	5.660	5.663	5.650	5.658	5.642	5.644	5.652	5.645	5.642	5.637	5.637
S98	5.675	5.673	5.673	5.673	5.668	5.667	5.663	5.666	5.657	5.658	5.645	5.662	5.654	5.654	5.645	5.650	5.652	5.637	5.637
S99	5.662	5.656	5.656	5.658	5.656	5.656	5.651	5.647	5.646	5.645	5.644	5.637	5.626	5.641	5.632	5.639	5.632	5.624	5.628
S100	5.655	5.653	5.657	5.648	5.646	5.646	5.648	5.639	5.640	5.641	5.638	5.627	5.637	5.634	5.624	5.632	5.630	5.617	5.624
Ave.	5.665	5.663	5.661	5.660	5.658	5.655	5.654	5.652	5.651	5.647	5.645	5.642	5.641	5.639	5.636	5.635	5.632	5.630	5.628
Med.	5.667	5.665	5.662	5.663	5.660	5.656	5.656	5.653	5.654	5.647	5.645	5.641	5.642	5.641	5.636	5.636	5.632	5.633	5.630
St dev	0.0128	0.0130	0.0139	0.0132	0.0130	0.0132	0.0133	0.0133	0.0130	0.0132	0.0141	0.0137	0.0153	0.0147	0.0114	0.0131	0.0152	0.0155	0.0133
Min.	5.627	5.620	5.620	5.626	5.619	5.617	5.615	5.612	5.612	5.613	5.604	5.606	5.594	5.605	5.604	5.604	5.587	5.589	5.595
Max.	5.686	5.679	5.680	5.684	5.678	5.676	5.680	5.671	5.670	5.669	5.664	5.666	5.665	5.665	5.653	5.658	5.653	5.659	5.650

## 3.20 Data Set 4, 55°C, 160mA (Chromaticity Shift)

Sample Number	u'	v'	CCT(K)	Chromaticity Shift (Au'v')																	
				0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000hrs s	12000hrs s	18000hrs s	13000hrs s	14000hrs s	15000hrs s	16000hrs s	17000hrs s
S76	0.2554	0.5270	2855	0.0001	0.0004	0.0005	0.0007	0.0010	0.0012	0.0014	0.0016	0.0018	0.0020	0.0023	0.0025	0.0026	0.0028	0.0031	0.0032	0.0034	0.0035
S77	0.2559	0.5279	2838	0.0001	0.0003	0.0004	0.0006	0.0008	0.0010	0.0012	0.0014	0.0017	0.0018	0.0020	0.0021	0.0023	0.0025	0.0027	0.0028	0.0029	0.0031
S78	0.2551	0.5266	2864	0.0001	0.0004	0.0005	0.0006	0.0008	0.0010	0.0013	0.0016	0.0018	0.0020	0.0023	0.0025	0.0028	0.0030	0.0032	0.0033	0.0035	0.0036
S79	0.2554	0.5268	2857	0.0002	0.0004	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0018	0.0020	0.0022	0.0025	0.0027	0.0028	0.0030	0.0032	0.0034	0.0035
S80	0.2553	0.5282	2851	0.0001	0.0003	0.0004	0.0005	0.0008	0.0010	0.0011	0.0014	0.0017	0.0020	0.0022	0.0023	0.0026	0.0028	0.0030	0.0032	0.0034	0.0035
S81	0.2554	0.5275	2851	0.0001	0.0003	0.0004	0.0005	0.0008	0.0010	0.0013	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0030	0.0033	0.0035
S82	0.2557	0.5284	2842	0.0001	0.0003	0.0004	0.0007	0.0009	0.0012	0.0014	0.0016	0.0019	0.0021	0.0023	0.0026	0.0028	0.0030	0.0032	0.0033	0.0034	0.0037
S83	0.2553	0.5271	2856	0.0002	0.0004	0.0004	0.0007	0.0008	0.0010	0.0012	0.0015	0.0017	0.0019	0.0022	0.0023	0.0025	0.0026	0.0029	0.0031	0.0032	0.0035
S84	0.2550	0.5266	2866	0.0002	0.0004	0.0005	0.0006	0.0009	0.0011	0.0013	0.0016	0.0018	0.0021	0.0022	0.0024	0.0026	0.0028	0.0030	0.0031	0.0032	0.0035
S85	0.2559	0.5280	2838	0.0001	0.0004	0.0005	0.0008	0.0010	0.0012	0.0014	0.0017	0.0020	0.0022	0.0025	0.0027	0.0029	0.0031	0.0033	0.0035	0.0036	0.0038
S86	0.2553	0.5270	2857	0.0002	0.0005	0.0006	0.0008	0.0010	0.0013	0.0015	0.0018	0.0019	0.0022	0.0024	0.0026	0.0027	0.0029	0.0031	0.0032	0.0034	0.0037
S87	0.2553	0.5272	2856	0.0001	0.0003	0.0004	0.0006	0.0009	0.0011	0.0012	0.0015	0.0017	0.0019	0.0021	0.0024	0.0025	0.0027	0.0029	0.0031	0.0032	0.0034
S88	0.2561	0.5294	2828	0.0002	0.0005	0.0005	0.0007	0.0009	0.0011	0.0014	0.0015	0.0017	0.0019	0.0022	0.0025	0.0027	0.0028	0.0030	0.0032	0.0035	0.0037
S89	0.2561	0.5292	2828	0.0001	0.0003	0.0004	0.0005	0.0007	0.0009	0.0012	0.0014	0.0016	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0030	0.0031	0.0033
S90	0.2565	0.5307	2811	0.0001	0.0003	0.0004	0.0006	0.0008	0.0010	0.0012	0.0014	0.0017	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0032	0.0034
S91	0.2563	0.5299	2822	0.0002	0.0005	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0018	0.0020	0.0023	0.0025	0.0027	0.0029	0.0031	0.0033	0.0036	0.0037
S92	0.2566	0.5303	2812	0.0001	0.0003	0.0004	0.0006	0.0009	0.0011	0.0013	0.0016	0.0019	0.0020	0.0023	0.0025	0.0026	0.0028	0.0030	0.0032	0.0034	0.0035
S93	0.2558	0.5291	2836	0.0001	0.0003	0.0004	0.0006	0.0008	0.0010	0.0013	0.0015	0.0017	0.0019	0.0022	0.0024	0.0026	0.0028	0.0029	0.0032	0.0033	0.0035
S94	0.2560	0.5295	2828	0.0002	0.0005	0.0006	0.0009	0.0011	0.0013	0.0014	0.0017	0.0019	0.0021	0.0022	0.0025	0.0027	0.0029	0.0030	0.0032	0.0034	0.0036
S95	0.2559	0.5289	2835	0.0001	0.0003	0.0004	0.0005	0.0007	0.0009	0.0012	0.0015	0.0016	0.0018	0.0020	0.0023	0.0025	0.0027	0.0029	0.0031	0.0032	0.0034
S96	0.2561	0.5306	2821	0.0001	0.0003	0.0004	0.0006	0.0008	0.0011	0.0013	0.0016	0.0019	0.0021	0.0022	0.0024	0.0027	0.0028	0.0030	0.0032	0.0034	0.0035
S97	0.2558	0.5291	2836	0.0001	0.0003	0.0004	0.0006	0.0008	0.0011	0.0013	0.0015	0.0017	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0031	0.0033	0.0035
S98	0.2556	0.5290	2840	0.0001	0.0003	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0016	0.0017	0.0019	0.0022	0.0024	0.0026	0.0028	0.0029	0.0030	0.0032
S99	0.2559	0.5295	2831	0.0002	0.0004	0.0005	0.0006	0.0009	0.0011	0.0014	0.0017	0.0020	0.0021	0.0023	0.0025	0.0027	0.0030	0.0031	0.0032	0.0035	0.0036
S100	0.2565	0.5302	2815	0.0001	0.0003	0.0004	0.0007	0.0009	0.0011	0.0013	0.0015	0.0018	0.0019	0.0021	0.0022	0.0024	0.0027	0.0028	0.0029	0.0031	0.0033
Ave.	0.2558	0.5285	2839	0.0001	0.0003	0.0004	0.0006	0.0009	0.0011	0.0013	0.0015	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0031	0.0033	0.0035
Med.	0.2558	0.5289	2838	0.0001	0.0003	0.0004	0.0006	0.0009	0.0011	0.0013	0.0015	0.0018	0.0020	0.0022	0.0024	0.0026	0.0028	0.0030	0.0032	0.0034	0.0035
St dev	0.0004	0.0013	16.2005	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002
Min.	0.2550	0.5266	2811	0.0001	0.0003	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0016	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0028	0.0029	0.0031
Max.	0.2566	0.5307	2866	0.0002	0.0005	0.0006	0.0009	0.0011	0.0013	0.0015	0.0018	0.0020	0.0022	0.0025	0.0027	0.0029	0.0031	0.0033	0.0035	0.0036	0.0038

## 3.21 Data Set 5, 85°C, 160mA (Lumen Maintenance)

Sample Number	Φ(lm) 0hr (Initial)	Lumen Maintenance (%)																	
		1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S101	140.8	100.10	99.98	99.86	99.65	99.44	99.28	99.11	98.97	98.83	98.72	98.61	98.49	98.38	98.28	98.19	98.12	98.02	97.93
S102	140.2	100.12	100.00	99.88	99.67	99.47	99.27	99.10	98.93	98.76	98.65	98.56	98.50	98.37	98.29	98.16	98.09	97.99	97.90
S103	140.8	100.12	100.01	99.88	99.72	99.50	99.34	99.17	99.00	98.83	98.68	98.57	98.45	98.33	98.24	98.14	98.04	97.96	97.88
S104	141.0	100.08	99.95	99.83	99.61	99.41	99.25	99.11	98.94	98.77	98.62	98.53	98.46	98.38	98.26	98.15	98.08	97.97	97.89
S105	140.8	100.08	99.97	99.84	99.67	99.47	99.26	99.12	98.95	98.78	98.67	98.58	98.50	98.38	98.29	98.19	98.09	97.98	97.93
S106	141.3	100.08	99.97	99.85	99.65	99.48	99.31	99.15	99.01	98.84	98.69	98.58	98.46	98.33	98.25	98.15	98.07	98.00	97.94
S107	140.6	100.04	99.92	99.80	99.64	99.42	99.22	99.08	98.91	98.75	98.60	98.49	98.42	98.30	98.22	98.13	98.06	97.96	97.87
S108	140.5	100.05	99.94	99.81	99.61	99.40	99.18	99.02	98.88	98.71	98.61	98.52	98.40	98.32	98.24	98.15	98.05	97.95	97.87
S109	140.7	100.12	99.99	99.87	99.66	99.46	99.25	99.08	98.91	98.77	98.62	98.51	98.39	98.29	98.18	98.08	97.98	97.87	97.79
S110	141.1	100.04	99.92	99.79	99.59	99.43	99.22	99.08	98.92	98.75	98.65	98.56	98.44	98.34	98.23	98.11	98.03	97.93	97.88
S111	140.3	100.08	99.95	99.83	99.62	99.42	99.22	99.05	98.88	98.72	98.62	98.47	98.39	98.27	98.16	98.08	97.98	97.88	97.79
S112	140.4	100.09	99.97	99.86	99.69	99.49	99.29	99.12	98.98	98.84	98.69	98.59	98.47	98.37	98.26	98.14	98.04	97.94	97.88
S113	140.6	100.04	99.91	99.79	99.58	99.42	99.20	99.04	98.87	98.73	98.62	98.47	98.35	98.24	98.12	98.04	97.96	97.89	97.80
S114	140.2	100.08	99.96	99.84	99.67	99.47	99.27	99.10	98.93	98.79	98.70	98.59	98.52	98.44	98.34	98.23	98.13	98.06	97.97
S115	140.0	100.13	100.00	99.89	99.68	99.48	99.28	99.14	98.97	98.80	98.69	98.60	98.54	98.41	98.31	98.18	98.08	97.98	97.92
S116	140.3	100.09	99.97	99.84	99.63	99.43	99.22	99.08	98.91	98.74	98.63	98.52	98.44	98.31	98.21	98.13	98.02	97.92	97.84
S117	140.8	100.04	99.92	99.79	99.58	99.41	99.25	99.08	98.91	98.74	98.65	98.54	98.48	98.39	98.27	98.17	98.09	97.99	97.91
S118	140.9	100.09	99.97	99.85	99.64	99.44	99.23	99.06	98.89	98.75	98.64	98.55	98.43	98.31	98.20	98.08	98.00	97.93	97.84
S119	140.3	100.03	99.91	99.78	99.57	99.36	99.15	98.98	98.81	98.64	98.53	98.42	98.36	98.23	98.13	98.01	97.90	97.83	97.75
S120	139.9	100.12	99.99	99.87	99.71	99.50	99.29	99.12	98.96	98.82	98.71	98.60	98.48	98.39	98.31	98.21	98.10	98.03	97.95
S121	140.3	100.06	99.94	99.82	99.65	99.45	99.28	99.11	98.95	98.78	98.69	98.58	98.46	98.35	98.25	98.12	98.02	97.92	97.86
S122	140.0	100.12	100.01	99.88	99.67	99.47	99.25	99.09	98.92	98.75	98.60	98.51	98.44	98.36	98.24	98.11	98.01	97.94	97.88
S123	140.3	100.07	99.94	99.81	99.61	99.40	99.20	99.06	98.92	98.78	98.63	98.52	98.45	98.35	98.27	98.16	98.06	97.98	97.90
S124	140.6	100.06	99.95	99.82	99.62	99.41	99.20	99.04	98.90	98.73	98.62	98.51	98.44	98.36	98.24	98.11	98.01	97.91	97.85
S125	140.5	100.12	99.99	99.87	99.66	99.44	99.28	99.14	99.00	98.83	98.72	98.57	98.45	98.34	98.22	98.12	98.01	97.94	97.86
Ave.	140.5	100.08	99.96	99.84	99.64	99.44	99.25	99.09	98.93	98.77	98.65	98.54	98.45	98.34	98.24	98.13	98.04	97.95	97.88
Med.	140.5	100.08	99.97	99.84	99.65	99.44	99.25	99.09	98.92	98.77	98.65	98.55	98.45	98.35	98.24	98.14	98.04	97.95	97.88
St dev	0.3577	0.0311	0.0314	0.0324	0.0396	0.0356	0.0434	0.0437	0.0456	0.0475	0.0450	0.0477	0.0459	0.0507	0.0532	0.0521	0.0533	0.0526	0.0540
Min.	139.9	100.03	99.91	99.78	99.57	99.36	99.15	98.98	98.81	98.64	98.53	98.42	98.35	98.23	98.12	98.01	97.90	97.83	97.75
Max.	141.3	100.13	100.01	99.89	99.72	99.50	99.34	99.17	99.01	98.84	98.72	98.61	98.54	98.44	98.34	98.23	98.13	98.06	97.97

## 3.22 Data Set 5, 85°C, 160mA (Photon Flux Maintenance, Photosynthetic (PFMp))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Photosynthetic (PFMp) (%)																	
	Ohr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S101	2.222	100.02	99.86	99.70	99.52	99.33	99.14	98.98	98.84	98.68	98.52	98.41	98.28	98.20	98.12	98.01	97.92	97.81	97.70
S102	2.222	100.02	99.86	99.69	99.54	99.38	99.19	99.02	98.88	98.72	98.55	98.42	98.29	98.17	98.09	98.00	97.92	97.83	97.72
S103	2.221	100.09	99.92	99.76	99.57	99.39	99.23	99.07	98.93	98.76	98.63	98.50	98.37	98.27	98.18	98.08	97.99	97.88	97.79
S104	2.222	100.09	99.93	99.76	99.57	99.38	99.19	99.02	98.88	98.72	98.58	98.48	98.35	98.23	98.16	98.07	97.96	97.87	97.78
S105	2.222	100.02	99.86	99.69	99.52	99.36	99.20	99.03	98.90	98.73	98.59	98.49	98.36	98.26	98.19	98.07	97.96	97.89	97.78
S106	2.221	100.03	99.88	99.71	99.53	99.35	99.17	99.01	98.87	98.70	98.57	98.47	98.36	98.26	98.20	98.10	98.03	97.95	97.86
S107	2.221	100.05	99.90	99.73	99.57	99.41	99.23	99.07	98.93	98.76	98.63	98.50	98.37	98.28	98.19	98.07	97.98	97.91	97.82
S108	2.221	100.01	99.85	99.69	99.51	99.32	99.14	98.97	98.84	98.67	98.54	98.44	98.34	98.23	98.15	98.05	97.94	97.86	97.77
S109	2.221	100.09	99.92	99.75	99.58	99.42	99.23	99.06	98.93	98.76	98.63	98.52	98.41	98.31	98.23	98.11	98.02	97.93	97.84
S110	2.221	100.04	99.88	99.72	99.56	99.41	99.25	99.08	98.95	98.78	98.65	98.55	98.44	98.32	98.25	98.13	98.06	97.97	97.88
S111	2.197	100.09	99.92	99.75	99.56	99.40	99.24	99.08	98.94	98.77	98.61	98.51	98.38	98.28	98.22	98.12	98.01	97.93	97.82
S112	2.197	100.11	99.94	99.78	99.59	99.43	99.24	99.08	98.94	98.78	98.64	98.54	98.43	98.33	98.27	98.15	98.06	97.95	97.88
S113	2.197	100.06	99.90	99.74	99.55	99.36	99.20	99.03	98.89	98.73	98.56	98.43	98.33	98.21	98.15	98.05	97.96	97.88	97.77
S114	2.198	100.02	99.85	99.70	99.54	99.35	99.16	98.99	98.86	98.70	98.57	98.47	98.34	98.23	98.16	98.08	97.97	97.89	97.80
S115	2.198	100.05	99.88	99.72	99.53	99.37	99.19	99.02	98.89	98.73	98.60	98.49	98.36	98.27	98.20	98.08	97.97	97.88	97.77
S116	2.198	100.07	99.90	99.74	99.55	99.36	99.20	99.04	98.90	98.73	98.60	98.47	98.37	98.28	98.21	98.09	98.02	97.94	97.83
S117	2.198	100.05	99.88	99.71	99.53	99.37	99.21	99.05	98.91	98.74	98.61	98.50	98.39	98.30	98.22	98.10	98.01	97.92	97.81
S118	2.198	100.07	99.91	99.74	99.55	99.37	99.19	99.02	98.89	98.72	98.59	98.46	98.33	98.21	98.12	98.01	97.93	97.82	97.75
S119	2.197	100.04	99.88	99.71	99.55	99.36	99.17	99.01	98.87	98.70	98.57	98.44	98.30	98.22	98.15	98.06	97.95	97.86	97.78
S120	2.198	100.06	99.89	99.72	99.54	99.35	99.19	99.03	98.89	98.72	98.56	98.43	98.33	98.23	98.16	98.04	97.96	97.87	97.78
S121	2.197	100.11	99.94	99.78	99.59	99.41	99.24	99.07	98.93	98.77	98.63	98.50	98.40	98.31	98.25	98.13	98.04	97.95	97.88
S122	2.198	100.07	99.91	99.74	99.56	99.41	99.22	99.05	98.92	98.75	98.59	98.46	98.33	98.24	98.18	98.08	97.97	97.90	97.82
S123	2.198	100.07	99.90	99.73	99.56	99.37	99.21	99.04	98.91	98.75	98.59	98.46	98.35	98.26	98.19	98.10	98.03	97.95	97.86
S124	2.198	100.09	99.93	99.77	99.61	99.46	99.30	99.13	98.99	98.82	98.66	98.53	98.40	98.31	98.24	98.14	98.07	97.99	97.88
S125	2.198	100.05	99.88	99.71	99.56	99.40	99.22	99.06	98.92	98.76	98.59	98.49	98.39	98.28	98.20	98.10	98.01	97.94	97.86
Ave.	2.207	100.06	99.89	99.73	99.55	99.38	99.21	99.04	98.90	98.74	98.59	98.48	98.36	98.26	98.19	98.08	97.99	97.90	97.81
Med.	2.198	100.06	99.90	99.73	99.55	99.37	99.20	99.04	98.90	98.73	98.59	98.48	98.36	98.26	98.19	98.08	97.98	97.90	97.81
St dev	0.0119	0.0288	0.0271	0.0278	0.0250	0.0325	0.0355	0.0354	0.0352	0.0347	0.0358	0.0373	0.0406	0.0421	0.0448	0.0415	0.0443	0.0479	0.0508
Min.	2.197	100.01	99.85	99.69	99.51	99.32	99.14	98.97	98.84	98.67	98.52	98.41	98.28	98.17	98.09	98.00	97.92	97.81	97.70
Max.	2.222	100.11	99.94	99.78	99.61	99.46	99.30	99.13	98.99	98.82	98.66	98.55	98.44	98.33	98.27	98.15	98.07	97.99	97.88



## 3.23 Data Set 5, 85°C, 160mA (Photon Flux Maintenance, Far-Red (PFMFR))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Far-Red (PFMFR) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S101	0.1624	100.02	99.91	99.77	99.57	99.38	99.19	99.00	98.79	98.65	98.53	98.40	98.28	98.17	98.04	97.99	97.92	97.82	97.71
S102	0.1623	100.07	99.96	99.77	99.58	99.44	99.29	99.10	98.90	98.75	98.63	98.53	98.44	98.38	98.26	98.14	98.05	97.98	97.90
S103	0.1624	100.02	99.91	99.72	99.53	99.39	99.19	98.98	98.77	98.62	98.50	98.37	98.25	98.14	98.01	97.90	97.80	97.73	97.62
S104	0.1624	100.03	99.87	99.73	99.54	99.40	99.20	99.01	98.81	98.66	98.54	98.41	98.29	98.24	98.17	98.12	98.02	97.93	97.85
S105	0.1623	100.05	99.89	99.75	99.56	99.38	99.19	98.98	98.77	98.61	98.49	98.36	98.27	98.15	98.02	97.91	97.84	97.74	97.64
S106	0.1624	100.00	99.84	99.65	99.51	99.36	99.18	98.97	98.76	98.62	98.50	98.40	98.30	98.25	98.13	98.08	98.00	97.91	97.80
S107	0.1624	100.03	99.92	99.73	99.58	99.44	99.25	99.04	98.84	98.71	98.58	98.46	98.33	98.22	98.09	97.97	97.87	97.80	97.69
S108	0.1624	100.08	99.96	99.82	99.68	99.53	99.39	99.20	98.98	98.85	98.73	98.63	98.50	98.38	98.26	98.14	98.05	97.96	97.85
S109	0.1625	100.06	99.90	99.76	99.56	99.38	99.18	98.97	98.76	98.61	98.52	98.39	98.27	98.21	98.09	97.97	97.90	97.81	97.73
S110	0.1624	100.03	99.92	99.73	99.58	99.39	99.19	98.98	98.77	98.62	98.50	98.37	98.24	98.19	98.13	98.08	98.01	97.94	97.84
S111	0.1586	100.06	99.90	99.75	99.57	99.43	99.24	99.03	98.83	98.68	98.56	98.43	98.34	98.23	98.10	98.04	97.95	97.88	97.77
S112	0.1585	100.10	99.99	99.80	99.61	99.47	99.28	99.07	98.87	98.72	98.59	98.50	98.37	98.25	98.13	98.01	97.94	97.85	97.75
S113	0.1585	100.00	99.89	99.70	99.50	99.36	99.21	99.02	98.81	98.66	98.56	98.44	98.31	98.19	98.13	98.08	98.01	97.94	97.85
S114	0.1586	100.04	99.93	99.74	99.55	99.36	99.17	98.96	98.75	98.60	98.47	98.35	98.22	98.11	97.99	97.94	97.85	97.78	97.67
S115	0.1585	100.04	99.88	99.69	99.50	99.30	99.11	98.90	98.69	98.54	98.41	98.29	98.16	98.05	97.93	97.82	97.75	97.65	97.54
S116	0.1586	100.11	100.00	99.81	99.62	99.44	99.25	99.03	98.84	98.69	98.56	98.44	98.31	98.20	98.08	97.96	97.89	97.83	97.73
S117	0.1586	100.06	99.90	99.76	99.58	99.39	99.21	99.01	98.80	98.65	98.53	98.43	98.34	98.22	98.10	98.05	97.96	97.89	97.81
S118	0.1585	100.04	99.93	99.74	99.55	99.40	99.21	99.00	98.81	98.67	98.58	98.48	98.39	98.33	98.20	98.09	98.01	97.91	97.81
S119	0.1585	100.04	99.93	99.74	99.60	99.40	99.26	99.05	98.84	98.70	98.61	98.48	98.39	98.33	98.20	98.09	98.01	97.94	97.83
S120	0.1586	99.99	99.83	99.69	99.55	99.36	99.16	98.97	98.76	98.61	98.48	98.39	98.26	98.15	98.02	97.91	97.83	97.74	97.66
S121	0.1586	100.10	99.94	99.74	99.55	99.36	99.21	99.02	98.82	98.67	98.55	98.43	98.30	98.25	98.12	98.01	97.92	97.84	97.74
S122	0.1587	100.09	99.98	99.84	99.65	99.50	99.36	99.15	98.95	98.80	98.68	98.58	98.45	98.34	98.28	98.23	98.16	98.06	97.96
S123	0.1586	100.04	99.93	99.79	99.60	99.41	99.21	99.00	98.79	98.66	98.53	98.44	98.31	98.26	98.13	98.01	97.93	97.84	97.76
S124	0.1586	100.01	99.90	99.76	99.62	99.42	99.23	99.02	98.82	98.67	98.55	98.42	98.30	98.24	98.12	98.07	97.99	97.92	97.81
S125	0.1586	100.07	99.91	99.72	99.53	99.34	99.16	98.95	98.75	98.60	98.48	98.35	98.26	98.20	98.08	98.03	97.95	97.85	97.77
Ave.	0.1601	100.05	99.92	99.75	99.57	99.40	99.22	99.02	98.81	98.67	98.55	98.43	98.31	98.23	98.11	98.03	97.94	97.86	97.76
Med.	0.1586	100.04	99.91	99.74	99.57	99.39	99.21	99.01	98.81	98.66	98.54	98.43	98.30	98.22	98.12	98.03	97.95	97.85	97.77
St dev	0.0019	0.0322	0.0410	0.0430	0.0439	0.0506	0.0605	0.0622	0.0652	0.0669	0.0674	0.0749	0.0763	0.0821	0.0874	0.0931	0.0914	0.0922	0.0927
Min.	0.1585	99.99	99.83	99.65	99.50	99.30	99.11	98.90	98.69	98.54	98.41	98.29	98.16	98.05	97.93	97.82	97.75	97.65	97.54
Max.	0.1625	100.11	100.00	99.84	99.68	99.53	99.39	99.20	98.98	98.85	98.73	98.63	98.50	98.38	98.28	98.23	98.16	98.06	97.96

## 3.24 Data Set 5, 85°C, 160mA (Forward Voltage)

Sample Number	Forward Voltage(V)																		
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S101	5.671	5.663	5.667	5.661	5.669	5.662	5.656	5.662	5.660	5.654	5.653	5.650	5.646	5.646	5.644	5.648	5.645	5.646	5.639
S102	5.680	5.678	5.677	5.677	5.672	5.670	5.672	5.668	5.667	5.665	5.665	5.657	5.662	5.657	5.659	5.647	5.654	5.653	5.645
S103	5.661	5.657	5.661	5.651	5.651	5.651	5.647	5.647	5.644	5.644	5.645	5.647	5.636	5.639	5.634	5.630	5.632	5.636	5.636
S104	5.631	5.626	5.623	5.627	5.622	5.617	5.623	5.617	5.617	5.615	5.614	5.610	5.614	5.606	5.604	5.607	5.606	5.604	5.604
S105	5.663	5.660	5.658	5.655	5.655	5.657	5.651	5.654	5.644	5.647	5.650	5.642	5.637	5.640	5.636	5.632	5.637	5.636	5.637
S106	5.664	5.660	5.659	5.656	5.656	5.651	5.656	5.650	5.654	5.650	5.650	5.646	5.638	5.647	5.641	5.635	5.631	5.628	5.632
S107	5.666	5.663	5.663	5.658	5.659	5.659	5.654	5.656	5.648	5.646	5.652	5.650	5.643	5.643	5.639	5.642	5.633	5.640	5.629
S108	5.674	5.669	5.672	5.672	5.664	5.667	5.659	5.659	5.655	5.654	5.651	5.652	5.649	5.649	5.650	5.648	5.651	5.645	5.637
S109	5.667	5.666	5.661	5.657	5.659	5.661	5.657	5.653	5.647	5.654	5.644	5.644	5.650	5.643	5.640	5.641	5.642	5.632	5.640
S110	5.659	5.659	5.659	5.657	5.649	5.644	5.647	5.647	5.641	5.641	5.638	5.644	5.641	5.636	5.635	5.630	5.626	5.632	5.633
S111	5.656	5.655	5.656	5.648	5.646	5.647	5.648	5.642	5.642	5.638	5.638	5.635	5.639	5.639	5.628	5.633	5.630	5.622	5.619
S112	5.646	5.638	5.643	5.636	5.638	5.638	5.632	5.634	5.634	5.627	5.633	5.624	5.623	5.621	5.619	5.621	5.616	5.614	5.617
S113	5.616	5.609	5.610	5.608	5.608	5.602	5.608	5.608	5.597	5.598	5.601	5.594	5.593	5.590	5.589	5.586	5.590	5.582	5.587
S114	5.652	5.652	5.644	5.648	5.647	5.644	5.640	5.640	5.638	5.633	5.631	5.639	5.627	5.629	5.628	5.628	5.626	5.623	5.618
S115	5.660	5.658	5.656	5.652	5.651	5.651	5.646	5.650	5.648	5.643	5.637	5.639	5.635	5.635	5.633	5.634	5.635	5.623	5.623
S116	5.653	5.653	5.653	5.651	5.643	5.644	5.641	5.639	5.642	5.635	5.636	5.630	5.636	5.631	5.632	5.627	5.624	5.621	5.619
S117	5.645	5.639	5.642	5.643	5.640	5.638	5.631	5.637	5.633	5.630	5.622	5.630	5.619	5.619	5.622	5.612	5.616	5.618	5.609
S118	5.650	5.647	5.642	5.648	5.642	5.643	5.642	5.636	5.636	5.632	5.627	5.627	5.632	5.633	5.623	5.617	5.617	5.622	5.623
S119	5.648	5.644	5.640	5.640	5.640	5.641	5.636	5.636	5.637	5.634	5.633	5.631	5.627	5.622	5.627	5.619	5.622	5.621	5.616
S120	5.665	5.662	5.658	5.655	5.658	5.658	5.656	5.657	5.653	5.648	5.642	5.644	5.640	5.640	5.642	5.633	5.632	5.628	5.633
S121	5.656	5.648	5.656	5.654	5.654	5.642	5.646	5.646	5.636	5.636	5.638	5.640	5.631	5.633	5.629	5.632	5.627	5.621	5.628
S122	5.660	5.656	5.660	5.652	5.650	5.653	5.651	5.648	5.650	5.643	5.644	5.636	5.643	5.634	5.639	5.636	5.629	5.625	5.624
S123	5.653	5.648	5.649	5.649	5.649	5.647	5.645	5.641	5.640	5.633	5.632	5.630	5.631	5.628	5.629	5.630	5.620	5.628	5.626
S124	5.616	5.616	5.608	5.606	5.608	5.610	5.606	5.602	5.602	5.601	5.601	5.601	5.598	5.594	5.598	5.590	5.593	5.590	5.587
S125	5.646	5.644	5.643	5.636	5.644	5.640	5.638	5.637	5.634	5.635	5.632	5.623	5.629	5.620	5.619	5.616	5.620	5.618	5.611
Ave.	5.654	5.651	5.650	5.648	5.647	5.645	5.643	5.642	5.640	5.638	5.636	5.635	5.633	5.631	5.629	5.627	5.626	5.624	5.623
Med.	5.656	5.655	5.656	5.651	5.649	5.647	5.646	5.646	5.642	5.638	5.638	5.639	5.636	5.634	5.632	5.630	5.627	5.623	5.624
St dev	0.0156	0.0160	0.0168	0.0162	0.0157	0.0163	0.0152	0.0157	0.0159	0.0156	0.0152	0.0155	0.0152	0.0162	0.0156	0.0159	0.0153	0.0158	0.0150
Min.	5.616	5.609	5.608	5.606	5.608	5.602	5.606	5.602	5.597	5.598	5.601	5.594	5.593	5.590	5.589	5.586	5.590	5.582	5.587
Max.	5.680	5.678	5.677	5.677	5.672	5.670	5.672	5.668	5.667	5.665	5.665	5.657	5.662	5.657	5.659	5.648	5.654	5.653	5.645

3.25 Data Set 5, 85°C, 160mA (Chromaticity Shift)

Sample Number	u'	v'	CCT(K)	Chromaticity Shift (Au'v')																	
				0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000hrs s	11000hrs s	12000hrs s	13000hrs s	14000hrs s	15000hrs s	16000hrs s	17000hrs s
S101	0.2560	0.5243	2856	0.0002	0.0003	0.0005	0.0008	0.0011	0.0015	0.0016	0.0019	0.0020	0.0023	0.0024	0.0027	0.0029	0.0030	0.0032	0.0034	0.0036	0.0038
S102	0.2557	0.5239	2864	0.0002	0.0003	0.0005	0.0008	0.0011	0.0014	0.0016	0.0019	0.0021	0.0023	0.0024	0.0026	0.0028	0.0030	0.0032	0.0033	0.0035	0.0037
S103	0.2557	0.5239	2864	0.0001	0.0004	0.0005	0.0008	0.0011	0.0014	0.0016	0.0019	0.0021	0.0022	0.0025	0.0027	0.0029	0.0031	0.0032	0.0034	0.0036	0.0038
S104	0.2559	0.5240	2858	0.0002	0.0004	0.0006	0.0009	0.0011	0.0014	0.0017	0.0019	0.0021	0.0022	0.0025	0.0028	0.0030	0.0031	0.0033	0.0035	0.0037	0.0039
S105	0.2563	0.5256	2842	0.0002	0.0004	0.0006	0.0008	0.0011	0.0014	0.0015	0.0018	0.0021	0.0022	0.0025	0.0027	0.0029	0.0030	0.0032	0.0034	0.0036	0.0038
S106	0.2560	0.5255	2849	0.0002	0.0003	0.0005	0.0009	0.0012	0.0015	0.0016	0.0017	0.0020	0.0023	0.0024	0.0026	0.0028	0.0029	0.0031	0.0033	0.0035	0.0037
S107	0.2559	0.5244	2857	0.0002	0.0004	0.0006	0.0009	0.0012	0.0014	0.0017	0.0018	0.0021	0.0023	0.0025	0.0026	0.0028	0.0029	0.0031	0.0033	0.0034	0.0036
S108	0.2560	0.5247	2852	0.0001	0.0003	0.0005	0.0008	0.0011	0.0014	0.0015	0.0018	0.0020	0.0022	0.0024	0.0027	0.0029	0.0030	0.0032	0.0034	0.0035	0.0037
S109	0.2558	0.5237	2862	0.0002	0.0003	0.0005	0.0008	0.0011	0.0014	0.0017	0.0019	0.0021	0.0022	0.0025	0.0028	0.0029	0.0031	0.0033	0.0035	0.0036	0.0038
S110	0.2566	0.5252	2838	0.0002	0.0003	0.0005	0.0008	0.0011	0.0013	0.0016	0.0019	0.0021	0.0024	0.0026	0.0027	0.0029	0.0030	0.0032	0.0034	0.0035	0.0037
S111	0.2561	0.5261	2844	0.0002	0.0004	0.0006	0.0009	0.0012	0.0015	0.0017	0.0019	0.0021	0.0022	0.0024	0.0026	0.0027	0.0029	0.0031	0.0033	0.0034	0.0036
S112	0.2557	0.5257	2854	0.0001	0.0003	0.0005	0.0008	0.0010	0.0013	0.0016	0.0019	0.0022	0.0024	0.0027	0.0030	0.0032	0.0033	0.0035	0.0037	0.0039	0.0041
S113	0.2560	0.5259	2846	0.0002	0.0003	0.0005	0.0008	0.0011	0.0013	0.0015	0.0016	0.0018	0.0021	0.0023	0.0025	0.0026	0.0028	0.0030	0.0032	0.0033	0.0035
S114	0.2560	0.5263	2845	0.0002	0.0003	0.0005	0.0008	0.0011	0.0013	0.0015	0.0017	0.0019	0.0020	0.0023	0.0024	0.0026	0.0027	0.0029	0.0031	0.0033	0.0035
S115	0.2562	0.5265	2840	0.0002	0.0004	0.0006	0.0008	0.0011	0.0014	0.0015	0.0016	0.0019	0.0021	0.0024	0.0026	0.0028	0.0030	0.0031	0.0033	0.0035	0.0037
S116	0.2558	0.5256	2853	0.0001	0.0003	0.0005	0.0008	0.0011	0.0013	0.0016	0.0018	0.0020	0.0023	0.0024	0.0025	0.0027	0.0028	0.0030	0.0032	0.0033	0.0035
S117	0.2566	0.5270	2828	0.0002	0.0004	0.0006	0.0008	0.0011	0.0014	0.0015	0.0018	0.0021	0.0022	0.0024	0.0027	0.0029	0.0030	0.0032	0.0034	0.0036	0.0038
S118	0.2561	0.5273	2838	0.0002	0.0004	0.0005	0.0008	0.0010	0.0013	0.0016	0.0019	0.0022	0.0025	0.0027	0.0030	0.0031	0.0033	0.0035	0.0036	0.0038	0.0040
S119	0.2564	0.5275	2830	0.0001	0.0003	0.0005	0.0008	0.0011	0.0013	0.0016	0.0017	0.0020	0.0023	0.0024	0.0026	0.0028	0.0030	0.0031	0.0033	0.0035	0.0037
S120	0.2557	0.5257	2854	0.0002	0.0004	0.0006	0.0009	0.0012	0.0014	0.0015	0.0018	0.0019	0.0021	0.0023	0.0025	0.0027	0.0028	0.0030	0.0032	0.0034	0.0036
S121	0.2559	0.5260	2848	0.0002	0.0004	0.0005	0.0008	0.0010	0.0013	0.0015	0.0016	0.0017	0.0020	0.0022	0.0025	0.0027	0.0028	0.0030	0.0032	0.0034	0.0036
S122	0.2562	0.5265	2839	0.0002	0.0004	0.0005	0.0009	0.0012	0.0014	0.0017	0.0020	0.0022	0.0024	0.0026	0.0027	0.0029	0.0031	0.0033	0.0034	0.0036	0.0038
S123	0.2559	0.5255	2852	0.0002	0.0004	0.0005	0.0008	0.0011	0.0014	0.0017	0.0018	0.0020	0.0023	0.0026	0.0028	0.0030	0.0032	0.0033	0.0035	0.0037	0.0038
S124	0.2561	0.5258	2846	0.0001	0.0003	0.0005	0.0008	0.0011	0.0014	0.0016	0.0019	0.0020	0.0022	0.0023	0.0025	0.0026	0.0028	0.0029	0.0031	0.0033	0.0035
S125	0.2557	0.5258	2854	0.0002	0.0003	0.0005	0.0008	0.0011	0.0014	0.0016	0.0019	0.0022	0.0025	0.0028	0.0031	0.0032	0.0034	0.0036	0.0037	0.0039	0.0041
Ave.	0.2560	0.5255	2849	0.0002	0.0004	0.0005	0.0008	0.0011	0.0014	0.0016	0.0018	0.0020	0.0022	0.0025	0.0027	0.0028	0.0030	0.0032	0.0034	0.0035	0.0037
Med.	0.2560	0.5257	2849	0.0002	0.0003	0.0005	0.0008	0.0011	0.0014	0.0016	0.0018	0.0021	0.0022	0.0024	0.0027	0.0029	0.0030	0.0032	0.0034	0.0035	0.0037
St dev	0.0003	0.0011	9.6830	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	0.2557	0.5237	2828	0.0001	0.0003	0.0005	0.0008	0.0010	0.0013	0.0015	0.0016	0.0017	0.0020	0.0022	0.0024	0.0026	0.0027	0.0029	0.0031	0.0033	0.0035
Max.	0.2566	0.5275	2864	0.0002	0.0004	0.0006	0.0009	0.0012	0.0015	0.0017	0.0020	0.0022	0.0025	0.0028	0.0031	0.0032	0.0034	0.0036	0.0037	0.0039	0.0041

## 3.26 Data Set 6, 105°C, 160mA (Lumen Maintenance)

Sample Number	Φ(lm)	Lumen Maintenance (%)																	
		0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs
S126	139.6	100.02	99.84	99.66	99.48	99.27	99.07	98.88	98.73	98.54	98.37	98.21	98.09	97.97	97.85	97.73	97.63	97.56	97.49
S127	141.0	99.98	99.79	99.56	99.35	99.14	98.93	98.78	98.59	98.41	98.29	98.17	98.05	97.94	97.83	97.72	97.62	97.53	97.43
S128	141.5	100.04	99.91	99.73	99.52	99.32	99.14	98.95	98.80	98.61	98.49	98.37	98.25	98.14	98.03	97.92	97.83	97.75	97.65
S129	141.2	99.95	99.82	99.59	99.40	99.19	98.98	98.79	98.60	98.41	98.29	98.17	98.06	97.93	97.82	97.71	97.61	97.54	97.47
S130	141.4	99.94	99.81	99.59	99.39	99.20	99.00	98.81	98.62	98.43	98.31	98.20	98.08	97.96	97.83	97.72	97.64	97.54	97.47
S131	140.7	100.03	99.85	99.62	99.43	99.23	99.02	98.83	98.64	98.45	98.28	98.17	98.05	97.94	97.83	97.71	97.61	97.53	97.44
S132	140.9	100.03	99.84	99.62	99.43	99.23	99.03	98.88	98.73	98.54	98.42	98.31	98.19	98.06	97.95	97.82	97.75	97.67	97.60
S133	141.6	99.98	99.85	99.68	99.46	99.28	99.08	98.89	98.74	98.55	98.43	98.31	98.19	98.07	97.96	97.85	97.77	97.69	97.60
S134	140.8	100.02	99.83	99.66	99.46	99.27	99.07	98.88	98.73	98.54	98.38	98.26	98.14	98.01	97.90	97.79	97.72	97.65	97.55
S135	141.1	100.02	99.83	99.61	99.42	99.23	99.02	98.83	98.65	98.46	98.34	98.22	98.10	97.98	97.85	97.74	97.67	97.59	97.52
S136	141.1	99.94	99.81	99.64	99.43	99.25	99.06	98.87	98.68	98.50	98.38	98.21	98.05	97.94	97.83	97.72	97.62	97.53	97.45
S137	141.5	99.99	99.80	99.63	99.42	99.21	99.01	98.82	98.67	98.48	98.36	98.19	98.02	97.91	97.79	97.68	97.61	97.53	97.43
S138	141.5	99.95	99.76	99.59	99.38	99.18	98.99	98.80	98.61	98.46	98.29	98.13	97.96	97.83	97.72	97.61	97.52	97.42	97.35
S139	141.6	99.98	99.79	99.62	99.41	99.21	99.01	98.86	98.71	98.52	98.35	98.23	98.12	98.01	97.88	97.75	97.68	97.61	97.53
S140	141.8	99.99	99.85	99.63	99.43	99.22	99.00	98.82	98.67	98.52	98.35	98.18	98.01	97.91	97.78	97.65	97.58	97.51	97.44
S141	141.2	99.98	99.85	99.62	99.41	99.23	99.04	98.85	98.66	98.51	98.39	98.27	98.15	98.04	97.93	97.82	97.75	97.65	97.55
S142	141.9	100.01	99.82	99.59	99.41	99.21	99.00	98.85	98.67	98.48	98.36	98.25	98.08	97.97	97.84	97.73	97.66	97.56	97.49
S143	141.5	99.96	99.78	99.55	99.35	99.14	98.93	98.74	98.59	98.41	98.29	98.12	98.01	97.88	97.77	97.66	97.56	97.47	97.40
S144	141.4	99.94	99.75	99.53	99.32	99.11	98.91	98.73	98.54	98.39	98.22	98.10	97.94	97.83	97.72	97.61	97.54	97.46	97.39
S145	141.4	99.98	99.85	99.63	99.44	99.23	99.03	98.84	98.65	98.46	98.34	98.23	98.11	98.00	97.88	97.77	97.67	97.59	97.50
S146	142.0	99.93	99.79	99.57	99.36	99.15	98.95	98.77	98.58	98.39	98.27	98.15	97.98	97.87	97.75	97.62	97.54	97.47	97.40
S147	141.1	100.01	99.82	99.65	99.45	99.24	99.03	98.84	98.65	98.50	98.33	98.22	98.10	97.99	97.88	97.77	97.70	97.60	97.53
S148	141.3	99.95	99.76	99.53	99.33	99.14	98.94	98.75	98.56	98.37	98.26	98.14	98.02	97.91	97.80	97.68	97.61	97.51	97.43
S149	141.6	100.04	99.90	99.68	99.49	99.29	99.08	98.89	98.74	98.59	98.42	98.25	98.14	98.01	97.89	97.76	97.69	97.62	97.52
S150	141.9	99.99	99.86	99.69	99.50	99.30	99.10	98.95	98.76	98.62	98.50	98.33	98.21	98.10	97.98	97.85	97.76	97.68	97.61
Ave.	141.3	99.99	99.82	99.62	99.42	99.22	99.02	98.84	98.66	98.48	98.35	98.22	98.08	97.97	97.85	97.74	97.65	97.57	97.49
Med.	141.4	99.98	99.82	99.62	99.42	99.23	99.02	98.84	98.66	98.48	98.35	98.21	98.08	97.97	97.84	97.73	97.64	97.56	97.49
St dev	0.4920	0.0347	0.0398	0.0503	0.0531	0.0540	0.0555	0.0574	0.0672	0.0693	0.0685	0.0676	0.0796	0.0790	0.0789	0.0787	0.0785	0.0812	0.0767
Min.	139.6	99.93	99.75	99.53	99.32	99.11	98.91	98.73	98.54	98.37	98.22	98.10	97.94	97.83	97.72	97.61	97.52	97.42	97.35
Max.	142.0	100.04	99.91	99.73	99.52	99.32	99.14	98.95	98.80	98.62	98.50	98.37	98.25	98.14	98.03	97.92	97.83	97.75	97.65

## 3.27 Data Set 6, 105°C, 160mA (Photon Flux Maintenance, Photosynthetic (PFMp))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Photosynthetic (PFMp) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S126	2.191	100.01	99.83	99.61	99.42	99.19	98.99	98.81	98.63	98.48	98.31	98.22	98.13	98.02	97.93	97.83	97.71	97.62	97.54
S127	2.214	99.97	99.77	99.56	99.32	99.09	98.86	98.68	98.50	98.35	98.19	98.02	97.86	97.75	97.64	97.54	97.42	97.32	97.25
S128	2.215	99.99	99.81	99.60	99.33	99.10	98.90	98.72	98.51	98.33	98.17	98.07	97.91	97.80	97.70	97.59	97.47	97.38	97.30
S129	2.214	99.97	99.78	99.55	99.32	99.06	98.86	98.68	98.47	98.34	98.25	98.08	97.99	97.90	97.81	97.71	97.59	97.50	97.42
S130	2.214	99.92	99.74	99.51	99.28	99.01	98.85	98.70	98.52	98.37	98.28	98.18	98.02	97.91	97.82	97.72	97.60	97.51	97.43
S131	2.215	99.91	99.73	99.52	99.28	99.09	98.92	98.71	98.56	98.38	98.22	98.05	97.96	97.85	97.75	97.66	97.54	97.45	97.37
S132	2.214	99.95	99.77	99.54	99.28	99.09	98.85	98.68	98.50	98.35	98.25	98.16	98.00	97.89	97.79	97.70	97.58	97.49	97.41
S133	2.214	100.01	99.81	99.58	99.32	99.12	98.92	98.74	98.53	98.35	98.19	98.02	97.85	97.75	97.66	97.57	97.45	97.37	97.29
S134	2.214	99.99	99.79	99.57	99.31	99.05	98.89	98.68	98.50	98.32	98.22	98.13	98.04	97.95	97.84	97.75	97.63	97.54	97.46
S135	2.215	99.97	99.77	99.54	99.35	99.09	98.92	98.71	98.50	98.38	98.29	98.12	97.95	97.85	97.74	97.63	97.52	97.43	97.35
S136	2.214	100.01	99.81	99.57	99.34	99.11	98.95	98.77	98.61	98.49	98.32	98.23	98.07	97.96	97.85	97.76	97.65	97.55	97.47
S137	2.216	100.00	99.82	99.60	99.41	99.15	98.95	98.74	98.58	98.46	98.29	98.13	97.96	97.86	97.77	97.66	97.54	97.46	97.37
S138	2.223	99.99	99.79	99.56	99.30	99.07	98.84	98.66	98.48	98.33	98.16	98.07	97.91	97.80	97.69	97.59	97.46	97.38	97.29
S139	2.223	99.95	99.76	99.55	99.32	99.12	98.96	98.75	98.54	98.36	98.19	98.03	97.93	97.84	97.74	97.63	97.51	97.42	97.34
S140	2.223	100.00	99.80	99.59	99.39	99.13	98.97	98.76	98.61	98.48	98.32	98.15	98.06	97.97	97.87	97.78	97.66	97.57	97.49
S141	2.223	99.99	99.79	99.55	99.32	99.13	98.90	98.72	98.56	98.38	98.22	98.05	97.96	97.85	97.76	97.66	97.54	97.44	97.37
S142	2.223	100.02	99.84	99.61	99.38	99.12	98.89	98.68	98.50	98.37	98.21	98.11	97.95	97.84	97.74	97.63	97.51	97.42	97.34
S143	2.223	99.95	99.75	99.54	99.31	99.07	98.87	98.69	98.54	98.41	98.25	98.08	97.99	97.88	97.78	97.67	97.55	97.47	97.39
S144	2.223	99.91	99.73	99.51	99.28	99.05	98.85	98.69	98.51	98.33	98.17	98.00	97.84	97.73	97.64	97.55	97.44	97.35	97.27
S145	2.222	99.95	99.77	99.54	99.34	99.11	98.88	98.73	98.52	98.34	98.17	98.01	97.84	97.74	97.63	97.52	97.40	97.32	97.24
S146	2.223	100.00	99.80	99.57	99.30	99.07	98.84	98.66	98.51	98.36	98.20	98.10	98.01	97.90	97.82	97.71	97.59	97.50	97.42
S147	2.223	99.95	99.75	99.54	99.31	99.11	98.95	98.74	98.58	98.40	98.24	98.15	97.98	97.89	97.80	97.70	97.58	97.48	97.40
S148	2.223	99.98	99.78	99.54	99.31	99.08	98.92	98.70	98.55	98.37	98.21	98.04	97.88	97.77	97.67	97.56	97.45	97.36	97.27
S149	2.223	99.99	99.80	99.59	99.36	99.16	98.93	98.72	98.57	98.45	98.35	98.19	98.02	97.92	97.83	97.72	97.60	97.51	97.44
S150	2.224	99.98	99.78	99.57	99.34	99.10	98.90	98.72	98.57	98.44	98.35	98.18	98.02	97.93	97.82	97.74	97.62	97.53	97.44
Ave.	2.218	99.98	99.78	99.56	99.33	99.10	98.90	98.71	98.54	98.39	98.24	98.10	97.96	97.86	97.76	97.66	97.54	97.45	97.38
Med.	2.222	99.98	99.78	99.56	99.32	99.10	98.90	98.71	98.53	98.37	98.22	98.10	97.96	97.86	97.77	97.66	97.54	97.46	97.37
St dev	0.0071	0.0308	0.0292	0.0293	0.0390	0.0385	0.0434	0.0358	0.0433	0.0524	0.0593	0.0676	0.0750	0.0774	0.0789	0.0801	0.0807	0.0795	0.0795
Min.	2.191	99.91	99.73	99.51	99.28	99.01	98.84	98.66	98.47	98.32	98.16	98.00	97.84	97.73	97.63	97.52	97.40	97.32	97.24
Max.	2.224	100.02	99.84	99.61	99.42	99.19	98.99	98.81	98.63	98.49	98.35	98.23	98.13	98.02	97.93	97.83	97.71	97.62	97.54

## 3.28 Data Set 6, 105°C, 160mA (Photon Flux Maintenance, Far-Red (PFMR))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Far-Red (PFMR) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S126	0.1598	99.93	99.76	99.58	99.35	99.14	98.91	98.66	98.45	98.24	98.11	97.97	97.88	97.74	97.61	97.48	97.39	97.29	97.20
S127	0.1615	100.01	99.86	99.68	99.48	99.26	99.00	98.75	98.54	98.33	98.20	98.08	97.93	97.79	97.70	97.60	97.51	97.42	97.33
S128	0.1614	99.91	99.77	99.57	99.33	99.12	98.88	98.64	98.44	98.24	98.12	97.97	97.82	97.76	97.66	97.60	97.51	97.42	97.33
S129	0.1613	99.94	99.77	99.60	99.36	99.16	98.89	98.66	98.45	98.29	98.15	98.02	97.93	97.86	97.70	97.56	97.47	97.38	97.29
S130	0.1615	99.92	99.75	99.55	99.34	99.13	98.89	98.70	98.49	98.27	98.13	97.99	97.84	97.78	97.68	97.58	97.49	97.40	97.30
S131	0.1615	99.94	99.77	99.59	99.38	99.18	98.94	98.75	98.59	98.37	98.19	98.05	97.94	97.84	97.71	97.65	97.56	97.47	97.37
S132	0.1615	99.99	99.82	99.64	99.44	99.23	98.97	98.72	98.56	98.36	98.22	98.04	97.89	97.75	97.66	97.56	97.46	97.37	97.27
S133	0.1616	100.00	99.83	99.65	99.44	99.21	98.97	98.73	98.57	98.41	98.26	98.12	98.03	97.96	97.84	97.70	97.60	97.51	97.42
S134	0.1614	99.89	99.72	99.54	99.33	99.12	98.88	98.65	98.46	98.24	98.10	97.92	97.82	97.76	97.67	97.60	97.51	97.42	97.32
S135	0.1616	99.90	99.73	99.55	99.32	99.11	98.88	98.68	98.47	98.27	98.13	98.01	97.91	97.78	97.68	97.55	97.45	97.36	97.27
S136	0.1614	99.97	99.82	99.62	99.41	99.20	98.94	98.69	98.53	98.32	98.19	98.01	97.90	97.76	97.67	97.57	97.48	97.39	97.30
S137	0.1615	99.90	99.73	99.54	99.33	99.10	98.83	98.59	98.39	98.23	98.05	97.90	97.81	97.75	97.58	97.44	97.36	97.27	97.18
S138	0.1630	99.95	99.80	99.60	99.38	99.15	98.90	98.71	98.55	98.38	98.24	98.10	98.01	97.87	97.71	97.57	97.48	97.39	97.30
S139	0.1630	99.97	99.80	99.63	99.41	99.20	98.97	98.78	98.56	98.35	98.21	98.07	97.92	97.78	97.62	97.52	97.42	97.34	97.25
S140	0.1630	99.96	99.81	99.63	99.42	99.21	98.98	98.75	98.58	98.42	98.28	98.10	97.99	97.92	97.79	97.73	97.64	97.55	97.46
S141	0.1630	99.96	99.79	99.59	99.37	99.16	98.91	98.67	98.47	98.26	98.13	97.99	97.88	97.82	97.65	97.59	97.50	97.41	97.32
S142	0.1629	99.94	99.79	99.59	99.36	99.12	98.86	98.67	98.50	98.34	98.21	98.09	97.99	97.90	97.73	97.67	97.57	97.48	97.39
S143	0.1629	100.00	99.85	99.65	99.42	99.18	98.95	98.72	98.50	98.31	98.12	97.98	97.87	97.77	97.64	97.51	97.42	97.33	97.24
S144	0.1630	99.99	99.85	99.67	99.44	99.22	98.95	98.76	98.55	98.39	98.26	98.12	98.02	97.93	97.83	97.73	97.64	97.55	97.46
S145	0.1629	99.95	99.78	99.60	99.38	99.17	98.92	98.73	98.52	98.32	98.18	98.05	97.96	97.82	97.66	97.52	97.43	97.35	97.25
S146	0.1629	99.93	99.76	99.58	99.37	99.13	98.89	98.65	98.48	98.28	98.10	97.96	97.85	97.71	97.55	97.41	97.32	97.22	97.14
S147	0.1631	99.89	99.74	99.56	99.36	99.12	98.88	98.68	98.47	98.26	98.13	97.99	97.88	97.74	97.65	97.52	97.42	97.33	97.24
S148	0.1630	99.98	99.81	99.61	99.39	99.18	98.94	98.75	98.59	98.42	98.24	98.12	98.00	97.94	97.85	97.78	97.69	97.60	97.51
S149	0.1630	99.96	99.79	99.59	99.38	99.16	98.90	98.67	98.45	98.26	98.11	97.97	97.88	97.74	97.61	97.52	97.42	97.33	97.24
S150	0.1630	99.97	99.80	99.62	99.39	99.18	98.92	98.69	98.53	98.36	98.18	98.06	97.96	97.83	97.73	97.67	97.58	97.49	97.40
Ave.	0.1622	99.95	99.79	99.60	99.38	99.17	98.92	98.70	98.51	98.32	98.17	98.03	97.92	97.81	97.69	97.58	97.49	97.40	97.31
Med.	0.1629	99.95	99.79	99.60	99.38	99.16	98.91	98.69	98.50	98.32	98.18	98.02	97.91	97.78	97.67	97.57	97.48	97.39	97.30
St dev	0.0009	0.0353	0.0385	0.0395	0.0403	0.0426	0.0418	0.0459	0.0536	0.0614	0.0614	0.0623	0.0658	0.0721	0.0762	0.0917	0.0911	0.0918	0.0916
Min.	0.1598	99.89	99.72	99.54	99.32	99.10	98.83	98.59	98.39	98.23	98.05	97.90	97.81	97.71	97.55	97.41	97.32	97.22	97.14
Max.	0.1631	100.01	99.86	99.68	99.48	99.26	99.00	98.78	98.59	98.42	98.28	98.12	98.03	97.96	97.85	97.78	97.69	97.60	97.51

**3.29 Data Set 6, 105°C, 160mA (Forward Voltage)**

Sample Number	Forward Voltage(V)																		
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S126	5.688	5.688	5.681	5.681	5.681	5.681	5.677	5.677	5.671	5.671	5.666	5.667	5.660	5.663	5.661	5.654	5.660	5.653	5.651
S127	5.688	5.686	5.687	5.682	5.680	5.681	5.677	5.674	5.677	5.670	5.666	5.663	5.666	5.664	5.662	5.660	5.653	5.653	5.654
S128	5.677	5.677	5.677	5.669	5.673	5.669	5.664	5.663	5.665	5.660	5.659	5.656	5.657	5.652	5.651	5.642	5.643	5.645	5.637
S129	5.678	5.678	5.671	5.672	5.672	5.670	5.667	5.661	5.666	5.660	5.662	5.658	5.656	5.653	5.652	5.649	5.648	5.646	5.642
S130	5.648	5.641	5.641	5.640	5.642	5.640	5.635	5.632	5.631	5.630	5.626	5.624	5.620	5.623	5.618	5.621	5.620	5.613	5.614
S131	5.697	5.696	5.693	5.693	5.689	5.690	5.687	5.682	5.684	5.680	5.680	5.677	5.671	5.672	5.672	5.663	5.669	5.661	5.666
S132	5.683	5.683	5.683	5.679	5.680	5.671	5.676	5.672	5.667	5.668	5.660	5.662	5.661	5.657	5.657	5.653	5.655	5.648	5.645
S133	5.681	5.681	5.676	5.673	5.673	5.674	5.668	5.665	5.665	5.665	5.663	5.659	5.657	5.655	5.657	5.651	5.653	5.647	5.647
S134	5.691	5.684	5.685	5.684	5.683	5.684	5.679	5.680	5.676	5.670	5.669	5.664	5.663	5.665	5.666	5.660	5.654	5.656	5.654
S135	5.679	5.672	5.679	5.673	5.670	5.672	5.667	5.663	5.662	5.657	5.658	5.653	5.659	5.655	5.648	5.649	5.642	5.647	5.640
S136	5.684	5.683	5.681	5.681	5.681	5.671	5.672	5.667	5.672	5.669	5.668	5.664	5.657	5.656	5.660	5.653	5.654	5.649	5.650
S137	5.648	5.643	5.646	5.643	5.645	5.639	5.636	5.634	5.635	5.625	5.627	5.628	5.621	5.622	5.622	5.615	5.620	5.612	5.618
S138	5.678	5.674	5.672	5.671	5.670	5.669	5.671	5.666	5.661	5.661	5.657	5.652	5.658	5.652	5.648	5.650	5.643	5.646	5.644
S139	5.668	5.666	5.666	5.660	5.660	5.658	5.660	5.652	5.651	5.647	5.652	5.642	5.646	5.643	5.642	5.639	5.638	5.635	5.634
S140	5.638	5.632	5.636	5.634	5.630	5.625	5.626	5.625	5.624	5.622	5.620	5.618	5.611	5.612	5.612	5.613	5.611	5.610	5.602
S141	5.682	5.675	5.682	5.679	5.674	5.670	5.669	5.670	5.669	5.659	5.659	5.660	5.655	5.656	5.651	5.654	5.655	5.647	5.647
S142	5.667	5.666	5.660	5.663	5.659	5.659	5.659	5.654	5.651	5.651	5.651	5.647	5.645	5.636	5.642	5.638	5.637	5.632	5.636
S143	5.670	5.670	5.667	5.662	5.664	5.657	5.659	5.654	5.654	5.654	5.650	5.643	5.643	5.646	5.642	5.637	5.638	5.641	5.641
S144	5.674	5.667	5.674	5.669	5.667	5.661	5.664	5.663	5.661	5.651	5.658	5.654	5.654	5.648	5.649	5.646	5.645	5.641	5.640
S145	5.675	5.674	5.669	5.669	5.667	5.663	5.664	5.660	5.661	5.659	5.657	5.653	5.655	5.647	5.650	5.648	5.640	5.650	5.635
S146	5.672	5.672	5.672	5.664	5.667	5.665	5.660	5.659	5.656	5.656	5.651	5.651	5.650	5.646	5.646	5.647	5.644	5.644	5.635
S147	5.687	5.681	5.683	5.683	5.680	5.676	5.678	5.673	5.670	5.670	5.664	5.665	5.667	5.662	5.659	5.659	5.659	5.656	5.659
S148	5.682	5.680	5.675	5.678	5.674	5.675	5.674	5.666	5.670	5.667	5.659	5.655	5.655	5.656	5.651	5.649	5.652	5.646	5.646
S149	5.675	5.668	5.669	5.672	5.667	5.668	5.668	5.664	5.660	5.659	5.659	5.653	5.654	5.644	5.644	5.640	5.645	5.646	5.640
S150	5.638	5.633	5.635	5.630	5.631	5.631	5.626	5.626	5.621	5.621	5.615	5.612	5.617	5.607	5.614	5.601	5.604	5.610	5.604
Ave.	5.674	5.671	5.670	5.668	5.667	5.665	5.663	5.660	5.659	5.656	5.654	5.651	5.650	5.648	5.647	5.644	5.643	5.641	5.639
Med.	5.678	5.674	5.674	5.672	5.670	5.669	5.667	5.663	5.662	5.659	5.659	5.654	5.655	5.652	5.650	5.649	5.645	5.646	5.641
St dev	0.0156	0.0167	0.0157	0.0162	0.0155	0.0161	0.0162	0.0156	0.0162	0.0159	0.0158	0.0157	0.0161	0.0165	0.0156	0.0159	0.0156	0.0149	0.0156
Min.	5.638	5.632	5.635	5.630	5.630	5.625	5.626	5.625	5.621	5.621	5.615	5.612	5.611	5.607	5.612	5.601	5.604	5.610	5.602
Max.	5.697	5.696	5.693	5.693	5.689	5.690	5.687	5.682	5.684	5.680	5.680	5.677	5.671	5.672	5.672	5.663	5.669	5.661	5.666

**3.30 Data Set 6, 105°C, 160mA (Chromaticity Shift)**

Sample Number	u'	v'	CCT(K)	Chromaticity Shift (Au'v')																	
				0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000hrs s	11000hrs s	12000hrs s	13000hrs s	14000hrs s	15000hrs s	16000hrs s	17000hrs s
S126	0.2561	0.5262	2843	0.0002	0.0004	0.0005	0.0009	0.0012	0.0016	0.0018	0.0020	0.0024	0.0025	0.0026	0.0028	0.0031	0.0033	0.0036	0.0039	0.0042	0.0044
S127	0.2562	0.5261	2842	0.0003	0.0006	0.0008	0.0011	0.0014	0.0018	0.0020	0.0021	0.0023	0.0025	0.0026	0.0028	0.0030	0.0033	0.0035	0.0037	0.0039	0.0042
S128	0.2568	0.5271	2824	0.0003	0.0005	0.0008	0.0011	0.0015	0.0018	0.0020	0.0022	0.0023	0.0025	0.0026	0.0028	0.0030	0.0033	0.0035	0.0037	0.0039	0.0041
S129	0.2559	0.5257	2851	0.0002	0.0004	0.0006	0.0010	0.0013	0.0017	0.0021	0.0023	0.0024	0.0026	0.0027	0.0029	0.0032	0.0035	0.0037	0.0039	0.0040	0.0042
S130	0.2562	0.5259	2843	0.0002	0.0004	0.0005	0.0009	0.0013	0.0016	0.0018	0.0019	0.0023	0.0025	0.0027	0.0028	0.0032	0.0034	0.0038	0.0041	0.0042	0.0045
S131	0.2559	0.5259	2850	0.0003	0.0005	0.0008	0.0010	0.0013	0.0017	0.0018	0.0020	0.0022	0.0023	0.0024	0.0026	0.0028	0.0032	0.0034	0.0037	0.0040	0.0043
S132	0.2562	0.5264	2841	0.0002	0.0004	0.0005	0.0009	0.0013	0.0017	0.0018	0.0020	0.0024	0.0025	0.0027	0.0028	0.0031	0.0034	0.0037	0.0039	0.0041	0.0044
S133	0.2563	0.5273	2834	0.0002	0.0004	0.0006	0.0009	0.0012	0.0016	0.0020	0.0024	0.0026	0.0027	0.0029	0.0030	0.0033	0.0036	0.0039	0.0041	0.0043	0.0045
S134	0.2563	0.5267	2835	0.0003	0.0005	0.0008	0.0010	0.0014	0.0018	0.0019	0.0023	0.0025	0.0027	0.0028	0.0030	0.0032	0.0036	0.0039	0.0041	0.0044	0.0046
S135	0.2565	0.5275	2829	0.0002	0.0003	0.0006	0.0010	0.0014	0.0017	0.0019	0.0021	0.0022	0.0024	0.0025	0.0027	0.0029	0.0032	0.0034	0.0036	0.0038	0.0040
S136	0.2560	0.5257	2849	0.0002	0.0004	0.0008	0.0010	0.0014	0.0017	0.0019	0.0023	0.0025	0.0026	0.0028	0.0030	0.0033	0.0036	0.0039	0.0042	0.0044	0.0047
S137	0.2561	0.5259	2844	0.0002	0.0004	0.0005	0.0009	0.0013	0.0016	0.0018	0.0019	0.0021	0.0023	0.0024	0.0026	0.0029	0.0032	0.0035	0.0037	0.0039	0.0040
S138	0.2561	0.5266	2842	0.0003	0.0005	0.0007	0.0010	0.0014	0.0018	0.0019	0.0021	0.0023	0.0024	0.0026	0.0027	0.0031	0.0034	0.0037	0.0038	0.0041	0.0043
S139	0.2556	0.5262	2853	0.0002	0.0004	0.0005	0.0009	0.0013	0.0016	0.0018	0.0022	0.0026	0.0028	0.0029	0.0031	0.0033	0.0037	0.0039	0.0042	0.0045	0.0048
S140	0.2560	0.5264	2844	0.0002	0.0006	0.0008	0.0010	0.0014	0.0017	0.0019	0.0023	0.0024	0.0026	0.0028	0.0029	0.0032	0.0035	0.0038	0.0041	0.0043	0.0045
S141	0.2562	0.5271	2837	0.0003	0.0005	0.0007	0.0011	0.0015	0.0018	0.0020	0.0022	0.0023	0.0025	0.0026	0.0028	0.0031	0.0034	0.0037	0.0040	0.0043	0.0045
S142	0.2567	0.5275	2824	0.0002	0.0005	0.0007	0.0010	0.0014	0.0018	0.0022	0.0024	0.0026	0.0027	0.0028	0.0030	0.0032	0.0035	0.0038	0.0039	0.0042	0.0044
S143	0.2564	0.5280	2828	0.0002	0.0004	0.0006	0.0009	0.0013	0.0017	0.0018	0.0020	0.0022	0.0023	0.0024	0.0026	0.0028	0.0031	0.0033	0.0035	0.0037	0.0039
S144	0.2560	0.5268	2842	0.0002	0.0004	0.0006	0.0010	0.0013	0.0017	0.0018	0.0020	0.0022	0.0023	0.0024	0.0026	0.0028	0.0031	0.0034	0.0035	0.0038	0.0040
S145	0.2559	0.5260	2849	0.0003	0.0005	0.0008	0.0012	0.0015	0.0019	0.0022	0.0024	0.0026	0.0028	0.0029	0.0031	0.0034	0.0037	0.0040	0.0042	0.0044	0.0046
S146	0.2561	0.5278	2835	0.0002	0.0004	0.0006	0.0009	0.0013	0.0017	0.0021	0.0023	0.0027	0.0028	0.0030	0.0031	0.0034	0.0037	0.0039	0.0042	0.0044	0.0046
S147	0.2558	0.5262	2851	0.0003	0.0006	0.0007	0.0011	0.0014	0.0018	0.0020	0.0021	0.0025	0.0027	0.0029	0.0030	0.0033	0.0037	0.0039	0.0041	0.0043	0.0044
S148	0.2562	0.5270	2837	0.0002	0.0005	0.0006	0.0010	0.0013	0.0017	0.0018	0.0020	0.0022	0.0023	0.0025	0.0026	0.0030	0.0033	0.0035	0.0037	0.0039	0.0041
S149	0.2558	0.5261	2850	0.0003	0.0005	0.0008	0.0010	0.0014	0.0017	0.0019	0.0020	0.0024	0.0026	0.0027	0.0029	0.0032	0.0034	0.0037	0.0039	0.0042	0.0043
S150	0.2561	0.5263	2843	0.0003	0.0006	0.0007	0.0010	0.0014	0.0017	0.0021	0.0023	0.0025	0.0026	0.0027	0.0029	0.0031	0.0034	0.0037	0.0039	0.0040	0.0042
Ave.	0.2561	0.5266	2841	0.0002	0.0005	0.0007	0.0010	0.0014	0.0017	0.0019	0.0022	0.0024	0.0025	0.0027	0.0028	0.0031	0.0034	0.0037	0.0039	0.0041	0.0043
Med.	0.2561	0.5264	2842	0.0002	0.0005	0.0007	0.0010	0.0014	0.0017	0.0019	0.0021	0.0024	0.0025	0.0027	0.0028	0.0031	0.0034	0.0037	0.0039	0.0042	0.0044
St dev	0.0003	0.0007	8.4410	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	0.2556	0.5257	2824	0.0002	0.0003	0.0005	0.0009	0.0012	0.0016	0.0018	0.0019	0.0021	0.0023	0.0024	0.0026	0.0028	0.0031	0.0033	0.0035	0.0037	0.0039
Max.	0.2568	0.5280	2853	0.0003	0.0006	0.0008	0.0012	0.0015	0.0019	0.0022	0.0024	0.0027	0.0028	0.0030	0.0031	0.0034	0.0037	0.0040	0.0042	0.0045	0.0048



## 3.31 Data Set 7, 55°C, 200mA (Lumen Maintenance)

Sample Number	Φ(lm)	Lumen Maintenance (%)																	
		0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs
S151	172.6	100.17	99.97	99.81	99.57	99.36	99.15	98.91	98.67	98.43	98.14	97.95	97.74	97.58	97.40	97.17	96.98	96.75	96.53
S152	173.0	100.18	100.02	99.87	99.67	99.42	99.18	98.97	98.75	98.45	98.26	98.08	97.87	97.71	97.47	97.23	97.10	96.91	96.73
S153	172.3	100.16	100.00	99.85	99.64	99.39	99.15	98.91	98.70	98.45	98.16	97.98	97.77	97.60	97.36	97.19	97.05	96.87	96.74
S154	173.0	100.12	99.92	99.76	99.55	99.35	99.14	98.90	98.69	98.44	98.24	97.95	97.74	97.58	97.41	97.24	97.01	96.82	96.60
S155	172.6	100.17	100.02	99.82	99.61	99.36	99.16	98.94	98.73	98.52	98.23	98.04	97.75	97.58	97.41	97.24	97.11	96.88	96.65
S156	172.3	100.18	100.02	99.82	99.58	99.38	99.10	98.85	98.61	98.36	98.17	97.97	97.73	97.49	97.26	97.02	96.83	96.64	96.41
S157	173.3	100.13	99.98	99.78	99.58	99.38	99.17	98.95	98.71	98.41	98.22	98.04	97.83	97.65	97.42	97.25	97.07	96.84	96.65
S158	171.2	100.18	99.98	99.78	99.58	99.34	99.11	98.87	98.62	98.32	98.09	97.88	97.68	97.51	97.35	97.11	96.89	96.75	96.53
S159	171.8	100.14	99.99	99.76	99.51	99.22	98.96	98.69	98.44	98.21	97.96	97.75	97.55	97.34	97.14	96.97	96.78	96.63	96.46
S160	171.7	100.14	99.94	99.78	99.54	99.29	99.09	98.85	98.64	98.33	98.13	97.84	97.63	97.46	97.28	97.05	96.91	96.73	96.50
S161	172.5	100.12	99.96	99.80	99.60	99.36	99.15	98.91	98.70	98.39	98.19	98.00	97.81	97.58	97.34	97.17	96.94	96.72	96.49
S162	173.6	100.14	99.94	99.74	99.54	99.29	99.08	98.78	98.57	98.32	98.12	97.93	97.75	97.57	97.33	97.10	96.87	96.74	96.61
S163	173.8	100.18	100.02	99.86	99.62	99.42	99.21	98.97	98.76	98.45	98.25	98.04	97.83	97.67	97.49	97.33	97.10	96.97	96.84
S164	173.9	100.20	99.99	99.84	99.59	99.39	99.15	98.85	98.54	98.33	98.12	97.92	97.63	97.45	97.28	97.04	96.91	96.68	96.46
S165	173.6	100.13	99.93	99.73	99.53	99.32	99.11	98.87	98.66	98.44	98.15	97.95	97.74	97.50	97.34	97.16	97.03	96.90	96.77
S166	173.4	100.19	99.99	99.83	99.59	99.39	99.18	98.97	98.72	98.51	98.33	98.14	97.95	97.79	97.61	97.44	97.31	97.12	96.89
S167	173.2	100.12	99.97	99.81	99.57	99.37	99.12	98.82	98.51	98.30	98.01	97.72	97.53	97.36	97.19	96.96	96.83	96.60	96.47
S168	174.2	100.18	100.02	99.82	99.62	99.42	99.17	98.87	98.63	98.32	98.14	97.85	97.66	97.42	97.26	97.08	96.95	96.73	96.60
S169	174.0	100.20	99.99	99.79	99.59	99.35	99.11	98.89	98.65	98.41	98.22	98.02	97.83	97.65	97.42	97.18	97.05	96.92	96.69
S170	173.6	100.17	99.97	99.77	99.53	99.33	99.08	98.84	98.60	98.39	98.18	97.89	97.68	97.45	97.28	97.12	96.93	96.74	96.52
S171	174.0	100.11	99.91	99.75	99.55	99.34	99.09	98.79	98.58	98.36	98.18	97.97	97.78	97.62	97.38	97.22	97.03	96.90	96.67
S172	172.7	100.10	99.90	99.75	99.54	99.34	99.09	98.80	98.50	98.25	97.96	97.76	97.51	97.31	97.14	96.96	96.74	96.55	96.42
S173	173.3	100.17	99.97	99.81	99.61	99.40	99.16	98.85	98.61	98.40	98.19	97.90	97.61	97.44	97.26	97.03	96.90	96.67	96.44
S174	173.1	100.15	99.95	99.79	99.55	99.31	99.11	98.89	98.59	98.34	98.16	97.95	97.75	97.51	97.27	97.04	96.85	96.62	96.44
S175	173.7	100.16	100.00	99.80	99.59	99.35	99.11	98.86	98.56	98.26	98.07	97.88	97.68	97.50	97.27	97.03	96.90	96.77	96.58
Ave.	173.1	100.16	99.97	99.80	99.58	99.36	99.13	98.87	98.63	98.38	98.15	97.94	97.72	97.53	97.34	97.13	96.96	96.78	96.59
Med.	173.2	100.16	99.98	99.80	99.58	99.36	99.12	98.87	98.63	98.39	98.16	97.95	97.74	97.51	97.34	97.12	96.94	96.75	96.58
St dev	0.7848	0.0281	0.0366	0.0379	0.0389	0.0466	0.0496	0.0662	0.0824	0.0782	0.0878	0.1017	0.1076	0.1163	0.1089	0.1196	0.1256	0.1336	0.1352
Min.	171.2	100.10	99.90	99.73	99.51	99.22	98.96	98.69	98.44	98.21	97.96	97.72	97.51	97.31	97.14	96.96	96.74	96.55	96.41
Max.	174.2	100.20	100.02	99.87	99.67	99.42	99.21	98.97	98.76	98.52	98.33	98.14	97.95	97.79	97.61	97.44	97.31	97.12	96.89

## 3.32 Data Set 7, 55°C, 200mA (Photon Flux Maintenance, Photosynthetic (PFMp) )

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Photosynthetic (PFMp) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S151	2.708	100.09	99.94	99.78	99.55	99.29	99.09	98.85	98.61	98.32	98.08	97.80	97.57	97.39	97.21	97.01	96.83	96.65	96.48
S152	2.707	100.10	99.94	99.78	99.56	99.37	99.18	98.88	98.64	98.40	98.13	97.86	97.62	97.44	97.24	97.06	96.91	96.78	96.63
S153	2.708	100.09	99.93	99.76	99.57	99.35	99.16	98.92	98.62	98.34	98.07	97.80	97.53	97.35	97.15	96.97	96.84	96.66	96.51
S154	2.707	100.13	99.96	99.80	99.53	99.31	99.12	98.82	98.52	98.28	98.02	97.74	97.47	97.26	97.08	96.92	96.77	96.64	96.51
S155	2.708	100.19	100.02	99.86	99.67	99.48	99.29	99.01	98.73	98.43	98.20	97.92	97.66	97.49	97.29	97.11	96.93	96.76	96.63
S156	2.707	100.11	99.95	99.79	99.57	99.30	99.08	98.78	98.54	98.24	97.97	97.73	97.46	97.26	97.10	96.89	96.71	96.58	96.45
S157	2.709	100.11	99.95	99.79	99.57	99.35	99.12	98.83	98.53	98.25	97.98	97.71	97.43	97.25	97.05	96.89	96.74	96.56	96.41
S158	2.698	100.08	99.92	99.77	99.55	99.32	99.13	98.89	98.59	98.35	98.12	97.88	97.61	97.45	97.29	97.11	96.96	96.81	96.68
S159	2.699	100.10	99.94	99.78	99.56	99.37	99.18	98.94	98.64	98.36	98.09	97.82	97.58	97.40	97.20	97.02	96.87	96.72	96.59
S160	2.698	100.13	99.97	99.82	99.60	99.37	99.10	98.86	98.59	98.35	98.07	97.81	97.54	97.33	97.17	96.99	96.86	96.71	96.56
S161	2.699	100.08	99.92	99.76	99.49	99.30	99.03	98.79	98.55	98.25	97.99	97.71	97.45	97.27	97.09	96.88	96.71	96.56	96.43
S162	2.716	100.13	99.97	99.81	99.62	99.40	99.17	98.87	98.64	98.34	98.07	97.80	97.53	97.37	97.19	97.03	96.88	96.75	96.62
S163	2.716	100.08	99.92	99.77	99.58	99.39	99.12	98.82	98.58	98.30	98.06	97.80	97.52	97.34	97.14	96.96	96.83	96.68	96.55
S164	2.715	100.09	99.94	99.78	99.52	99.25	99.02	98.73	98.45	98.17	97.89	97.66	97.42	97.24	97.08	96.88	96.73	96.55	96.42
S165	2.716	100.11	99.96	99.80	99.61	99.38	99.16	98.88	98.60	98.33	98.06	97.79	97.52	97.34	97.16	96.98	96.81	96.66	96.53
S166	2.716	100.09	99.93	99.77	99.58	99.31	99.04	98.74	98.47	98.23	97.95	97.68	97.41	97.21	97.00	96.84	96.66	96.48	96.35
S167	2.715	100.13	99.98	99.83	99.56	99.33	99.11	98.87	98.63	98.35	98.09	97.85	97.61	97.45	97.29	97.13	96.98	96.80	96.67
S168	2.715	100.14	99.98	99.82	99.63	99.44	99.17	98.93	98.65	98.36	98.12	97.88	97.65	97.47	97.31	97.10	96.97	96.82	96.69
S169	2.715	100.18	100.02	99.85	99.59	99.32	99.05	98.77	98.47	98.19	97.96	97.68	97.42	97.24	97.08	96.90	96.72	96.54	96.37
S170	2.715	100.14	99.98	99.83	99.56	99.34	99.15	98.85	98.57	98.27	98.00	97.77	97.50	97.34	97.16	96.98	96.81	96.68	96.50
S171	2.717	100.18	100.03	99.87	99.60	99.38	99.11	98.83	98.55	98.25	98.02	97.74	97.48	97.30	97.14	96.93	96.75	96.58	96.45
S172	2.706	100.18	100.02	99.86	99.67	99.45	99.18	98.88	98.60	98.30	98.04	97.77	97.49	97.29	97.13	96.92	96.79	96.61	96.48
S173	2.707	100.07	99.91	99.75	99.53	99.30	99.11	98.87	98.59	98.30	98.03	97.79	97.56	97.38	97.20	97.02	96.84	96.67	96.54
S174	2.706	100.14	99.98	99.82	99.63	99.41	99.18	98.89	98.59	98.31	98.04	97.77	97.54	97.33	97.17	97.01	96.88	96.73	96.60
S175	2.706	100.08	99.92	99.77	99.50	99.28	99.01	98.71	98.47	98.17	97.94	97.66	97.39	97.21	97.05	96.84	96.67	96.54	96.41
Ave.	2.709	100.12	99.96	99.80	99.58	99.35	99.12	98.85	98.58	98.30	98.04	97.78	97.52	97.34	97.16	96.98	96.82	96.66	96.52
Med.	2.708	100.11	99.95	99.79	99.57	99.35	99.12	98.86	98.59	98.30	98.04	97.79	97.52	97.34	97.16	96.98	96.83	96.66	96.51
St dev	0.0062	0.0356	0.0358	0.0347	0.0461	0.0564	0.0627	0.0693	0.0672	0.0669	0.0697	0.0709	0.0773	0.0841	0.0831	0.0857	0.0932	0.0961	0.0990
Min.	2.698	100.07	99.91	99.75	99.49	99.25	99.01	98.71	98.45	98.17	97.89	97.66	97.39	97.21	97.00	96.84	96.66	96.48	96.35
Max.	2.717	100.19	100.03	99.87	99.67	99.48	99.29	99.01	98.73	98.43	98.20	97.92	97.66	97.49	97.31	97.13	96.98	96.82	96.69

## 3.33 Data Set 7, 55°C, 200mA (Photon Flux Maintenance, Far-Red (PFMFR))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Far-Red (PFMFR) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S151	0.1923	100.15	99.93	99.71	99.53	99.30	99.09	98.84	98.55	98.30	98.11	97.86	97.66	97.43	97.22	97.01	96.79	96.67	96.45
S152	0.1923	100.12	99.90	99.68	99.46	99.28	99.05	98.80	98.56	98.31	98.03	97.81	97.56	97.35	97.12	96.89	96.67	96.45	96.31
S153	0.1922	100.14	99.92	99.70	99.48	99.30	99.07	98.83	98.58	98.33	98.05	97.83	97.56	97.34	97.16	96.98	96.84	96.72	96.58
S154	0.1921	100.07	99.86	99.63	99.45	99.23	99.02	98.73	98.48	98.23	98.04	97.79	97.54	97.36	97.18	96.95	96.74	96.61	96.49
S155	0.1923	100.18	99.96	99.73	99.51	99.30	99.08	98.80	98.51	98.23	97.95	97.78	97.51	97.29	97.06	96.85	96.63	96.49	96.27
S156	0.1925	100.09	99.88	99.65	99.47	99.25	99.07	98.78	98.50	98.25	97.97	97.73	97.53	97.30	97.07	96.84	96.62	96.48	96.34
S157	0.1922	100.17	99.95	99.73	99.55	99.36	99.18	98.93	98.68	98.43	98.15	97.91	97.63	97.42	97.19	97.01	96.79	96.57	96.36
S158	0.1921	100.19	99.96	99.75	99.52	99.34	99.15	98.90	98.65	98.40	98.13	97.91	97.66	97.48	97.30	97.07	96.95	96.82	96.61
S159	0.1922	100.08	99.87	99.65	99.43	99.22	99.03	98.78	98.53	98.25	98.00	97.83	97.55	97.34	97.11	96.88	96.66	96.45	96.23
S160	0.1922	100.15	99.93	99.71	99.52	99.30	99.09	98.84	98.58	98.33	98.08	97.92	97.72	97.54	97.33	97.11	96.97	96.85	96.73
S161	0.1921	100.18	99.95	99.74	99.52	99.30	99.09	98.80	98.55	98.30	98.05	97.83	97.64	97.42	97.21	96.98	96.86	96.74	96.52
S162	0.1974	100.12	99.91	99.69	99.51	99.32	99.10	98.81	98.53	98.24	98.04	97.80	97.52	97.34	97.13	96.95	96.83	96.61	96.39
S163	0.1973	100.15	99.92	99.70	99.51	99.29	99.10	98.82	98.53	98.29	98.04	97.87	97.67	97.49	97.28	97.10	96.96	96.83	96.69
S164	0.1975	100.10	99.88	99.66	99.44	99.23	99.01	98.73	98.48	98.19	97.94	97.70	97.50	97.27	97.09	96.91	96.79	96.57	96.35
S165	0.1974	100.15	99.94	99.72	99.51	99.29	99.11	98.82	98.57	98.32	98.13	97.96	97.68	97.47	97.26	97.03	96.88	96.74	96.60
S166	0.1974	100.09	99.87	99.66	99.43	99.25	99.02	98.77	98.49	98.24	97.99	97.77	97.52	97.29	97.06	96.83	96.70	96.49	96.34
S167	0.1974	100.07	99.86	99.63	99.45	99.23	99.05	98.76	98.51	98.26	97.99	97.82	97.54	97.37	97.15	96.92	96.78	96.66	96.44
S168	0.1974	100.14	99.91	99.70	99.51	99.33	99.10	98.82	98.57	98.32	98.07	97.85	97.57	97.36	97.18	97.00	96.78	96.66	96.54
S169	0.1973	100.12	99.90	99.68	99.46	99.27	99.09	98.84	98.59	98.30	98.10	97.88	97.69	97.51	97.28	97.06	96.85	96.72	96.51
S170	0.1972	100.11	99.88	99.66	99.47	99.25	99.04	98.79	98.54	98.25	98.00	97.84	97.56	97.35	97.12	96.89	96.77	96.55	96.41
S171	0.1981	100.07	99.86	99.64	99.45	99.23	99.02	98.77	98.52	98.27	98.02	97.85	97.60	97.37	97.16	96.98	96.86	96.64	96.50
S172	0.1971	100.16	99.94	99.72	99.51	99.32	99.11	98.86	98.58	98.33	98.13	97.91	97.66	97.48	97.27	97.04	96.89	96.68	96.46
S173	0.1973	100.16	99.95	99.73	99.54	99.36	99.14	98.89	98.65	98.40	98.15	97.90	97.63	97.39	97.16	96.95	96.73	96.61	96.49
S174	0.1972	100.09	99.87	99.65	99.42	99.20	98.98	98.69	98.44	98.19	97.94	97.70	97.45	97.24	97.01	96.78	96.65	96.51	96.29
S175	0.1972	100.17	99.94	99.72	99.51	99.32	99.13	98.88	98.63	98.38	98.19	97.94	97.69	97.48	97.26	97.03	96.89	96.77	96.55
Ave.	0.1951	100.13	99.91	99.69	99.49	99.28	99.08	98.81	98.55	98.29	98.05	97.84	97.59	97.39	97.17	96.96	96.80	96.64	96.46
Med.	0.1972	100.14	99.91	99.70	99.51	99.29	99.09	98.81	98.55	98.30	98.04	97.84	97.57	97.37	97.16	96.98	96.79	96.64	96.46
St dev	0.0026	0.0367	0.0352	0.0367	0.0375	0.0445	0.0483	0.0555	0.0580	0.0631	0.0697	0.0700	0.0730	0.0814	0.0851	0.0887	0.1017	0.1208	0.1294
Min.	0.1921	100.07	99.86	99.63	99.42	99.20	98.98	98.69	98.44	98.19	97.94	97.70	97.45	97.24	97.01	96.78	96.62	96.45	96.23
Max.	0.1981	100.19	99.96	99.75	99.55	99.36	99.18	98.93	98.68	98.43	98.19	97.96	97.72	97.54	97.33	97.11	96.97	96.85	96.73

## 3.34 Data Set 7, 55°C, 200mA (Forward Voltage)

Sample Number	Forward Voltage(V)																		
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S151	5.764	5.768	5.768	5.761	5.766	5.762	5.763	5.761	5.749	5.754	5.749	5.752	5.753	5.750	5.739	5.744	5.735	5.746	5.735
S152	5.723	5.763	5.763	5.763	5.758	5.753	5.751	5.756	5.752	5.753	5.753	5.749	5.740	5.736	5.747	5.743	5.736	5.743	5.733
S153	5.767	5.771	5.767	5.769	5.762	5.761	5.764	5.762	5.757	5.756	5.750	5.754	5.747	5.752	5.743	5.738	5.747	5.747	5.740
S154	5.752	5.759	5.754	5.757	5.753	5.747	5.752	5.749	5.750	5.737	5.741	5.741	5.741	5.728	5.733	5.735	5.735	5.724	5.723
S155	5.755	5.760	5.755	5.755	5.760	5.757	5.751	5.747	5.752	5.742	5.743	5.746	5.747	5.738	5.737	5.728	5.737	5.728	5.729
S156	5.758	5.763	5.761	5.760	5.762	5.758	5.759	5.745	5.749	5.752	5.742	5.748	5.741	5.743	5.734	5.742	5.730	5.730	5.732
S157	5.756	5.755	5.755	5.751	5.753	5.747	5.752	5.751	5.741	5.747	5.745	5.740	5.745	5.742	5.736	5.726	5.738	5.737	5.735
S158	5.771	5.730	5.722	5.725	5.725	5.719	5.723	5.717	5.717	5.714	5.709	5.713	5.712	5.703	5.704	5.695	5.706	5.704	5.702
S159	5.762	5.752	5.757	5.751	5.749	5.750	5.748	5.751	5.743	5.745	5.745	5.743	5.743	5.733	5.740	5.724	5.736	5.733	5.726
S160	5.759	5.772	5.770	5.767	5.768	5.767	5.763	5.762	5.758	5.764	5.757	5.756	5.760	5.747	5.753	5.754	5.754	5.743	5.745
S161	5.756	5.769	5.764	5.762	5.760	5.762	5.758	5.755	5.755	5.753	5.753	5.742	5.746	5.750	5.743	5.742	5.733	5.744	5.735
S162	5.764	5.769	5.765	5.755	5.755	5.754	5.751	5.750	5.752	5.751	5.751	5.750	5.740	5.740	5.748	5.740	5.741	5.743	5.729
S163	5.754	5.765	5.761	5.754	5.761	5.759	5.757	5.751	5.745	5.740	5.750	5.748	5.741	5.746	5.734	5.741	5.731	5.742	5.732
S164	5.724	5.755	5.756	5.753	5.746	5.749	5.741	5.745	5.747	5.734	5.740	5.731	5.741	5.731	5.732	5.727	5.733	5.722	5.722
S165	5.756	5.710	5.713	5.712	5.713	5.704	5.708	5.707	5.703	5.703	5.702	5.701	5.690	5.691	5.698	5.693	5.682	5.682	5.684
S166	5.759	5.757	5.757	5.756	5.749	5.754	5.747	5.747	5.750	5.746	5.746	5.744	5.734	5.735	5.729	5.737	5.725	5.725	5.734
S167	5.767	5.746	5.739	5.734	5.741	5.736	5.735	5.734	5.734	5.725	5.732	5.728	5.726	5.724	5.720	5.715	5.722	5.722	5.711
S168	5.757	5.748	5.745	5.746	5.743	5.735	5.743	5.735	5.737	5.727	5.727	5.729	5.730	5.722	5.721	5.724	5.717	5.713	5.714
S169	5.752	5.746	5.743	5.737	5.735	5.730	5.733	5.729	5.731	5.725	5.722	5.719	5.719	5.715	5.720	5.721	5.722	5.721	5.711
S170	5.760	5.745	5.750	5.740	5.743	5.741	5.738	5.739	5.736	5.736	5.731	5.724	5.724	5.732	5.721	5.725	5.716	5.716	5.717
S171	5.759	5.755	5.744	5.746	5.741	5.748	5.741	5.739	5.740	5.731	5.739	5.733	5.735	5.727	5.730	5.729	5.718	5.718	5.728
S172	5.768	5.750	5.748	5.748	5.746	5.743	5.734	5.739	5.736	5.733	5.729	5.723	5.731	5.724	5.724	5.719	5.724	5.714	5.716
S173	5.756	5.758	5.758	5.754	5.756	5.750	5.751	5.752	5.751	5.751	5.750	5.742	5.737	5.739	5.745	5.738	5.738	5.739	5.737
S174	5.755	5.750	5.746	5.748	5.749	5.748	5.740	5.739	5.742	5.737	5.739	5.733	5.733	5.733	5.727	5.728	5.718	5.729	5.720
S175	5.748	5.739	5.739	5.734	5.738	5.732	5.735	5.736	5.729	5.731	5.721	5.729	5.723	5.720	5.715	5.711	5.715	5.722	5.719
Ave.	5.756	5.754	5.752	5.750	5.749	5.747	5.746	5.744	5.742	5.740	5.739	5.737	5.735	5.732	5.731	5.729	5.728	5.727	5.724
Med.	5.757	5.755	5.755	5.753	5.749	5.749	5.748	5.747	5.745	5.740	5.742	5.741	5.740	5.733	5.733	5.728	5.731	5.728	5.728
St dev	0.0113	0.0138	0.0138	0.0133	0.0130	0.0146	0.0132	0.0132	0.0127	0.0141	0.0140	0.0137	0.0144	0.0145	0.0134	0.0147	0.0146	0.0152	0.0133
Min.	5.723	5.710	5.713	5.712	5.713	5.704	5.708	5.707	5.703	5.703	5.702	5.701	5.690	5.691	5.698	5.693	5.682	5.682	5.684
Max.	5.771	5.772	5.770	5.769	5.768	5.767	5.764	5.762	5.758	5.764	5.757	5.756	5.760	5.752	5.753	5.754	5.754	5.747	5.745

**3.35 Data Set 7, 55°C, 200mA (Chromaticity Shift)**

Sample Number	u'	v'	CCT(K)	Chromaticity Shift (Au'v')																	
				0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000hrs s	12000hrs s	18000hrs s	13000hrs s	14000hrs s	15000hrs s	16000hrs s	17000hrs s
S151	0.2558	0.5233	2866	0.0001	0.0003	0.0005	0.0008	0.0010	0.0012	0.0014	0.0017	0.0020	0.0021	0.0024	0.0025	0.0027	0.0029	0.0031	0.0032	0.0036	0.0037
S152	0.2558	0.5230	2867	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0012	0.0013	0.0015	0.0017	0.0020	0.0022	0.0024	0.0026	0.0027	0.0029	0.0032	0.0034
S153	0.2559	0.5237	2859	0.0001	0.0002	0.0003	0.0006	0.0008	0.0011	0.0012	0.0015	0.0018	0.0020	0.0022	0.0023	0.0025	0.0026	0.0028	0.0029	0.0033	0.0034
S154	0.2564	0.5242	2846	0.0002	0.0003	0.0004	0.0006	0.0008	0.0011	0.0013	0.0014	0.0017	0.0019	0.0021	0.0022	0.0025	0.0027	0.0028	0.0030	0.0034	0.0036
S155	0.2561	0.5247	2852	0.0001	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0018	0.0020	0.0022	0.0024	0.0026	0.0029	0.0031	0.0032	0.0035	0.0036
S156	0.2557	0.5235	2865	0.0002	0.0003	0.0005	0.0007	0.0010	0.0012	0.0014	0.0016	0.0019	0.0022	0.0023	0.0025	0.0026	0.0028	0.0031	0.0033	0.0036	0.0038
S157	0.2559	0.5245	2856	0.0001	0.0003	0.0005	0.0006	0.0008	0.0011	0.0013	0.0015	0.0017	0.0020	0.0021	0.0023	0.0024	0.0026	0.0028	0.0030	0.0033	0.0035
S158	0.2560	0.5228	2863	0.0002	0.0003	0.0005	0.0008	0.0010	0.0012	0.0013	0.0015	0.0019	0.0021	0.0023	0.0024	0.0026	0.0028	0.0029	0.0031	0.0035	0.0036
S159	0.2563	0.5233	2854	0.0001	0.0003	0.0005	0.0008	0.0010	0.0012	0.0014	0.0015	0.0019	0.0020	0.0023	0.0026	0.0029	0.0030	0.0032	0.0034	0.0037	0.0039
S160	0.2562	0.5228	2859	0.0001	0.0003	0.0005	0.0007	0.0010	0.0012	0.0013	0.0015	0.0018	0.0019	0.0021	0.0022	0.0025	0.0028	0.0031	0.0033	0.0036	0.0038
S161	0.2563	0.5245	2847	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0012	0.0014	0.0017	0.0018	0.0021	0.0024	0.0025	0.0027	0.0030	0.0032	0.0035	0.0037
S162	0.2559	0.5264	2845	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0012	0.0015	0.0017	0.0019	0.0022	0.0024	0.0025	0.0027	0.0029	0.0030	0.0034	0.0036
S163	0.2556	0.5262	2854	0.0001	0.0002	0.0004	0.0007	0.0009	0.0011	0.0013	0.0015	0.0018	0.0019	0.0021	0.0022	0.0025	0.0028	0.0030	0.0031	0.0034	0.0036
S164	0.2560	0.5262	2846	0.0001	0.0003	0.0005	0.0007	0.0010	0.0012	0.0014	0.0016	0.0019	0.0020	0.0022	0.0023	0.0025	0.0028	0.0030	0.0031	0.0035	0.0037
S165	0.2563	0.5278	2832	0.0001	0.0002	0.0004	0.0006	0.0008	0.0010	0.0012	0.0013	0.0015	0.0018	0.0020	0.0021	0.0023	0.0026	0.0028	0.0029	0.0032	0.0034
S166	0.2559	0.5267	2845	0.0001	0.0002	0.0004	0.0006	0.0008	0.0010	0.0013	0.0015	0.0018	0.0019	0.0020	0.0023	0.0024	0.0026	0.0029	0.0030	0.0033	0.0035
S167	0.2561	0.5269	2839	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019	0.0020	0.0023	0.0026	0.0028	0.0031	0.0033	0.0036	0.0038
S168	0.2560	0.5277	2837	0.0002	0.0003	0.0005	0.0007	0.0009	0.0012	0.0014	0.0016	0.0019	0.0021	0.0024	0.0026	0.0027	0.0029	0.0032	0.0033	0.0036	0.0038
S169	0.2565	0.5274	2827	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0012	0.0014	0.0017	0.0018	0.0020	0.0023	0.0026	0.0027	0.0030	0.0032	0.0035	0.0036
S170	0.2557	0.5260	2854	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0028	0.0029	0.0030	0.0034	0.0036
S171	0.2558	0.5282	2840	0.0001	0.0002	0.0004	0.0006	0.0008	0.0010	0.0012	0.0014	0.0016	0.0017	0.0019	0.0020	0.0021	0.0023	0.0025	0.0026	0.0030	0.0031
S172	0.2554	0.5278	2851	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0012	0.0013	0.0015	0.0016	0.0018	0.0020	0.0023	0.0025	0.0027	0.0028	0.0032	0.0033
S173	0.2555	0.5276	2849	0.0002	0.0003	0.0004	0.0006	0.0009	0.0011	0.0013	0.0014	0.0016	0.0017	0.0019	0.0020	0.0022	0.0023	0.0025	0.0027	0.0030	0.0032
S174	0.2557	0.5283	2842	0.0001	0.0003	0.0004	0.0006	0.0009	0.0010	0.0012	0.0013	0.0016	0.0018	0.0020	0.0023	0.0025	0.0028	0.0030	0.0031	0.0034	0.0036
S175	0.2563	0.5290	2825	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0014	0.0015	0.0018	0.0020	0.0021	0.0022	0.0024	0.0026	0.0028	0.0029	0.0033	0.0035
Ave.	0.2560	0.5257	2849	0.0001	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0031	0.0034	0.0036
Med.	0.2559	0.5262	2849	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0031	0.0034	0.0036
St dev	0.0003	0.0020	11.5072	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	0.2554	0.5228	2825	0.0001	0.0002	0.0003	0.0006	0.0008	0.0010	0.0012	0.0013	0.0015	0.0016	0.0018	0.0020	0.0021	0.0023	0.0025	0.0026	0.0030	0.0031
Max.	0.2565	0.5290	2867	0.0002	0.0003	0.0005	0.0008	0.0010	0.0012	0.0014	0.0017	0.0020	0.0022	0.0024	0.0026	0.0029	0.0030	0.0032	0.0034	0.0037	0.0039

## 3.36 Data Set 8, 85°C, 200mA (Lumen Maintenance)

Sample Number	Φ(lm) 0hr (Initial)	Lumen Maintenance (%)																	
		1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S176	172.5	100.03	99.86	99.62	99.40	99.17	98.90	98.61	98.34	98.04	97.78	97.58	97.26	97.09	96.90	96.64	96.47	96.34	96.16
S177	172.7	100.02	99.85	99.61	99.33	99.06	98.76	98.49	98.19	97.92	97.54	97.34	97.14	96.91	96.71	96.52	96.35	96.22	96.04
S178	172.9	100.07	99.83	99.59	99.37	99.14	98.92	98.65	98.38	98.11	97.85	97.65	97.44	97.28	97.01	96.75	96.52	96.40	96.28
S179	172.3	100.10	99.93	99.75	99.45	99.23	98.95	98.68	98.34	98.00	97.74	97.42	97.22	97.06	96.80	96.60	96.44	96.31	96.13
S180	172.1	100.00	99.83	99.59	99.36	99.14	98.84	98.55	98.21	97.91	97.65	97.45	97.24	97.01	96.82	96.55	96.39	96.20	96.09
S181	172.5	100.03	99.79	99.61	99.39	99.12	98.89	98.62	98.35	98.01	97.75	97.43	97.23	97.00	96.73	96.54	96.31	96.19	96.07
S182	173.1	100.06	99.89	99.72	99.44	99.22	98.92	98.65	98.38	98.09	97.82	97.62	97.30	97.07	96.87	96.68	96.51	96.39	96.21
S183	173.2	100.03	99.79	99.56	99.26	98.95	98.65	98.38	98.09	97.75	97.49	97.17	96.96	96.80	96.61	96.41	96.24	96.11	96.00
S184	172.5	100.00	99.83	99.59	99.29	99.01	98.74	98.40	98.06	97.76	97.50	97.30	97.09	96.93	96.67	96.47	96.31	96.18	96.06
S185	172.0	100.09	99.85	99.68	99.45	99.15	98.85	98.58	98.29	97.95	97.68	97.48	97.28	97.12	96.85	96.66	96.43	96.30	96.12
S186	172.2	100.04	99.80	99.56	99.29	99.01	98.71	98.42	98.15	97.81	97.43	97.23	96.91	96.68	96.41	96.15	95.99	95.80	95.62
S187	172.9	100.01	99.78	99.60	99.30	99.00	98.73	98.46	98.16	97.89	97.63	97.42	97.22	97.02	96.83	96.63	96.43	96.27	96.15
S188	172.5	100.02	99.85	99.68	99.46	99.23	98.96	98.66	98.32	97.98	97.72	97.52	97.31	97.15	96.96	96.76	96.60	96.47	96.35
S189	171.9	100.06	99.82	99.65	99.38	99.15	98.85	98.56	98.27	97.97	97.59	97.39	97.07	96.84	96.58	96.39	96.15	96.03	95.91
S190	172.5	100.10	99.93	99.69	99.41	99.14	98.86	98.52	98.18	97.85	97.47	97.15	96.83	96.60	96.33	96.14	95.98	95.85	95.73
S191	173.1	100.09	99.92	99.75	99.48	99.25	98.95	98.68	98.41	98.12	97.85	97.65	97.45	97.28	97.09	96.89	96.72	96.53	96.42
S192	172.8	100.09	99.85	99.61	99.34	99.11	98.81	98.52	98.22	97.88	97.62	97.42	97.10	96.87	96.61	96.42	96.19	96.06	95.94
S193	172.3	100.07	99.89	99.66	99.38	99.11	98.88	98.59	98.25	97.98	97.71	97.40	97.19	97.03	96.83	96.57	96.41	96.28	96.10
S194	172.0	100.03	99.85	99.68	99.38	99.08	98.80	98.51	98.17	97.88	97.61	97.41	97.21	97.04	96.85	96.65	96.42	96.30	96.18
S195	172.1	100.07	99.83	99.61	99.39	99.11	98.89	98.55	98.21	97.91	97.60	97.36	97.11	96.89	96.70	96.51	96.34	96.19	96.07
S196	172.7	100.09	99.85	99.61	99.31	99.09	98.86	98.52	98.18	97.89	97.63	97.31	97.10	96.87	96.68	96.49	96.26	96.13	96.02
S197	172.4	100.02	99.85	99.67	99.45	99.23	98.93	98.59	98.29	97.95	97.57	97.37	97.17	96.94	96.74	96.55	96.32	96.20	96.08
S198	173.1	100.01	99.77	99.53	99.26	98.95	98.68	98.34	98.07	97.80	97.42	97.22	97.01	96.78	96.59	96.40	96.16	95.97	95.79
S199	172.4	100.08	99.84	99.60	99.30	99.03	98.80	98.53	98.24	97.95	97.57	97.36	97.04	96.88	96.68	96.42	96.19	96.00	95.89
S200	172.4	100.05	99.88	99.64	99.36	99.14	98.87	98.57	98.28	97.98	97.72	97.48	97.28	97.07	96.88	96.69	96.52	96.39	96.21
Ave.	172.5	100.05	99.85	99.63	99.37	99.11	98.84	98.55	98.24	97.94	97.64	97.40	97.17	96.97	96.75	96.54	96.35	96.20	96.07
Med.	172.5	100.05	99.85	99.61	99.38	99.12	98.86	98.55	98.24	97.95	97.63	97.41	97.19	97.00	96.74	96.55	96.35	96.20	96.08
St dev	0.3778	0.0333	0.0436	0.0577	0.0657	0.0859	0.0873	0.0936	0.0980	0.0990	0.1252	0.1356	0.1493	0.1647	0.1737	0.1729	0.1764	0.1820	0.1821
Min.	171.9	100.00	99.77	99.53	99.26	98.95	98.65	98.34	98.06	97.75	97.42	97.15	96.83	96.60	96.33	96.14	95.98	95.80	95.62
Max.	173.2	100.10	99.93	99.75	99.48	99.25	98.96	98.68	98.41	98.12	97.85	97.65	97.45	97.28	97.09	96.89	96.72	96.53	96.42

## 3.37 Data Set 8, 85°C, 200mA (Photon Flux Maintenance, Photosynthetic (PFMp))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Photosynthetic (PFMp) (%)																	
	Ohr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S176	2.707	99.99	99.78	99.57	99.26	98.95	98.64	98.38	98.12	97.85	97.60	97.35	97.03	96.83	96.64	96.44	96.28	96.11	95.94
S177	2.708	100.04	99.83	99.63	99.33	99.07	98.76	98.46	98.12	97.86	97.54	97.29	97.06	96.87	96.67	96.48	96.31	96.14	95.97
S178	2.710	100.06	99.90	99.69	99.39	99.08	98.78	98.44	98.09	97.83	97.58	97.26	96.94	96.75	96.57	96.31	96.16	95.98	95.83
S179	2.708	99.98	99.77	99.61	99.35	99.09	98.79	98.52	98.18	97.84	97.52	97.30	97.07	96.88	96.70	96.53	96.36	96.21	96.03
S180	2.708	100.06	99.89	99.73	99.47	99.17	98.87	98.60	98.31	98.01	97.69	97.47	97.15	96.96	96.78	96.52	96.34	96.19	96.02
S181	2.708	100.02	99.85	99.64	99.34	99.09	98.78	98.48	98.19	97.85	97.59	97.37	97.15	96.95	96.69	96.44	96.28	96.12	95.93
S182	2.709	99.99	99.83	99.67	99.36	99.10	98.84	98.50	98.20	97.86	97.64	97.32	97.00	96.80	96.55	96.37	96.19	96.01	95.86
S183	2.710	100.02	99.86	99.65	99.35	99.04	98.74	98.45	98.15	97.81	97.56	97.33	97.01	96.76	96.56	96.30	96.13	95.95	95.77
S184	2.709	100.02	99.81	99.61	99.35	99.05	98.79	98.49	98.15	97.81	97.49	97.27	97.04	96.78	96.61	96.44	96.29	96.12	95.94
S185	2.709	99.99	99.83	99.62	99.32	99.06	98.80	98.54	98.27	97.93	97.71	97.39	97.07	96.81	96.62	96.36	96.19	96.04	95.87
S186	2.711	100.04	99.88	99.72	99.42	99.16	98.86	98.57	98.30	97.96	97.64	97.39	97.07	96.90	96.73	96.53	96.38	96.21	96.03
S187	2.711	100.02	99.81	99.65	99.35	99.05	98.75	98.40	98.06	97.80	97.55	97.30	97.04	96.79	96.61	96.44	96.29	96.12	95.95
S188	2.704	100.06	99.85	99.64	99.34	99.03	98.72	98.38	98.04	97.74	97.49	97.17	96.92	96.75	96.49	96.32	96.15	95.97	95.80
S189	2.705	100.03	99.82	99.66	99.36	99.06	98.76	98.47	98.17	97.83	97.51	97.26	97.04	96.86	96.61	96.41	96.26	96.09	95.94
S190	2.704	99.99	99.83	99.67	99.36	99.05	98.79	98.45	98.19	97.92	97.61	97.29	97.04	96.78	96.60	96.41	96.26	96.10	95.92
S191	2.704	100.02	99.86	99.65	99.35	99.04	98.74	98.48	98.21	97.87	97.65	97.33	97.10	96.93	96.73	96.48	96.31	96.14	95.99
S192	2.702	100.00	99.83	99.63	99.33	99.02	98.76	98.49	98.20	97.86	97.61	97.35	97.13	96.87	96.68	96.48	96.31	96.15	95.98
S193	2.703	100.08	99.92	99.71	99.41	99.15	98.89	98.55	98.28	98.02	97.70	97.48	97.25	97.06	96.89	96.63	96.47	96.32	96.17
S194	2.704	100.07	99.90	99.74	99.43	99.18	98.87	98.53	98.23	97.94	97.62	97.39	97.07	96.82	96.62	96.43	96.24	96.09	95.91
S195	2.703	100.07	99.86	99.65	99.34	99.03	98.73	98.39	98.05	97.71	97.46	97.23	97.01	96.81	96.64	96.38	96.21	96.03	95.88
S196	2.704	100.02	99.81	99.64	99.39	99.13	98.87	98.53	98.26	97.92	97.60	97.35	97.10	96.92	96.75	96.55	96.39	96.23	96.08
S197	2.703	100.01	99.80	99.59	99.28	99.02	98.76	98.50	98.16	97.82	97.59	97.27	97.05	96.86	96.66	96.46	96.30	96.14	95.99
S198	2.704	100.03	99.87	99.66	99.36	99.10	98.84	98.55	98.28	97.99	97.74	97.42	97.10	96.90	96.64	96.45	96.27	96.10	95.95
S199	2.704	100.06	99.85	99.69	99.43	99.17	98.86	98.60	98.30	98.01	97.78	97.56	97.31	97.14	96.96	96.77	96.60	96.45	96.26
S200	2.704	100.05	99.89	99.68	99.38	99.07	98.76	98.47	98.20	97.91	97.68	97.43	97.18	97.01	96.75	96.55	96.40	96.22	96.07
Ave.	2.706	100.03	99.85	99.66	99.36	99.08	98.79	98.49	98.19	97.88	97.61	97.34	97.08	96.87	96.67	96.46	96.29	96.13	95.96
Med.	2.705	100.02	99.85	99.65	99.35	99.07	98.78	98.49	98.19	97.86	97.60	97.33	97.07	96.86	96.64	96.44	96.29	96.12	95.95
St dev	0.0029	0.0286	0.0377	0.0425	0.0467	0.0561	0.0591	0.0620	0.0802	0.0819	0.0823	0.0867	0.0859	0.0977	0.1039	0.1029	0.1040	0.1104	0.1099
Min.	2.702	99.98	99.77	99.57	99.26	98.95	98.64	98.38	98.04	97.71	97.46	97.17	96.92	96.75	96.49	96.30	96.13	95.95	95.77
Max.	2.711	100.08	99.92	99.74	99.47	99.18	98.89	98.60	98.31	98.02	97.78	97.56	97.31	97.14	96.96	96.77	96.60	96.45	96.26

## 3.38 Data Set 8, 85°C, 200mA (Photon Flux Maintenance, Far-Red (PFMFR))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Far-Red (PFMFR) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S176	0.1936	100.07	99.83	99.63	99.39	99.13	98.89	98.58	98.24	97.97	97.77	97.57	97.37	97.11	96.94	96.77	96.56	96.35	96.15
S177	0.1938	100.09	99.88	99.68	99.45	99.22	98.97	98.67	98.36	98.05	97.78	97.57	97.30	97.13	96.96	96.70	96.47	96.26	96.04
S178	0.1937	100.05	99.81	99.58	99.35	99.12	98.88	98.61	98.35	98.04	97.76	97.48	97.29	97.03	96.77	96.60	96.39	96.16	95.94
S179	0.1937	99.99	99.76	99.56	99.30	99.06	98.80	98.53	98.27	98.00	97.80	97.52	97.32	97.15	96.89	96.72	96.52	96.31	96.11
S180	0.1936	100.08	99.84	99.65	99.40	99.14	98.91	98.65	98.30	97.96	97.68	97.48	97.28	97.11	96.85	96.60	96.37	96.17	95.94
S181	0.1936	100.00	99.76	99.54	99.30	99.07	98.84	98.57	98.31	97.96	97.77	97.49	97.29	97.12	96.95	96.78	96.55	96.35	96.14
S182	0.1936	100.08	99.88	99.65	99.42	99.19	98.93	98.62	98.35	98.01	97.81	97.61	97.41	97.15	96.98	96.81	96.59	96.38	96.16
S183	0.1937	100.02	99.81	99.58	99.32	99.09	98.85	98.54	98.28	98.01	97.81	97.54	97.34	97.17	97.00	96.74	96.53	96.32	96.10
S184	0.1935	100.03	99.79	99.56	99.32	99.06	98.83	98.48	98.18	97.87	97.67	97.48	97.27	97.10	96.93	96.76	96.54	96.31	96.11
S185	0.1935	100.01	99.77	99.57	99.31	99.07	98.83	98.57	98.26	97.92	97.72	97.44	97.25	96.99	96.82	96.56	96.36	96.13	95.92
S186	0.1937	100.07	99.86	99.64	99.38	99.12	98.87	98.53	98.26	97.92	97.72	97.52	97.32	97.06	96.89	96.72	96.51	96.30	96.10
S187	0.1938	100.00	99.76	99.53	99.29	99.05	98.80	98.54	98.27	97.93	97.73	97.53	97.25	97.08	96.82	96.57	96.36	96.16	95.94
S188	0.1968	100.01	99.78	99.58	99.32	99.09	98.83	98.48	98.18	97.87	97.67	97.47	97.27	97.01	96.75	96.49	96.29	96.08	95.86
S189	0.1969	100.04	99.80	99.57	99.33	99.10	98.86	98.60	98.25	97.99	97.79	97.51	97.31	97.14	96.97	96.80	96.60	96.38	96.18
S190	0.1969	100.01	99.81	99.58	99.34	99.10	98.84	98.50	98.19	97.93	97.73	97.53	97.25	97.08	96.83	96.57	96.34	96.12	95.91
S191	0.1968	100.03	99.79	99.60	99.35	99.09	98.86	98.52	98.25	97.95	97.75	97.54	97.35	97.09	96.92	96.75	96.52	96.32	96.09
S192	0.1968	100.08	99.87	99.64	99.38	99.12	98.86	98.52	98.25	97.99	97.71	97.51	97.30	97.13	96.96	96.71	96.50	96.30	96.09
S193	0.1968	100.09	99.88	99.68	99.44	99.21	98.95	98.60	98.26	98.00	97.72	97.44	97.16	96.99	96.82	96.65	96.45	96.25	96.03
S194	0.1968	99.99	99.76	99.56	99.33	99.07	98.83	98.57	98.26	97.96	97.75	97.55	97.35	97.18	97.01	96.84	96.63	96.42	96.20
S195	0.1968	100.06	99.85	99.63	99.37	99.12	98.89	98.55	98.24	97.93	97.73	97.53	97.25	97.08	96.91	96.74	96.53	96.31	96.10
S196	0.1969	100.02	99.81	99.62	99.38	99.14	98.91	98.56	98.22	97.91	97.64	97.44	97.24	97.07	96.90	96.64	96.44	96.23	96.02
S197	0.1967	100.06	99.85	99.65	99.42	99.18	98.93	98.63	98.29	97.94	97.66	97.39	97.11	96.94	96.68	96.51	96.30	96.08	95.87
S198	0.1969	100.04	99.81	99.58	99.32	99.09	98.84	98.58	98.27	98.01	97.73	97.53	97.25	96.99	96.82	96.56	96.34	96.13	95.91
S199	0.1969	99.99	99.79	99.56	99.32	99.07	98.84	98.57	98.23	97.96	97.69	97.48	97.29	97.03	96.77	96.60	96.39	96.16	95.94
S200	0.1969	100.04	99.80	99.60	99.36	99.10	98.87	98.53	98.22	97.95	97.68	97.47	97.20	96.94	96.77	96.60	96.37	96.16	95.94
Ave.	0.1953	100.04	99.81	99.60	99.36	99.11	98.87	98.56	98.26	97.96	97.73	97.51	97.28	97.08	96.88	96.67	96.46	96.25	96.03
Med.	0.1967	100.04	99.81	99.58	99.35	99.10	98.86	98.57	98.26	97.96	97.73	97.51	97.29	97.08	96.89	96.70	96.47	96.26	96.04
St dev	0.0016	0.0326	0.0409	0.0432	0.0458	0.0466	0.0446	0.0485	0.0476	0.0462	0.0479	0.0491	0.0639	0.0690	0.0882	0.1007	0.1000	0.1023	0.1052
Min.	0.1935	99.99	99.76	99.53	99.29	99.05	98.80	98.48	98.18	97.87	97.64	97.39	97.11	96.94	96.68	96.49	96.29	96.08	95.86
Max.	0.1969	100.09	99.88	99.68	99.45	99.22	98.97	98.67	98.36	98.05	97.81	97.61	97.41	97.18	97.01	96.84	96.63	96.42	96.20



## 3.39 Data Set 8, 85°C, 200mA (Forward Voltage)

Sample Number	Forward Voltage(V)																		
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S176	5.763	5.762	5.765	5.757	5.758	5.758	5.761	5.753	5.755	5.751	5.745	5.749	5.742	5.748	5.744	5.746	5.734	5.738	5.732
S177	5.753	5.759	5.760	5.758	5.755	5.755	5.753	5.752	5.750	5.747	5.742	5.740	5.739	5.741	5.745	5.735	5.740	5.739	5.735
S178	5.723	5.773	5.771	5.765	5.762	5.762	5.769	5.754	5.754	5.760	5.752	5.755	5.751	5.752	5.742	5.744	5.743	5.736	5.738
S179	5.758	5.757	5.751	5.751	5.754	5.749	5.743	5.748	5.750	5.744	5.745	5.735	5.730	5.738	5.725	5.729	5.723	5.721	5.731
S180	5.766	5.763	5.755	5.752	5.757	5.754	5.749	5.755	5.743	5.745	5.739	5.742	5.744	5.739	5.738	5.740	5.727	5.724	5.732
S181	5.759	5.758	5.758	5.756	5.759	5.754	5.752	5.754	5.749	5.750	5.753	5.742	5.738	5.737	5.744	5.739	5.737	5.729	5.738
S182	5.751	5.761	5.754	5.755	5.755	5.750	5.752	5.746	5.746	5.740	5.740	5.738	5.733	5.740	5.734	5.724	5.725	5.724	5.727
S183	5.756	5.722	5.724	5.726	5.722	5.721	5.720	5.718	5.714	5.714	5.708	5.701	5.707	5.709	5.705	5.700	5.700	5.690	5.693
S184	5.754	5.752	5.752	5.748	5.748	5.752	5.751	5.743	5.740	5.744	5.740	5.738	5.738	5.736	5.738	5.728	5.735	5.732	5.728
S185	5.771	5.773	5.774	5.772	5.767	5.764	5.764	5.759	5.758	5.765	5.757	5.759	5.755	5.748	5.757	5.755	5.741	5.751	5.741
S186	5.766	5.763	5.762	5.767	5.762	5.757	5.761	5.754	5.749	5.744	5.750	5.746	5.740	5.747	5.738	5.732	5.745	5.732	5.732
S187	5.723	5.761	5.766	5.760	5.754	5.755	5.751	5.756	5.751	5.745	5.750	5.742	5.746	5.735	5.735	5.736	5.730	5.735	5.735
S188	5.763	5.762	5.760	5.759	5.758	5.751	5.758	5.755	5.745	5.747	5.747	5.746	5.744	5.740	5.740	5.734	5.737	5.729	5.727
S189	5.772	5.750	5.750	5.754	5.754	5.744	5.751	5.743	5.738	5.743	5.742	5.730	5.735	5.730	5.734	5.733	5.728	5.725	5.718
S190	5.755	5.717	5.712	5.708	5.708	5.703	5.702	5.701	5.707	5.696	5.696	5.691	5.689	5.692	5.692	5.694	5.680	5.686	5.681
S191	5.756	5.760	5.755	5.748	5.749	5.752	5.744	5.744	5.750	5.745	5.747	5.739	5.744	5.733	5.730	5.734	5.734	5.728	5.723
S192	5.751	5.742	5.738	5.734	5.739	5.731	5.732	5.730	5.731	5.733	5.725	5.721	5.729	5.720	5.724	5.717	5.715	5.719	5.714
S193	5.759	5.740	5.742	5.736	5.744	5.739	5.739	5.737	5.737	5.732	5.723	5.726	5.727	5.723	5.720	5.712	5.716	5.716	5.708
S194	5.766	5.745	5.745	5.736	5.736	5.738	5.729	5.734	5.735	5.724	5.726	5.722	5.718	5.717	5.722	5.708	5.712	5.719	5.707
S195	5.758	5.749	5.743	5.743	5.740	5.737	5.738	5.735	5.735	5.727	5.739	5.733	5.727	5.724	5.723	5.722	5.722	5.714	5.720
S196	5.722	5.745	5.745	5.749	5.741	5.739	5.737	5.733	5.733	5.739	5.728	5.732	5.728	5.722	5.725	5.715	5.722	5.726	5.716
S197	5.751	5.742	5.745	5.741	5.742	5.745	5.745	5.738	5.733	5.734	5.725	5.733	5.727	5.729	5.724	5.719	5.721	5.713	5.710
S198	5.756	5.757	5.757	5.761	5.757	5.751	5.749	5.756	5.754	5.748	5.748	5.741	5.737	5.737	5.739	5.740	5.729	5.737	5.733
S199	5.754	5.745	5.747	5.741	5.744	5.745	5.739	5.737	5.738	5.731	5.734	5.725	5.728	5.725	5.728	5.722	5.724	5.714	5.721
S200	5.759	5.744	5.743	5.739	5.739	5.738	5.736	5.734	5.735	5.730	5.731	5.721	5.717	5.724	5.714	5.722	5.717	5.711	5.706
Ave.	5.755	5.752	5.751	5.749	5.748	5.746	5.745	5.743	5.741	5.739	5.737	5.734	5.733	5.731	5.730	5.727	5.725	5.724	5.722
Med.	5.756	5.757	5.752	5.751	5.754	5.750	5.749	5.744	5.743	5.744	5.740	5.738	5.735	5.735	5.734	5.729	5.727	5.725	5.727
St dev	0.0134	0.0136	0.0136	0.0141	0.0132	0.0134	0.0146	0.0135	0.0122	0.0144	0.0145	0.0152	0.0142	0.0135	0.0138	0.0144	0.0143	0.0143	0.0148
Min.	5.722	5.717	5.712	5.708	5.708	5.703	5.702	5.701	5.707	5.696	5.696	5.691	5.689	5.692	5.692	5.694	5.680	5.686	5.681
Max.	5.772	5.773	5.774	5.772	5.767	5.764	5.769	5.759	5.758	5.765	5.757	5.759	5.755	5.752	5.757	5.755	5.745	5.751	5.741

## 3.40 Data Set 8, 85°C, 200mA (Chromaticity Shift)

Sample Number	u'	v'	CCT(K)	Chromaticity Shift (Au'v')																	
				0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000hrs s	11000hrs s	12000hrs s	13000hrs s	14000hrs s	15000hrs s	16000hrs s	17000hrs s
S176	0.2562	0.5233	2856	0.0002	0.0005	0.0007	0.0011	0.0013	0.0016	0.0018	0.0020	0.0023	0.0025	0.0026	0.0028	0.0030	0.0034	0.0037	0.0039	0.0041	0.0043
S177	0.2559	0.5230	2864	0.0002	0.0004	0.0006	0.0009	0.0012	0.0016	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0033	0.0037	0.0038	0.0041	0.0043
S178	0.2562	0.5231	2857	0.0001	0.0003	0.0006	0.0010	0.0012	0.0015	0.0017	0.0018	0.0020	0.0024	0.0027	0.0028	0.0032	0.0035	0.0037	0.0039	0.0041	0.0043
S179	0.2561	0.5235	2856	0.0002	0.0004	0.0006	0.0009	0.0010	0.0014	0.0015	0.0018	0.0020	0.0022	0.0024	0.0025	0.0026	0.0029	0.0033	0.0035	0.0037	0.0039
S180	0.2564	0.5237	2848	0.0002	0.0004	0.0006	0.0010	0.0011	0.0015	0.0017	0.0019	0.0021	0.0024	0.0026	0.0028	0.0032	0.0033	0.0036	0.0038	0.0040	0.0042
S181	0.2561	0.5228	2862	0.0001	0.0003	0.0006	0.0010	0.0012	0.0016	0.0019	0.0020	0.0023	0.0025	0.0027	0.0028	0.0031	0.0032	0.0035	0.0037	0.0039	0.0041
S182	0.2568	0.5243	2836	0.0002	0.0004	0.0006	0.0008	0.0011	0.0013	0.0015	0.0017	0.0018	0.0021	0.0022	0.0023	0.0026	0.0027	0.0029	0.0031	0.0033	0.0035
S183	0.2562	0.5246	2848	0.0002	0.0004	0.0006	0.0010	0.0012	0.0015	0.0017	0.0019	0.0020	0.0023	0.0024	0.0027	0.0031	0.0035	0.0037	0.0039	0.0041	0.0043
S184	0.2566	0.5246	2840	0.0002	0.0005	0.0006	0.0010	0.0012	0.0016	0.0017	0.0019	0.0021	0.0024	0.0026	0.0027	0.0029	0.0030	0.0034	0.0036	0.0038	0.0040
S185	0.2558	0.5229	2866	0.0001	0.0004	0.0007	0.0009	0.0012	0.0015	0.0018	0.0020	0.0022	0.0026	0.0027	0.0030	0.0032	0.0036	0.0038	0.0040	0.0042	0.0044
S186	0.2564	0.5238	2849	0.0002	0.0004	0.0006	0.0009	0.0011	0.0015	0.0016	0.0019	0.0021	0.0024	0.0025	0.0027	0.0031	0.0032	0.0033	0.0035	0.0037	0.0039
S187	0.2562	0.5229	2859	0.0002	0.0004	0.0006	0.0010	0.0012	0.0016	0.0017	0.0020	0.0022	0.0024	0.0026	0.0028	0.0032	0.0035	0.0039	0.0041	0.0043	0.0046
S188	0.2553	0.5261	2861	0.0001	0.0003	0.0006	0.0009	0.0012	0.0015	0.0017	0.0018	0.0020	0.0023	0.0024	0.0025	0.0027	0.0029	0.0033	0.0035	0.0037	0.0039
S189	0.2551	0.5259	2868	0.0002	0.0004	0.0006	0.0008	0.0010	0.0014	0.0015	0.0017	0.0019	0.0022	0.0024	0.0026	0.0030	0.0031	0.0035	0.0037	0.0039	0.0041
S190	0.2557	0.5275	2847	0.0002	0.0005	0.0006	0.0009	0.0011	0.0014	0.0017	0.0019	0.0021	0.0025	0.0026	0.0028	0.0029	0.0030	0.0034	0.0036	0.0038	0.0040
S191	0.2555	0.5274	2851	0.0001	0.0004	0.0006	0.0010	0.0012	0.0015	0.0017	0.0019	0.0022	0.0024	0.0026	0.0027	0.0029	0.0030	0.0033	0.0035	0.0037	0.0039
S192	0.2560	0.5270	2842	0.0002	0.0004	0.0006	0.0009	0.0011	0.0014	0.0015	0.0018	0.0020	0.0022	0.0024	0.0025	0.0027	0.0029	0.0030	0.0033	0.0035	0.0037
S193	0.2552	0.5256	2867	0.0002	0.0004	0.0006	0.0009	0.0010	0.0013	0.0014	0.0017	0.0019	0.0022	0.0023	0.0026	0.0029	0.0031	0.0035	0.0037	0.0039	0.0041
S194	0.2555	0.5266	2853	0.0001	0.0003	0.0006	0.0010	0.0012	0.0016	0.0018	0.0020	0.0023	0.0025	0.0028	0.0029	0.0031	0.0032	0.0036	0.0038	0.0040	0.0042
S195	0.2554	0.5263	2859	0.0002	0.0004	0.0007	0.0009	0.0011	0.0013	0.0016	0.0018	0.0020	0.0023	0.0025	0.0027	0.0029	0.0031	0.0035	0.0037	0.0039	0.0041
S196	0.2553	0.5259	2862	0.0002	0.0005	0.0006	0.0009	0.0011	0.0014	0.0017	0.0019	0.0022	0.0024	0.0026	0.0027	0.0030	0.0034	0.0036	0.0038	0.0041	0.0043
S197	0.2551	0.5258	2868	0.0002	0.0004	0.0006	0.0009	0.0011	0.0014	0.0015	0.0017	0.0018	0.0020	0.0022	0.0024	0.0026	0.0027	0.0030	0.0031	0.0033	0.0035
S198	0.2555	0.5274	2852	0.0001	0.0004	0.0006	0.0010	0.0012	0.0016	0.0017	0.0018	0.0020	0.0022	0.0024	0.0025	0.0026	0.0030	0.0034	0.0036	0.0038	0.0040
S199	0.2558	0.5275	2844	0.0002	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0016	0.0018	0.0022	0.0024	0.0025	0.0028	0.0029	0.0030	0.0032	0.0035	0.0037
S200	0.2551	0.5256	2868	0.0002	0.0004	0.0006	0.0010	0.0012	0.0015	0.0017	0.0018	0.0020	0.0022	0.0024	0.0027	0.0031	0.0032	0.0036	0.0038	0.0040	0.0042
Ave.	0.2558	0.5251	2855	0.0002	0.0004	0.0006	0.0009	0.0012	0.0015	0.0017	0.0019	0.0021	0.0023	0.0025	0.0027	0.0029	0.0031	0.0034	0.0036	0.0039	0.0041
Med.	0.2558	0.5256	2856	0.0002	0.0004	0.0006	0.0009	0.0012	0.0015	0.0017	0.0019	0.0020	0.0023	0.0025	0.0027	0.0029	0.0031	0.0035	0.0037	0.0039	0.0041
St dev	0.0005	0.0017	9.4106	0.0000	0.0001	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003
Min.	0.2551	0.5228	2836	0.0001	0.0003	0.0006	0.0008	0.0010	0.0013	0.0014	0.0016	0.0018	0.0020	0.0022	0.0023	0.0026	0.0027	0.0029	0.0031	0.0033	0.0035
Max.	0.2568	0.5275	2868	0.0002	0.0005	0.0007	0.0011	0.0013	0.0016	0.0019	0.0020	0.0023	0.0026	0.0028	0.0030	0.0032	0.0036	0.0039	0.0041	0.0043	0.0046

## 3.41 Data Set 9, 105°C, 200mA (Lumen Maintenance)

Sample Number	Φ(lm) 0hr (Initial)	Lumen Maintenance (%)																	
		1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S201	172.9	99.99	99.76	99.52	99.23	98.93	98.64	98.34	98.02	97.72	97.50	97.29	97.07	96.88	96.59	96.36	96.10	95.89	95.73
S202	172.9	99.93	99.70	99.50	99.20	98.87	98.57	98.25	97.95	97.65	97.35	97.07	96.77	96.48	96.29	96.10	95.91	95.75	95.59
S203	172.6	99.88	99.65	99.45	99.15	98.86	98.56	98.19	97.81	97.51	97.21	96.90	96.60	96.31	96.03	95.84	95.64	95.44	95.23
S204	173.5	99.89	99.66	99.46	99.16	98.87	98.57	98.19	97.87	97.49	97.27	97.05	96.84	96.60	96.31	96.03	95.77	95.56	95.34
S205	174.7	99.98	99.75	99.54	99.25	98.95	98.62	98.24	97.91	97.59	97.28	97.01	96.73	96.54	96.25	96.06	95.81	95.60	95.39
S206	173.8	99.96	99.76	99.55	99.25	98.96	98.66	98.34	98.04	97.72	97.44	97.22	96.95	96.86	96.42	96.13	95.90	95.69	95.48
S207	173.9	99.93	99.73	99.49	99.19	98.90	98.61	98.28	97.99	97.69	97.41	97.20	96.92	96.68	96.49	96.20	96.01	95.79	95.56
S208	174.2	99.92	99.69	99.46	99.12	98.78	98.44	98.07	97.77	97.47	97.25	97.04	96.76	96.57	96.33	96.14	95.95	95.73	95.50
S209	174.1	99.94	99.73	99.50	99.21	98.87	98.58	98.28	97.96	97.66	97.35	97.08	96.86	96.57	96.38	96.14	95.89	95.73	95.52
S210	173.3	99.89	99.69	99.49	99.20	98.86	98.57	98.19	97.89	97.59	97.38	97.07	96.80	96.61	96.41	96.13	95.89	95.68	95.47
S211	173.9	99.92	99.71	99.51	99.21	98.92	98.63	98.33	98.03	97.66	97.35	97.05	96.74	96.46	96.17	95.93	95.74	95.58	95.37
S212	173.9	99.97	99.77	99.56	99.27	98.97	98.67	98.30	97.97	97.59	97.32	97.01	96.71	96.47	96.18	95.95	95.75	95.53	95.31
S213	173.7	99.92	99.71	99.51	99.17	98.88	98.58	98.20	97.91	97.53	97.23	97.01	96.73	96.54	96.35	96.11	95.86	95.63	95.47
S214	172.5	99.98	99.78	99.55	99.21	98.87	98.53	98.24	97.94	97.61	97.34	97.06	96.75	96.52	96.28	96.04	95.85	95.69	95.46
S215	172.8	99.95	99.75	99.54	99.25	98.95	98.66	98.33	97.95	97.58	97.30	97.00	96.72	96.48	96.24	96.05	95.86	95.64	95.43
S216	172.0	99.90	99.67	99.43	99.13	98.84	98.55	98.17	97.85	97.52	97.22	97.00	96.73	96.49	96.25	96.06	95.82	95.61	95.45
S217	172.9	99.99	99.79	99.55	99.25	98.92	98.58	98.28	97.98	97.66	97.44	97.14	96.86	96.67	96.48	96.24	96.05	95.83	95.62
S218	172.3	99.98	99.78	99.54	99.21	98.87	98.57	98.25	97.87	97.54	97.24	97.02	96.72	96.43	96.19	95.91	95.65	95.45	95.22
S219	172.4	99.99	99.76	99.55	99.26	98.97	98.68	98.35	98.05	97.76	97.45	97.18	96.90	96.66	96.42	96.18	95.99	95.83	95.67
S220	172.2	99.90	99.70	99.46	99.13	98.83	98.54	98.24	97.91	97.59	97.31	97.01	96.73	96.44	96.21	95.97	95.71	95.51	95.34
S221	172.3	99.96	99.76	99.55	99.26	98.92	98.58	98.26	97.96	97.58	97.28	97.00	96.78	96.59	96.35	96.16	95.93	95.72	95.51
S222	173.0	99.94	99.73	99.50	99.21	98.91	98.61	98.24	97.94	97.64	97.36	97.06	96.75	96.56	96.37	96.09	95.83	95.61	95.45
S223	171.8	99.97	99.74	99.51	99.17	98.88	98.59	98.26	97.94	97.56	97.34	97.13	96.82	96.58	96.39	96.11	95.85	95.64	95.48
S224	172.3	99.88	99.68	99.48	99.18	98.89	98.59	98.29	97.91	97.62	97.31	97.09	96.88	96.69	96.40	96.16	95.92	95.72	95.51
S225	173.0	99.93	99.73	99.53	99.19	98.89	98.60	98.30	98.00	97.68	97.37	97.10	96.79	96.60	96.36	96.13	95.93	95.73	95.56
Ave.	173.1	99.94	99.73	99.51	99.20	98.89	98.59	98.26	97.94	97.61	97.33	97.07	96.80	96.56	96.33	96.09	95.87	95.66	95.47
Med.	172.9	99.94	99.73	99.51	99.21	98.89	98.58	98.26	97.94	97.59	97.34	97.06	96.77	96.57	96.35	96.11	95.86	95.68	95.47
St dev	0.7822	0.0361	0.0389	0.0386	0.0443	0.0468	0.0508	0.0653	0.0704	0.0747	0.0778	0.0838	0.0968	0.1122	0.1215	0.1127	0.1137	0.1153	0.1235
Min.	171.8	99.88	99.65	99.43	99.12	98.78	98.44	98.07	97.77	97.47	97.21	96.90	96.60	96.31	96.03	95.84	95.64	95.44	95.22
Max.	174.7	99.99	99.79	99.56	99.27	98.97	98.68	98.35	98.05	97.76	97.50	97.29	97.07	96.88	96.59	96.36	96.10	95.89	95.73

## 3.42 Data Set 9, 105°C, 200mA (Photon Flux Maintenance, Photosynthetic (PFMp))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Photosynthetic (PFMp) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S201	2.692	99.93	99.69	99.44	99.10	98.81	98.52	98.19	97.87	97.54	97.27	97.00	96.74	96.48	96.23	95.98	95.72	95.51	95.25
S202	2.691	99.92	99.68	99.43	99.09	98.74	98.45	98.14	97.74	97.41	97.14	96.88	96.66	96.43	96.18	95.93	95.72	95.46	95.26
S203	2.692	99.87	99.66	99.42	99.07	98.73	98.44	98.12	97.80	97.47	97.20	96.98	96.71	96.46	96.21	95.96	95.70	95.47	95.26
S204	2.693	99.95	99.70	99.50	99.21	98.92	98.63	98.30	97.96	97.65	97.42	97.16	96.94	96.68	96.43	96.18	95.95	95.75	95.49
S205	2.703	99.91	99.66	99.46	99.17	98.83	98.53	98.14	97.82	97.49	97.22	96.96	96.73	96.48	96.22	95.97	95.71	95.50	95.24
S206	2.702	99.95	99.75	99.50	99.21	98.92	98.63	98.31	97.98	97.65	97.43	97.16	96.89	96.66	96.41	96.16	95.93	95.72	95.52
S207	2.702	99.92	99.72	99.47	99.13	98.84	98.49	98.17	97.78	97.45	97.23	96.96	96.69	96.44	96.19	95.94	95.69	95.45	95.25
S208	2.701	99.91	99.71	99.51	99.21	98.87	98.52	98.13	97.81	97.49	97.27	97.01	96.78	96.53	96.27	96.04	95.81	95.55	95.29
S209	2.702	99.91	99.66	99.46	99.17	98.83	98.54	98.14	97.81	97.49	97.23	97.00	96.74	96.51	96.26	96.00	95.74	95.54	95.33
S210	2.702	99.93	99.73	99.49	99.20	98.91	98.56	98.23	97.91	97.52	97.25	96.99	96.77	96.54	96.28	96.03	95.83	95.62	95.39
S211	2.701	99.94	99.69	99.45	99.16	98.86	98.58	98.26	97.94	97.61	97.38	97.12	96.90	96.65	96.40	96.14	95.91	95.71	95.48
S212	2.701	99.96	99.71	99.47	99.12	98.83	98.49	98.15	97.84	97.44	97.22	96.95	96.69	96.43	96.21	95.98	95.77	95.54	95.31
S213	2.702	99.91	99.71	99.47	99.12	98.83	98.53	98.14	97.81	97.49	97.27	97.00	96.74	96.48	96.23	95.97	95.76	95.56	95.30
S214	2.672	99.95	99.75	99.50	99.16	98.86	98.52	98.20	97.88	97.55	97.28	97.06	96.80	96.57	96.34	96.08	95.88	95.62	95.41
S215	2.672	99.97	99.72	99.48	99.18	98.89	98.59	98.20	97.80	97.41	97.14	96.92	96.65	96.42	96.18	95.95	95.74	95.51	95.31
S216	2.670	99.88	99.63	99.43	99.14	98.85	98.56	98.22	97.83	97.51	97.29	97.02	96.75	96.50	96.27	96.04	95.84	95.58	95.37
S217	2.670	99.95	99.70	99.45	99.16	98.82	98.47	98.08	97.76	97.36	97.10	96.83	96.57	96.34	96.08	95.83	95.57	95.31	95.11
S218	2.669	99.97	99.72	99.48	99.19	98.84	98.55	98.22	97.89	97.57	97.30	97.04	96.77	96.51	96.27	96.01	95.78	95.52	95.31
S219	2.670	99.95	99.75	99.55	99.26	98.96	98.67	98.35	98.02	97.63	97.41	97.18	96.92	96.69	96.44	96.18	95.95	95.69	95.49
S220	2.670	99.91	99.67	99.42	99.13	98.83	98.49	98.17	97.84	97.52	97.25	96.99	96.72	96.49	96.24	95.99	95.76	95.52	95.29
S221	2.669	99.93	99.73	99.53	99.23	98.89	98.54	98.21	97.88	97.56	97.34	97.07	96.85	96.60	96.37	96.12	95.89	95.63	95.40
S222	2.669	99.96	99.72	99.47	99.18	98.83	98.54	98.22	97.89	97.57	97.35	97.13	96.91	96.65	96.42	96.17	95.94	95.73	95.53
S223	2.669	99.95	99.71	99.51	99.16	98.87	98.58	98.25	97.92	97.52	97.26	96.99	96.73	96.47	96.22	95.99	95.73	95.53	95.30
S224	2.670	99.94	99.69	99.49	99.20	98.86	98.51	98.19	97.80	97.41	97.18	96.92	96.69	96.44	96.22	95.99	95.73	95.52	95.29
S225	2.671	99.92	99.72	99.52	99.18	98.89	98.59	98.27	97.94	97.61	97.39	97.12	96.86	96.60	96.35	96.12	95.89	95.63	95.37
Ave.	2.685	99.93	99.70	99.48	99.16	98.85	98.54	98.20	97.86	97.52	97.27	97.02	96.77	96.52	96.28	96.03	95.80	95.57	95.34
Med.	2.691	99.93	99.71	99.47	99.17	98.85	98.54	98.20	97.84	97.52	97.27	97.00	96.74	96.50	96.26	96.00	95.77	95.54	95.31
St dev	0.0150	0.0254	0.0295	0.0335	0.0450	0.0510	0.0560	0.0660	0.0723	0.0781	0.0886	0.0902	0.0943	0.0926	0.0942	0.0917	0.0988	0.1019	0.1012
Min.	2.669	99.87	99.63	99.42	99.07	98.73	98.44	98.08	97.74	97.36	97.10	96.83	96.57	96.34	96.08	95.83	95.57	95.31	95.11
Max.	2.703	99.97	99.75	99.55	99.26	98.96	98.67	98.35	98.02	97.65	97.43	97.18	96.94	96.69	96.44	96.18	95.95	95.75	95.53

## 3.43 Data Set 9, 105°C, 200mA (Photon Flux Maintenance, Far-Red (PFMFR))

Sample Number	PPF (umol/s)	Photon Flux Maintenance, Far-Red (PFMFR) (%)																	
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S201	0.1961	99.91	99.68	99.40	99.10	98.81	98.48	98.10	97.75	97.44	97.15	96.90	96.62	96.42	96.21	95.97	95.77	95.61	95.45
S202	0.1961	99.88	99.65	99.41	99.12	98.82	98.49	98.17	97.83	97.44	97.11	96.82	96.54	96.31	96.09	95.85	95.69	95.53	95.38
S203	0.1960	99.89	99.65	99.38	99.05	98.75	98.43	98.04	97.70	97.31	97.06	96.78	96.45	96.24	96.02	95.76	95.56	95.40	95.25
S204	0.1960	99.92	99.68	99.45	99.15	98.86	98.57	98.25	97.91	97.53	97.20	96.91	96.63	96.43	96.22	95.96	95.81	95.65	95.49
S205	0.1962	99.94	99.71	99.44	99.15	98.85	98.55	98.17	97.83	97.44	97.19	96.91	96.58	96.35	96.13	95.89	95.73	95.57	95.38
S206	0.1962	99.95	99.72	99.44	99.12	98.79	98.49	98.10	97.82	97.51	97.26	97.01	96.67	96.48	96.27	96.03	95.87	95.72	95.57
S207	0.1961	99.90	99.67	99.43	99.10	98.81	98.51	98.12	97.78	97.39	97.06	96.81	96.56	96.36	96.16	95.90	95.75	95.56	95.36
S208	0.1961	99.92	99.65	99.38	99.05	98.76	98.46	98.15	97.87	97.55	97.30	96.97	96.64	96.42	96.21	95.95	95.79	95.63	95.48
S209	0.1960	99.94	99.71	99.43	99.13	98.81	98.48	98.09	97.81	97.43	97.18	96.89	96.65	96.42	96.20	95.96	95.80	95.64	95.48
S210	0.1961	99.89	99.66	99.42	99.10	98.80	98.48	98.16	97.81	97.49	97.16	96.83	96.58	96.38	96.15	95.91	95.76	95.60	95.44
S211	0.1961	99.90	99.63	99.36	99.03	98.70	98.41	98.03	97.68	97.36	97.03	96.70	96.37	96.15	95.92	95.68	95.53	95.33	95.18
S212	0.1960	99.89	99.66	99.42	99.13	98.84	98.51	98.13	97.78	97.40	97.11	96.78	96.45	96.25	96.05	95.79	95.63	95.44	95.25
S213	0.1962	99.95	99.72	99.48	99.15	98.85	98.56	98.18	97.90	97.58	97.33	97.05	96.80	96.57	96.37	96.13	95.97	95.81	95.65
S214	0.1915	99.94	99.70	99.47	99.18	98.89	98.59	98.21	97.93	97.55	97.26	96.93	96.60	96.39	96.19	95.96	95.80	95.60	95.41
S215	0.1918	99.88	99.65	99.41	99.08	98.79	98.50	98.18	97.84	97.45	97.17	96.88	96.60	96.40	96.17	95.93	95.78	95.58	95.42
S216	0.1916	99.90	99.62	99.39	99.09	98.80	98.47	98.15	97.87	97.56	97.31	96.98	96.73	96.50	96.30	96.04	95.88	95.73	95.58
S217	0.1916	99.93	99.69	99.42	99.09	98.80	98.50	98.11	97.77	97.38	97.05	96.77	96.52	96.32	96.11	95.87	95.68	95.48	95.33
S218	0.1915	99.97	99.70	99.42	99.09	98.80	98.50	98.11	97.77	97.38	97.05	96.80	96.47	96.25	96.05	95.78	95.59	95.44	95.29
S219	0.1915	99.95	99.68	99.44	99.14	98.85	98.52	98.14	97.80	97.41	97.16	96.91	96.58	96.36	96.13	95.89	95.70	95.51	95.31
S220	0.1915	99.87	99.64	99.36	99.04	98.74	98.45	98.06	97.71	97.33	97.05	96.80	96.55	96.32	96.13	95.86	95.67	95.52	95.36
S221	0.1915	99.94	99.70	99.43	99.10	98.80	98.47	98.09	97.81	97.43	97.14	96.81	96.52	96.32	96.10	95.86	95.67	95.51	95.35
S222	0.1914	99.91	99.68	99.44	99.11	98.82	98.49	98.18	97.83	97.45	97.20	96.87	96.53	96.33	96.13	95.89	95.73	95.57	95.37
S223	0.1916	99.87	99.64	99.40	99.08	98.78	98.48	98.16	97.81	97.43	97.14	96.86	96.53	96.33	96.13	95.88	95.73	95.58	95.39
S224	0.1917	99.96	99.72	99.49	99.19	98.90	98.57	98.18	97.83	97.52	97.23	96.98	96.73	96.53	96.31	96.05	95.90	95.74	95.58
S225	0.1916	99.94	99.67	99.43	99.13	98.83	98.54	98.15	97.81	97.49	97.24	96.99	96.70	96.48	96.28	96.02	95.86	95.70	95.55
Ave.	0.1939	99.92	99.67	99.42	99.11	98.81	98.50	98.14	97.81	97.45	97.17	96.88	96.58	96.37	96.16	95.91	95.75	95.58	95.41
Med.	0.1960	99.92	99.68	99.42	99.10	98.81	98.49	98.15	97.81	97.44	97.16	96.88	96.58	96.36	96.15	95.90	95.75	95.58	95.39
St dev	0.0023	0.0288	0.0296	0.0327	0.0411	0.0445	0.0452	0.0523	0.0610	0.0718	0.0871	0.0872	0.0987	0.0980	0.1008	0.0998	0.1071	0.1133	0.1166
Min.	0.1914	99.87	99.62	99.36	99.03	98.70	98.41	98.03	97.68	97.31	97.03	96.70	96.37	96.15	95.92	95.68	95.53	95.33	95.18
Max.	0.1962	99.97	99.72	99.49	99.19	98.90	98.59	98.25	97.93	97.58	97.33	97.05	96.80	96.57	96.37	96.13	95.97	95.81	95.65

**3.44 Data Set 9, 105°C, 200mA (Forward Voltage)**

Sample Number	Forward Voltage(V)																		
	0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000 hrs	11000 hrs	12000 hrs	13000 hrs	14000 hrs	15000 hrs	16000 hrs	17000 hrs	18000 hrs
S201	5.770	5.763	5.762	5.758	5.762	5.755	5.758	5.748	5.751	5.750	5.746	5.743	5.746	5.739	5.741	5.735	5.737	5.743	5.741
S202	5.767	5.760	5.767	5.764	5.760	5.754	5.754	5.758	5.752	5.746	5.743	5.737	5.740	5.735	5.734	5.735	5.733	5.729	5.729
S203	5.774	5.770	5.770	5.766	5.772	5.769	5.762	5.755	5.764	5.751	5.752	5.754	5.749	5.743	5.742	5.741	5.746	5.745	5.735
S204	5.759	5.755	5.751	5.756	5.750	5.749	5.750	5.748	5.740	5.744	5.734	5.732	5.732	5.730	5.728	5.727	5.725	5.719	5.721
S205	5.764	5.765	5.760	5.762	5.755	5.758	5.752	5.745	5.747	5.746	5.739	5.748	5.744	5.737	5.731	5.732	5.731	5.737	5.728
S206	5.766	5.762	5.762	5.760	5.754	5.755	5.756	5.751	5.753	5.745	5.742	5.742	5.742	5.735	5.735	5.729	5.733	5.730	5.737
S207	5.762	5.758	5.755	5.754	5.750	5.747	5.749	5.747	5.751	5.741	5.741	5.737	5.738	5.741	5.743	5.730	5.729	5.728	5.722
S208	5.730	5.731	5.725	5.721	5.717	5.725	5.717	5.719	5.717	5.708	5.714	5.703	5.705	5.703	5.699	5.701	5.695	5.701	5.694
S209	5.760	5.756	5.757	5.752	5.748	5.755	5.752	5.744	5.738	5.741	5.745	5.736	5.739	5.741	5.729	5.729	5.728	5.724	5.720
S210	5.779	5.780	5.774	5.770	5.771	5.767	5.764	5.766	5.764	5.763	5.763	5.749	5.751	5.746	5.746	5.746	5.746	5.743	5.743
S211	5.769	5.770	5.761	5.763	5.763	5.760	5.754	5.747	5.758	5.753	5.745	5.742	5.744	5.738	5.737	5.733	5.734	5.729	5.740
S212	5.767	5.759	5.763	5.765	5.755	5.756	5.754	5.756	5.750	5.742	5.751	5.748	5.740	5.738	5.745	5.741	5.736	5.738	5.733
S213	5.766	5.761	5.762	5.758	5.763	5.756	5.753	5.750	5.745	5.745	5.751	5.736	5.737	5.742	5.738	5.737	5.730	5.736	5.730
S214	5.758	5.753	5.754	5.749	5.745	5.749	5.747	5.739	5.736	5.742	5.737	5.737	5.734	5.737	5.731	5.729	5.724	5.719	5.718
S215	5.718	5.719	5.719	5.705	5.712	5.710	5.707	5.702	5.699	5.697	5.694	5.698	5.690	5.690	5.687	5.685	5.688	5.682	5.678
S216	5.761	5.758	5.757	5.759	5.753	5.756	5.751	5.740	5.740	5.746	5.739	5.742	5.737	5.730	5.740	5.728	5.728	5.727	5.731
S217	5.746	5.742	5.738	5.744	5.740	5.741	5.741	5.735	5.733	5.731	5.728	5.727	5.719	5.715	5.715	5.718	5.717	5.710	5.712
S218	5.748	5.743	5.743	5.744	5.740	5.739	5.733	5.731	5.729	5.725	5.730	5.728	5.719	5.729	5.716	5.714	5.712	5.708	5.708
S219	5.746	5.747	5.742	5.742	5.739	5.739	5.735	5.733	5.733	5.731	5.730	5.730	5.730	5.715	5.718	5.718	5.711	5.710	5.710
S220	5.752	5.745	5.753	5.739	5.745	5.745	5.743	5.730	5.735	5.736	5.734	5.736	5.728	5.720	5.721	5.719	5.726	5.718	5.714
S221	5.753	5.750	5.753	5.746	5.751	5.746	5.745	5.738	5.738	5.737	5.734	5.729	5.725	5.722	5.731	5.722	5.721	5.719	5.715
S222	5.750	5.746	5.745	5.742	5.741	5.742	5.735	5.728	5.735	5.726	5.729	5.722	5.723	5.721	5.717	5.722	5.713	5.720	5.714
S223	5.765	5.761	5.766	5.756	5.763	5.756	5.753	5.755	5.749	5.743	5.741	5.745	5.735	5.743	5.737	5.739	5.730	5.727	5.729
S224	5.753	5.746	5.749	5.749	5.744	5.745	5.738	5.743	5.742	5.731	5.728	5.732	5.728	5.731	5.720	5.723	5.723	5.719	5.719
S225	5.746	5.738	5.747	5.744	5.733	5.737	5.733	5.727	5.724	5.725	5.725	5.727	5.725	5.725	5.718	5.717	5.713	5.716	5.708
Ave.	5.757	5.754	5.753	5.751	5.749	5.748	5.745	5.742	5.741	5.738	5.736	5.734	5.732	5.730	5.728	5.726	5.725	5.723	5.721
Med.	5.760	5.756	5.755	5.754	5.750	5.749	5.750	5.744	5.740	5.742	5.739	5.736	5.735	5.735	5.731	5.729	5.728	5.724	5.721
St dev	0.0136	0.0133	0.0131	0.0144	0.0145	0.0127	0.0134	0.0138	0.0145	0.0141	0.0136	0.0130	0.0139	0.0136	0.0143	0.0133	0.0136	0.0142	0.0151
Min.	5.718	5.719	5.719	5.705	5.712	5.710	5.707	5.702	5.699	5.697	5.694	5.698	5.690	5.690	5.687	5.685	5.688	5.682	5.678
Max.	5.779	5.780	5.774	5.770	5.772	5.769	5.764	5.766	5.764	5.763	5.763	5.754	5.751	5.746	5.746	5.746	5.746	5.745	5.743

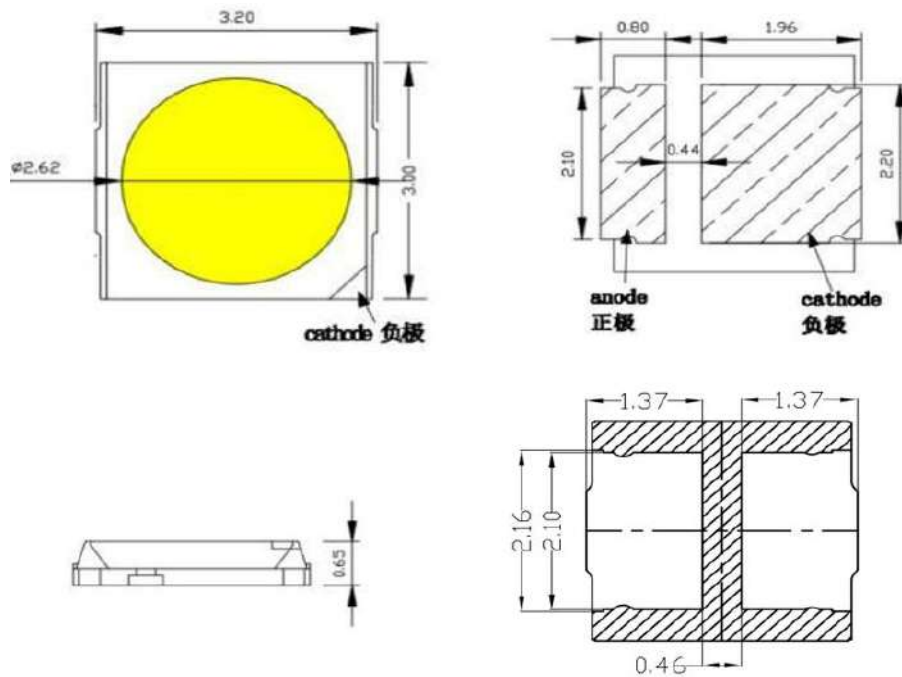
**3.45 Data Set 9, 105°C, 200mA (Chromaticity Shift)**

Sample Number	u'	v'	CCT(K)	Chromaticity Shift (Δu'v')																	
				0hr (Initial)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs	7000 hrs	8000 hrs	9000 hrs	10000hrs	11000hrs	12000hrs	13000hrs	14000hrs	15000hrs	16000hrs	17000hrs
S201	0.2555	0.5283	2846	0.0002	0.0005	0.0008	0.0010	0.0013	0.0016	0.0019	0.0021	0.0023	0.0026	0.0029	0.0032	0.0035	0.0037	0.0039	0.0041	0.0044	0.0046
S202	0.2553	0.5278	2852	0.0002	0.0004	0.0006	0.0009	0.0011	0.0015	0.0017	0.0019	0.0021	0.0024	0.0027	0.0029	0.0031	0.0033	0.0035	0.0038	0.0041	0.0044
S203	0.2556	0.5288	2841	0.0003	0.0005	0.0007	0.0009	0.0012	0.0016	0.0019	0.0020	0.0024	0.0026	0.0029	0.0031	0.0034	0.0037	0.0039	0.0041	0.0043	0.0046
S204	0.2561	0.5292	2828	0.0003	0.0006	0.0008	0.0011	0.0013	0.0015	0.0017	0.0019	0.0021	0.0024	0.0027	0.0030	0.0032	0.0034	0.0036	0.0039	0.0041	0.0044
S205	0.2550	0.5295	2852	0.0003	0.0005	0.0007	0.0010	0.0013	0.0016	0.0019	0.0020	0.0024	0.0027	0.0028	0.0030	0.0032	0.0035	0.0037	0.0039	0.0041	0.0043
S206	0.2548	0.5286	2859	0.0002	0.0005	0.0008	0.0010	0.0012	0.0016	0.0018	0.0019	0.0023	0.0024	0.0027	0.0030	0.0032	0.0035	0.0038	0.0040	0.0042	0.0044
S207	0.2553	0.5297	2844	0.0003	0.0005	0.0007	0.0011	0.0014	0.0017	0.0020	0.0022	0.0026	0.0029	0.0032	0.0035	0.0037	0.0039	0.0042	0.0044	0.0047	0.0049
S208	0.2549	0.5281	2860	0.0002	0.0005	0.0007	0.0009	0.0013	0.0016	0.0017	0.0019	0.0021	0.0024	0.0027	0.0030	0.0033	0.0036	0.0039	0.0042	0.0045	0.0047
S209	0.2546	0.5280	2867	0.0003	0.0006	0.0009	0.0011	0.0015	0.0018	0.0021	0.0022	0.0024	0.0026	0.0029	0.0032	0.0034	0.0036	0.0039	0.0042	0.0045	0.0048
S210	0.2546	0.5280	2867	0.0003	0.0006	0.0009	0.0011	0.0013	0.0016	0.0019	0.0022	0.0023	0.0026	0.0029	0.0032	0.0035	0.0037	0.0039	0.0042	0.0045	0.0048
S211	0.2549	0.5283	2860	0.0003	0.0005	0.0007	0.0009	0.0013	0.0017	0.0019	0.0022	0.0025	0.0028	0.0030	0.0031	0.0034	0.0037	0.0039	0.0042	0.0044	0.0047
S212	0.2547	0.5279	2865	0.0002	0.0004	0.0006	0.0009	0.0011	0.0014	0.0016	0.0018	0.0019	0.0021	0.0024	0.0027	0.0030	0.0033	0.0036	0.0038	0.0040	0.0043
S213	0.2549	0.5285	2859	0.0003	0.0006	0.0009	0.0012	0.0014	0.0016	0.0019	0.0021	0.0024	0.0027	0.0028	0.0030	0.0032	0.0035	0.0037	0.0039	0.0041	0.0044
S214	0.2548	0.5285	2860	0.0003	0.0005	0.0007	0.0009	0.0011	0.0014	0.0017	0.0019	0.0021	0.0023	0.0025	0.0028	0.0030	0.0033	0.0035	0.0038	0.0040	0.0043
S215	0.2548	0.5283	2861	0.0003	0.0005	0.0007	0.0011	0.0013	0.0017	0.0020	0.0023	0.0025	0.0028	0.0030	0.0033	0.0036	0.0039	0.0042	0.0045	0.0047	0.0050
S216	0.2551	0.5289	2853	0.0002	0.0005	0.0007	0.0009	0.0012	0.0014	0.0016	0.0018	0.0021	0.0024	0.0026	0.0029	0.0031	0.0033	0.0035	0.0038	0.0040	0.0043
S217	0.2554	0.5294	2843	0.0003	0.0006	0.0009	0.0012	0.0015	0.0017	0.0019	0.0020	0.0023	0.0024	0.0027	0.0030	0.0033	0.0035	0.0037	0.0040	0.0042	0.0044
S218	0.2552	0.5298	2846	0.0003	0.0006	0.0008	0.0012	0.0015	0.0017	0.0019	0.0022	0.0024	0.0026	0.0029	0.0032	0.0034	0.0037	0.0039	0.0042	0.0044	0.0046
S219	0.2546	0.5281	2868	0.0003	0.0006	0.0009	0.0011	0.0015	0.0017	0.0019	0.0022	0.0024	0.0027	0.0029	0.0032	0.0034	0.0037	0.0040	0.0043	0.0045	0.0048
S220	0.2548	0.5287	2859	0.0003	0.0006	0.0009	0.0012	0.0016	0.0019	0.0022	0.0024	0.0028	0.0029	0.0031	0.0034	0.0037	0.0039	0.0042	0.0044	0.0046	0.0048
S221	0.2546	0.5280	2868	0.0002	0.0005	0.0008	0.0012	0.0014	0.0016	0.0019	0.0023	0.0026	0.0029	0.0031	0.0034	0.0036	0.0039	0.0041	0.0044	0.0046	0.0049
S222	0.2548	0.5296	2854	0.0003	0.0006	0.0009	0.0012	0.0015	0.0018	0.0020	0.0023	0.0025	0.0028	0.0030	0.0031	0.0034	0.0037	0.0039	0.0041	0.0044	0.0046
S223	0.2545	0.5281	2869	0.0002	0.0005	0.0008	0.0011	0.0015	0.0018	0.0019	0.0021	0.0023	0.0025	0.0028	0.0031	0.0033	0.0036	0.0039	0.0042	0.0044	0.0047
S224	0.2547	0.5279	2867	0.0003	0.0005	0.0008	0.0011	0.0014	0.0016	0.0018	0.0019	0.0023	0.0024	0.0027	0.0029	0.0032	0.0034	0.0037	0.0040	0.0043	0.0045
S225	0.2555	0.5294	2841	0.0003	0.0006	0.0009	0.0011	0.0015	0.0017	0.0020	0.0023	0.0025	0.0028	0.0031	0.0034	0.0036	0.0039	0.0042	0.0044	0.0046	0.0048
Ave.	0.2550	0.5286	2856	0.0003	0.0005	0.0008	0.0011	0.0013	0.0016	0.0019	0.0021	0.0023	0.0026	0.0028	0.0031	0.0034	0.0036	0.0039	0.0041	0.0043	0.0046
Med.	0.2549	0.5285	2859	0.0003	0.0005	0.0008	0.0011	0.0013	0.0016	0.0019	0.0021	0.0024	0.0026	0.0029	0.0031	0.0034	0.0036	0.0039	0.0041	0.0044	0.0046
St dev	0.0004	0.0006	10.7784	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	0.2545	0.5278	2828	0.0002	0.0004	0.0006	0.0009	0.0011	0.0014	0.0016	0.0018	0.0019	0.0021	0.0024	0.0027	0.0030	0.0033	0.0035	0.0038	0.0040	0.0043
Max.	0.2561	0.5298	2869	0.0003	0.0006	0.0009	0.0012	0.0016	0.0019	0.0022	0.0024	0.0028	0.0029	0.0032	0.0035	0.0037	0.0039	0.0042	0.0045	0.0047	0.0050

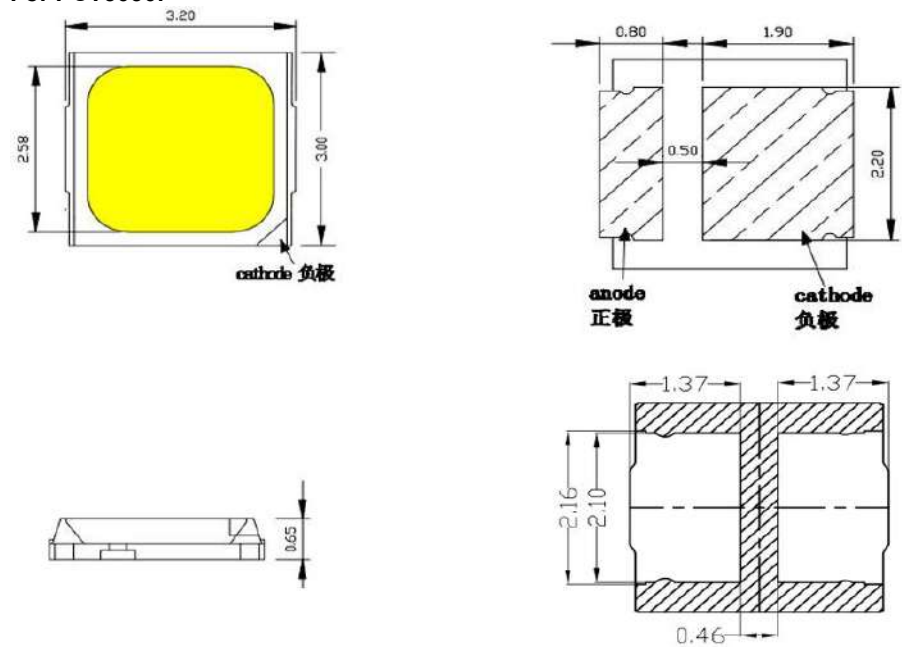
## 4. EUT Photo

### 4.1 Mechanical Dimensions

For PCT3030:



For PCT3030:

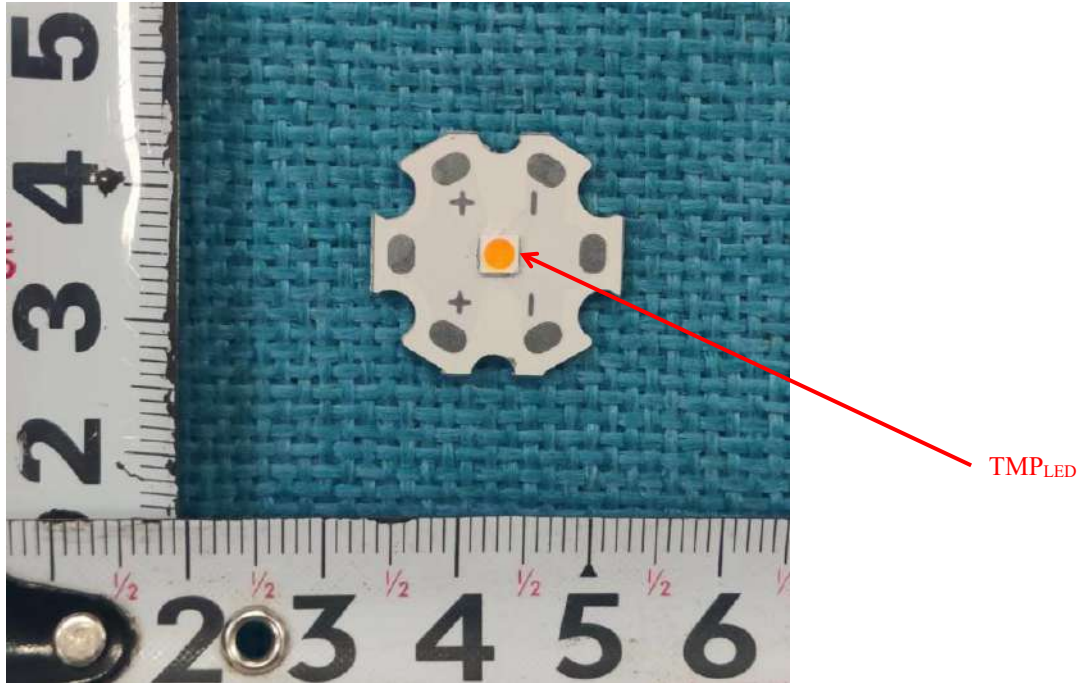


All dimensions are in millimeter



4.2 EUT Photo

For PCT3030 (Test Model):



For PCT3030:



---End of Report---

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# Avaliação da Conformidade

Procurando algo?



Página inicial (<http://www.inmetro.gov.br/>)

/ [Qualidade](http://www.inmetro.gov.br/qualidade/) / [Registro de objeto](#) (../)

/ [Consultar registros concedidos](#)



## Registro de Objeto [Consultar registros concedidos](#)

### Q Detalhes do Registro 012308/2023

#### Status

Ativo

#### Concessão

10/01/2024

#### RAJIX COMERCIAL LTDA

Avenida República Argentina, 1505 SALA 2012 Cep:80620-010 | AGUA VERDE - CURITIBA - PR

Tel: (Telefone) 41984996644 - [raphael@rajix.com.br](mailto:raphael@rajix.com.br) (<mailto:raphael@rajix.com.br>) - CNPJ:

(CNPJ)46.889.684/0001-25



#### Programa de Avaliação da Conformidade

Luminárias para Iluminação Pública Viária

#### Portaria Inmetro

nº (número) 62 de 17/02/2022

#### Nome de Família

LED Luminária de Iluminação

Pública / REFOND / RF-

W\*HP32DS-AF-I3 / IP66 /

50000h

#### Certificado

6176791.31

### ↕Pesquisar histórico de alterações

Data	Alteração	Marca	Modelo	Descrição
------	-----------	-------	--------	-----------

Data	Alteração	Marca	Modelo	Descrição
10/01/2024	Incluído	RAJIX	RLP0305E	30W/4200lm/140lm/W/FP > 0,95/5000K
10/01/2024	Incluído	RAJIX	RLP0505E	50W/7000lm/140lm/W/FP > 0,97/5000K
10/01/2024	Incluído	RAJIX	RLP1005E	100W/14000lm/140lm/W/FP > 0,97/5000K
10/01/2024	Incluído	RAJIX	RLP1505E	150W/21000lm/140lm/W/FP > 0,97/5000K
10/01/2024	Incluído	RAJIX	RLP2005E	200W/28000lm/140lm/W/FP > 0,97/5000K

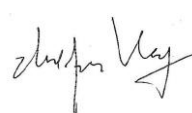

<< Voltar

Barra GovBr (<http://www.gov.br/acessoainformacao/>)

(<http://www.brasil.gov.br/>)



**TEST REPORT**  
**INMETRO PORTARIA NO. 62 OF FEBRUARY 17, 2022**  
**TECHNICAL QUALITY REGULATION**  
**FOR LED LIGHT LAMPS WITH BASE-INTEGRATED CONTROL DEVICE**

<b>Report Reference No.</b> .....	6176790.50P
<b>Tested by (name + signature)</b> .....	Zhijun Wang 
<b>Approved by (name + signature)</b> .....	Bingshan Wang 
<b>Date of issue</b> .....	2023-12-13
<b>Number of pages</b> .....	26
<b>Testing Laboratory</b> .....	DEKRA Testing and Certification (Shanghai) Ltd.
<b>Address</b> .....	3/F, #250, Jiangchangsan Road building 16 Headquarter Economy Park Shibe Hi-Tech Park, Jing'an District, Shanghai, P.R.C 200436
<b>Test procedure</b> .....	CBTL <input checked="" type="checkbox"/> SMT <input type="checkbox"/> TMP <input type="checkbox"/>
<b>Applicant's name</b> .....	RAJIX COMERCIAL LTDA
<b>Address</b> .....	Avenida Republica Argentina, 1505, Sala 2012, Curitiba, Parana, 80620-010, Brazil
<b>Test specification:</b>	
INMETRO PORTARIA No. ....	Portaria No. 62 of February 17, 2022
Test procedure .....	INMETRO
Non-standard test method .....	N/A
<b>Test Report Form No.</b> .....	Portaria No. 62-2022 V1.1
<b>Test item description:</b>	
Trademark .....	RAJIX
Manufacturer .....	ZheJiang XuGuang Electronic Technology Co., Ltd. No 121 Yongxing Rd, Gushan Industrial Park, Qiandaohu Town, Chun'an County, Hangzhou City, Zhejiang Province, China
Factory.....	ZheJiang XuGuang Electronic Technology Co., Ltd. No 121 Yongxing Rd, Gushan Industrial Park, Qiandaohu Town, Chun'an County, Hangzhou City, Zhejiang Province, China
Model/Type reference.....	Details see Appendix I
<b>Summary of testing:</b>	
Performance testing refer to test report.	

**Standard Reference:**

- |   |  |
|---|--|
| <input checked="" type="checkbox"/> ABNT NBR 15129:2012 | <input checked="" type="checkbox"/> ABNT NBR 5123:2016               |
| <input checked="" type="checkbox"/> ABNT NBR 5101:2012  | <input checked="" type="checkbox"/> ABNT NBR 16026:2012              |
| <input checked="" type="checkbox"/> ASTM G154           | <input type="checkbox"/> ABNT NBR IEC 60238:2005                     |
| <input checked="" type="checkbox"/> CISPR 15:2013       | <input checked="" type="checkbox"/> ABNT NBR IEC 60598-1:2010        |
| <input checked="" type="checkbox"/> BS EN 55015:2013    | <input type="checkbox"/> ABNT NBR IEC 60662:1997                     |
| <input checked="" type="checkbox"/> IEC 61000-3-2:2014  | <input checked="" type="checkbox"/> ABNT NBR IEC 62262:2015          |
| <input checked="" type="checkbox"/> IES TM-21-11        | <input checked="" type="checkbox"/> ABNT NBR IEC 61347-2-13:2012     |
| <input checked="" type="checkbox"/> IESNA LM-79-08      | <input checked="" type="checkbox"/> INMETRO Portaria No. 200 of 2021 |
| <input checked="" type="checkbox"/> IESNA LM-80-08      |  |

**Test item particulars:**

- Light source using.....:  Discharge Lamps                       LED Technology
- a) Brand of origin .....: RAJIX
- c) Photometric classification                      As below
- Energy Class .....:  Class A             Class B             Class C             Class D
- Lateral Light Distributions.....:  Type I             Type II             Type III
- Vertical Light Distributions.....:  Short             Medium             Long
- Lighting intensity distribution control .:  Full cutoff             Cutoff             Semi-cutoff
- The corresponding elevation angle ....:  0°             5°             10°             15°
- e) Rated voltage (V) .....: 110 – 277V
- f) Rated frequency (Hz) .....: 50 / 60 Hz
- h) Control device used (Brand / Model / Power / Rated electrical output).....: N/A
- o) Rated expected life (h) corresponds to L<sub>70</sub> or L<sub>80</sub>.....: 50000 (L<sub>70</sub>)
- Declared lumen maintenance (%) .....: 95.8            at 6000 h
- LED light source (Brand/Model) .....: Shenzhen Zhongshan Semiconductor Optoelectronic Co., Ltd. S-g3030 Pct3030
- Rated expected life (h) corresponds to t<sub>c</sub> for LED control device.....: 50000 (t<sub>c</sub> 90 °C)

**Possible test case verdicts:**

- test case does not apply to the test  
object .....: N/A
- test object does meet the requirement  
.....: P (Pass)
- test object does not meet the  
requirement .....: F (Fail)

**Testing:**

Date of receipt of test item .....: 2023/11/03  
Date (s) of performance of tests .....: 2023/11/03 to 2023/12/11

**The test results shown in this report relate only to the tests performed according to the test program. The test object has not been submitted to a full test program.**

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Number of the tested samples for each item		
Test	<input type="checkbox"/> Partial test	<input checked="" type="checkbox"/> Type Test
Safety		
Marking		
Pakaging		
Electromagnetic interference and radio frequency		1
Leakage Current		
Electric shock protection		
Torque resistance of screws and connections		
Internal and external wiring		
Socket for photoelectric relay (when applicable)		1
Degree of protection		
Dielectric strength		
Insulation Resistance		1
Wind force resistance		
Vibration resistance		1
Protection against external mechanical impacts		
Ultraviolet radiation resistance for polymer (UV) lenses and refractors		1
Energy Efficiency		
Power		
Power factor		
Voltage and current output		3
Supply current		
Harmonics Limit		
Energy efficiency		
Correlated color temperature (TCC)		
Color reproduction index (IRC)		3
Classification of distribution		
Classification of flux distribution control (CDL		
Maintenance of the luminous flux of the luminaire		1
Built-in control device durability		1
Standard / Regulation	As requested	Portaria No. 62-2022
Applicable Clauses which can be adopted for the application		
<input checked="" type="checkbox"/> Clause 4.1 – ELECTRICAL SAFETY REQUIREMENTS		
<input checked="" type="checkbox"/> Clause 4.2 – PERFORMRANCE REQUIREMENTS		
<input checked="" type="checkbox"/> Clause 5 – MARKING REQUIREMENTS AND INSTRUCTIONS		

**General remarks:**

Throughout this report a  comma or  point is used as the decimal separator.

The test results presented in this report relate only to the object tested.

This report shall not be reproduced except in full without the written approval of the testing laboratory.

- Appendix I: Technical Specification Spreadsheet - PET
- Appendix II: Test Results
- Appendix III: LED source LM-80 report
- Appendix IV: Photos

**General product information:**

N/A

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INMETRO Portaria No. 62-2022			
Clause	Test Item and requirements	Results - Remark	Verdict
<b>4</b>	<b>TECHNICAL REQUIREMENTS FOR LIGHTING FIXTURES WITH LED TECHNOLOGY</b>		<b>P</b>
<b>4.1</b>	<b>Electrical safety requirements</b>		<b>P</b>
<b>4.1.1</b>	<b>Conditions of operation</b>		<b>P</b>
	a) altitude not exceeding 1,500 m; b) average ambient air temperature over a 24-hour period not exceeding +35 °C; c) ambient air temperature between -5 °C and +50 °C; d) relative humidity up to 100%. .....	50 °C	P
<b>4.1.2</b>	<b>Packaging</b>		<b>P</b>
	The luminaires must be individually packed in packages suitable for the type of transport (in which it is applied) and for the usual loading, unloading, handling and storage operations. ....		P
<b>4.1.3</b>	<b>Internal and external wiring</b>		<b>P</b>
	The luminaire must be provided with adequate anchoring, so that the conductors of the supply cables are relieved of mechanical stress at the points where they are connected to the terminals. ....		P
<b>4.1.4</b>	<b>Socket for photoelectric relay (when applicable)</b>		<b>P</b>
	The photoelectric relay socket (when applicable) must have insulation resistance, dielectric strength, ability to conduct currents from the appropriate contacts and adequate mechanical fixing of the conductors, in order to avoid the risk of electric shock, overheating and undue unlocking of the pins and cables. ....		P
<b>4.1.5</b>	<b>Degree of protection</b>		<b>P</b>
	The housing of the luminaire must ensure the degree of protection against the penetration of dust, solid objects and moisture, in accordance with the classification of the luminaire and the IP code marked on the luminaire. ....		P
	The housing of the vital parts (LED, secondary optical system and controller) must have at least a degree of protection IP-66, according to ABNT NBR IEC 60598-1:2010 (Light fixtures - Part 1: General requirements and tests). ....		P

INMETRO Portaria No. 62-2022			
Clause	Test Item and requirements	Results - Remark	Verdict
	If the controller is IP-65 or higher, the controller housing in the luminaire must be at least IP-44.....:		N/A
<b>4.1.6</b>	<b>Dielectric strength and Insulation Resistance</b>		<b>P</b>
	The insulation resistance and dielectric strength must be adequate, so that the luminaire is free from faults in the electrical insulation so that, at operating temperature, the leakage current from the device is not excessive. ....:		P
<b>4.1.7</b>	<b>Leakage Current</b>		<b>P</b>
	The leakage current that may occur during normal use of the luminaire must not cause an electric shock hazard. ....:		P
<b>4.1.8</b>	<b>Electric shock protection</b>		<b>P</b>
	Luminaires shall be constructed in such a way that their live parts are not accessible when the luminaire is installed and electrically connected for normal use. ....:		P
<b>4.1.9</b>	<b>Electromagnetic interference and radio frequency</b>		<b>P</b>
	Filters must be provided in the controller (driver) to suppress electromagnetic and radio frequency interference. ....:		P
<b>4.1.10</b>	<b>Protection against external mechanical impacts</b>		<b>P</b>
	Luminaires must have a resistance to external mechanical impacts to which they are subject under the conditions of use. ....:		P
	Luminaires must have, at least, degree of protection IK08, according to the ABNT NBR IEC 62262:2015 standard (Degrees of protection ensured by electrical equipment enclosures against external mechanical impacts (IK Code)). ....:		P
<b>4.1.11</b>	<b>Torque resistance of screws and connections</b>		<b>P</b>
	The screws used in the luminaires and in the connections intended for the installation of the luminaires must not show any deformation during tightening and loosening or cause deformation or breakage of the luminaire. ....:		P

INMETRO Portaria No. 62-2022			
Clause	Test Item and requirements	Results - Remark	Verdict

<b>4.1.12</b>	<b>Wind force resistance</b>		<b>P</b>
	Luminaires must be resistant to the wind force to which they are subjected when in normal use. .... :		P

<b>4.1.13</b>	<b>Vibration resistance</b>		<b>P</b>
	The luminaires must continue to work in situations of vibration to which they are subject when in normal use, not being able to present any electrical or mechanical failures such as cracks, breaks, warping, opening of the fasteners and others that may compromise their performance. .... :		P

INMETRO Portaria No. 62-2022			
Clause	Test Item and requirements	Results - Remark	Verdict
<b>4</b>	<b>TECHNICAL REQUIREMENTS FOR LIGHTING FIXTURES WITH LED TECHNOLOGY</b>		<b>P</b>
<b>4.2</b>	<b>Performance requirements</b>		<b>P</b>
<b>4.2.1</b>	<b>Power</b>		<b>P</b>
	The total power of the circuit, at rated voltage, must not exceed 110% of the declared value. .... :	See table 1	<b>P</b>
<b>4.2.2</b>	<b>Power factor</b>		<b>P</b>
	The power factor of the luminaires must meet the following requirements: The measured power factor of the circuit cannot be less than the declared value by more than 0.05, when the luminaire is supplied with rated voltage and frequency. The power factor must be equal to or greater than 0.92. .... :	See table 1	<b>P</b>
<b>4.2.3</b>	<b>Voltage and current output</b>		<b>N/A</b>
	The output voltage and current conditions of the control device during operation shall be as follows: For control devices with non-stabilized output voltage, when supplied with the rated voltage, the output voltage must not differ by more than $\pm 10\%$ from the rated voltage of the LED modules. .... :	See table 2	<b>N/A</b>
	For control devices with a stabilized output voltage, when powered at any voltage between 92% and 106% of the rated voltage, the output voltage cannot differ by more than $\pm 10\%$ from the rated voltage of the LED modules. .... :	See table 2	<b>N/A</b>
	For control devices with non-stabilized output current, when supplied with the rated voltage, the output current cannot differ by more than $\pm 10\%$ from the rated current of the LED modules. .... :	See table 2	<b>N/A</b>
	For control devices with stabilized output current, when powered at any voltage between 92% and 106% of the rated voltage, the output current cannot vary more than $\pm 10\%$ of the rated current of the LED modules. .... :	See table 2	<b>N/A</b>
	The luminaire with LED technology must have a surge protection device. .... :	See table 2	<b>N/A</b>
<b>4.2.4</b>	<b>Supply current and Harmonics Limit</b>		<b>P</b>

INMETRO Portaria No. 62-2022			
Clause	Test Item and requirements	Results - Remark	Verdict

	The supply current, at rated voltage, must not differ by more than 10% from the value declared on the control device or in the supplier's literature .....	See table 1	P
	The harmonics of the supply current must comply with the IEC 61000-3-2:2014 standard ((Electromagnetic compatibility (EMC) - Limits for harmonic current emissions (equipment input current < 16 A per phase)). .....		P

<b>4.2.5</b>	<b>Energy efficiency</b>		<b>P</b>															
	<p>The luminaires must meet the minimum energy efficiency (EE) of 68 lm/W, as well as be classified in the Energy Efficiency classes of Table 5:</p> <p>Table 5 LED Road Luminire EE</p> <table border="1"> <thead> <tr> <th>Classes</th> <th>Energy EfficiencyLevel (lm/W)</th> <th>Minimum Acceptable Value Measured (lm/W)</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>EE≥100</td> <td>98</td> </tr> <tr> <td>B</td> <td>90≤EE&lt;100</td> <td>88</td> </tr> <tr> <td>C</td> <td>80≤EE&lt;90</td> <td>78</td> </tr> <tr> <td>D</td> <td>70≤EE&lt;80</td> <td>68</td> </tr> </tbody> </table> <p>..... :</p>	Classes	Energy EfficiencyLevel (lm/W)	Minimum Acceptable Value Measured (lm/W)	A	EE≥100	98	B	90≤EE<100	88	C	80≤EE<90	78	D	70≤EE<80	68	See table 1	P
Classes	Energy EfficiencyLevel (lm/W)	Minimum Acceptable Value Measured (lm/W)																
A	EE≥100	98																
B	90≤EE<100	88																
C	80≤EE<90	78																
D	70≤EE<80	68																
	The average energy efficiency measured cannot be less than the minimum acceptable values defined in Table 5, nor less than 90% of the declared energy efficiency value.....		P															

<b>4.2.6</b>	<b>Correlated color temperature (TCC)</b>		<b>P</b>																														
	<p>A temperatura de cor correlata (TCC) nominal de uma lâmpada deve se situar entre 2.700 K e 6.500 K, seguindo as variações estabelecidas na Tabela 6:</p> <p>Table 6 CCT</p> <table border="1"> <thead> <tr> <th>Minimum value (K)</th> <th>Rated TCC (K)</th> <th>Maximum Value (K)</th> </tr> </thead> <tbody> <tr> <td>2580</td> <td>2700</td> <td>2870</td> </tr> <tr> <td>2870</td> <td>3000</td> <td>3220</td> </tr> <tr> <td>3220</td> <td>3500</td> <td>3710</td> </tr> <tr> <td>3710</td> <td>4000</td> <td>4260</td> </tr> <tr> <td>4260</td> <td>4500</td> <td>4746</td> </tr> <tr> <td>4746</td> <td>5000</td> <td>5312</td> </tr> <tr> <td>5312</td> <td>5700</td> <td>6022</td> </tr> <tr> <td>6022</td> <td>6500</td> <td>7042</td> </tr> <tr> <td>Flexible TCC (2800 – 5600K)</td> <td>TF<sup>i</sup> ± ΔT<sup>ii</sup></td> <td></td> </tr> </tbody> </table> <p>i) TF must be chosen in 100K steps (2800, 2900, ..., 6400K), excluding the TCC nominal values listed above.</p> <p>ii) ΔT must be calculated by <math>\Delta T = 1,1900 \times 10^{-8} \times T^3 - 1,5434 \times 10^{-4} \times T^2 + 0,7168 \times T - 902,55</math></p> <p>..... :</p>	Minimum value (K)	Rated TCC (K)	Maximum Value (K)	2580	2700	2870	2870	3000	3220	3220	3500	3710	3710	4000	4260	4260	4500	4746	4746	5000	5312	5312	5700	6022	6022	6500	7042	Flexible TCC (2800 – 5600K)	TF <sup>i</sup> ± ΔT <sup>ii</sup>		See table 1	P
Minimum value (K)	Rated TCC (K)	Maximum Value (K)																															
2580	2700	2870																															
2870	3000	3220																															
3220	3500	3710																															
3710	4000	4260																															
4260	4500	4746																															
4746	5000	5312																															
5312	5700	6022																															
6022	6500	7042																															
Flexible TCC (2800 – 5600K)	TF <sup>i</sup> ± ΔT <sup>ii</sup>																																

INMETRO Portaria No. 62-2022																		
Clause	Test Item and requirements	Results - Remark	Verdict															
<b>4.2.7</b>	<b>Color reproduction index (IRC)</b>		<b>P</b>															
	The General Color Reproduction Index (Ra), which characterizes the Color Reproduction Index (CRI), must be greater than or equal to 70 (Ra ≥ 70). .... :	See table 1	P															
<b>4.2.8</b>	<b>Maintenance of the luminous flux of the luminaire</b>		<b>P</b>															
	Minimum life expectancy for maintaining 70% luminous flux (L70) is 50,000 hours. .... :		P															
<b>4.2.9</b>	<b>Built-in control device durability</b>		<b>P</b>															
	The built-in control device must have a durability commensurate with the rated life of the lamp. .... :		P															
<b>4.2.10</b>	<b>Classification of distribution</b>		<b>P</b>															
	<p>The luminaire must be classified according to the transverse and longitudinal light intensity distributions, according to the categories in Table 7, for an installation with an elevation angle of 0°.</p> <p>Table 7 Classification of light intensity distributions</p> <table border="1"> <thead> <tr> <th>Distribution</th> <th>Category of classification</th> </tr> </thead> <tbody> <tr> <td>Transversal</td> <td>Type I / II / III</td> </tr> <tr> <td>Longitudinal</td> <td>Short / Mean / Long</td> </tr> </tbody> </table> <p>..... :</p>	Distribution	Category of classification	Transversal	Type I / II / III	Longitudinal	Short / Mean / Long	See table 4	P									
Distribution	Category of classification																	
Transversal	Type I / II / III																	
Longitudinal	Short / Mean / Long																	
<b>4.2.11</b>	<b>Classification of luminous distribution control (CDL)</b>		<b>P</b>															
	<p>The luminaire must be classified as to the control of light distribution (CDL), for an installation with an elevation angle of 0°; in the categories specified in Table 8</p> <p>Table 8 CDL Category</p> <table border="1"> <thead> <tr> <th rowspan="2">Category</th> <th colspan="2">Criterion</th> </tr> <tr> <th>Direction of light emitted by the light source</th> <th>CDL</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Totally limited</td> <td>over 90°</td> <td>0%</td> </tr> <tr> <td>over 80°up to 90°</td> <td>≤ 10%</td> </tr> <tr> <td rowspan="2">Limited</td> <td>over 90°</td> <td>≤ 2,5%</td> </tr> <tr> <td>over 80°up to 90°</td> <td>≤ 10%</td> </tr> </tbody> </table> <p>..... :</p>	Category	Criterion		Direction of light emitted by the light source	CDL	Totally limited	over 90°	0%	over 80°up to 90°	≤ 10%	Limited	over 90°	≤ 2,5%	over 80°up to 90°	≤ 10%	See table 4	P
Category	Criterion																	
	Direction of light emitted by the light source	CDL																
Totally limited	over 90°	0%																
	over 80°up to 90°	≤ 10%																
Limited	over 90°	≤ 2,5%																
	over 80°up to 90°	≤ 10%																
<b>4.2.12</b>	<b>Ultraviolet radiation resistance for polymer (UV) lenses and refractors</b>		<b>N/A</b>															

INMETRO Portaria No. 62-2022			
Clause	Test Item and requirements	Results - Remark	Verdict
	a) Polymer lenses and refractors subject to weather exposure must not show premature degradation that compromises the operational performance of the luminaires; b) The transparency of polymer lenses and refractors must not be less than 90% of the initial value; c) The refractors must be designed against UV rays and with uniform thickness, in order to avoid distortions in the photometric curve. .... :		N/A

INMETRO Portaria No. 62-2022			
Clause	Test Item and requirements	Results - Remark	Verdict

<b>5</b>	<b>MARKING REQUIREMENTS AND INSTRUCTIONS</b>		<b>P</b>
<b>5.1</b>	<b>Marking</b>		<b>P</b>
	The markings must be legibly and indelibly indicated on the luminaire, by means of an adhesive, engraving or other method that guarantees legibility and indelibility. Additionally, the luminaires must present the following information, in addition to that established in the ABNT NBR 15129:2012 standard (Luminaires for Public Lighting - Particular requirements):		P
	a) Serial number of manufacture of the luminaire;		P
:	b) Luminaire model.		P

<b>5.2</b>	<b>Instruction leaflet</b>		<b>P</b>
	The insulation resistance and dielectric strength must be adequate, so that the luminaire is free from faults in the electrical insulation so that, at operating temperature, the leakage current from the device is not excessive.		P
	a) name and/or brand of the supplier;		P
	b) model or supplier code;		P
	c) photometric classification, with indication of the corresponding elevation angle;		P
	d) rated power, in watts;		P
	e) rated voltage range, in volts;		P
	f) rated frequency, in hertz;		P
	g) country of origin of the product;		P
	h) user instructions for electrical installation, recommended handling and care;		P
	i) information about the importer or distributor;		P
	j) product warranty, from the date of the sales note to the consumer, being at least 60 months;		P
	k) expiry date for storage: undetermined;		P
	l) type of protection against electric shock;		P
	m) guidelines for obtaining the IES file of photometry.		P

<b>5.3</b>	<b>Additional marking for LED road luminaire</b>		<b>P</b>
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INMETRO Portaria No. 62-2022			
Clause	Test Item and requirements	Results - Remark	Verdict
	a) The instruction leaflet must also contain information about the controller (brand, model, power, rated electrical current) and life expectancy (h) that corresponds to maintaining a luminous flux of 70% (L70) or 80% (L80)		P
	b) The controller must be marked according to ABNT NBR IEC 61347-2-13:2012 (Lamp Control Device - Part 2-13: Particular requirements for dc or ac powered electronic control for LED modules) and ABNT NBR 16026:2012 (DC or AC electronic control device for LED modules – Performance requirements)		N/A
	c) Packages must be identified externally with the following minimum information, legibly and indelibly marked, by means of an adhesive, engraving or other method that guarantees legibility and indelibility: <ul style="list-style-type: none"> <li>- name and/or factory brand;</li> <li>- model or light fixture type;</li> <li>- CNPJ and supplier address;</li> <li>- Gross weight; and</li> <li>- Capacity and pile position.</li> </ul>		P

**Appendix I: Technical Specification Spreadsheet - PET**

01 – COMMERCIAL NAME											
<b>BRAND</b>		RAJIX									
<b>SUPPLIER</b>		ZheJiang XuGuang Electronic Technology Co., Ltd.									
<b>MANUFACTURER</b>		ZheJiang XuGuang Electronic Technology Co., Ltd.									
02 - IDENTIFICATION OF FAMILY											
<b>FAMILY (*)</b>				RAJIX/LED Technology/ Street light LED/ 500000h							
<b>LED BRAND / MODEL</b>				LED Technology							
<b>TYPE OF LIGHT</b>				Street light LED							
<b>DECLARED LIFE (hr)</b>				50000h							
FAMILY CODE: LED TECHNOLOGY/TYPE OF LIGHT/ DECLARED LIFE											
BARCODE	MODEL	TEST VOLTAGE(V)	FREQ.(HZ)	POWER(W)	POWER FACTOR	LUMINOUS FLUX (lm)	Optical Yied Ratio (%)	EE (lm/W)	CRI	CCT (K)	TEST / LABORATORY REPORT
789872 731177 5	RLP0305E	110-277	50/60	30	>0.95	4200	/	140	>70	5000	6176790.50P
789872 731178 2	RLP0505E	110-277	50/60	50	>0.97	7000	/	140	>70	5000	6176790.50P
789872 731179 9	RLP1005E	110-277	50/60	100	>0.97	14000	/	140	>70	5000	6176790.50P
789872 731180 5	RLP1505E	110-277	50/60	150	>0.97	21000	/	140	>70	5000	6176790.50P
789872 731181 2	RLP2005E	110-277	50/60	200	>0.97	28000	/	140	>70	5000	6176790.50P

\*Add/Delete Rows as Necessary\*

## Appendix II: Test Results

**Table 1: Initial Test Results:**

Summary of test results (if applicable):

Test Results										
Model	Test Voltage (V)	Test Current (A)	Lamp Wattage (W)	Power factor	Luminous flux $\Phi$ (lm)	Efficacy (lm/W)	CRI	CCT (K)	Chromaticity	
									x	y
RLP200 5E	127	1,519	192,3	0,996	24495,7	127,4	73	5106	0,3428	0,3580
	220	0,882	188,78	0,9733	24477,1	129,7	73	5116	0,3429	0,3583
	277									
RLP150 5E	127	1,15	145,7	0,996	19173,2	131,6	71	4891	0,3501	0,3718
	220	0,679	143,7	0,962	19162,5	133,4	71	4898	0,3502	0,3719
	277									
RLP100 5E	127	0,771	97,6	0,9968	13155,6	134,8	72	5030	0,3451	0,3613
	220	0,449	96,4	0,9758	13180,85	136,7	72	5037	0,3453	0,3613
	277									
RLP050 5E	127	0,381	48,2	0,997	6555,89	136,0	72	5012	0,3458	0,3636
	220	0,223	47,6	0,9718	6564,4	137,9	72	5005	0,3456	0,3634
	277									
RLP030 5E	127	0,228	28,8	0,994	3999,2	138,9	72	4887	0,3499	0,3688
	220	0,136	28,5	0,953	4001,8	140,4	72	4893	0,3498	0,3689
	277									

Table 2: Output voltage and current of control device during operation:

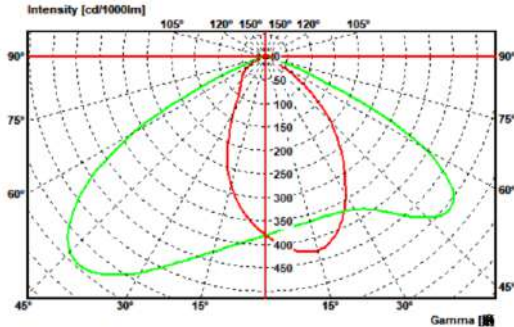
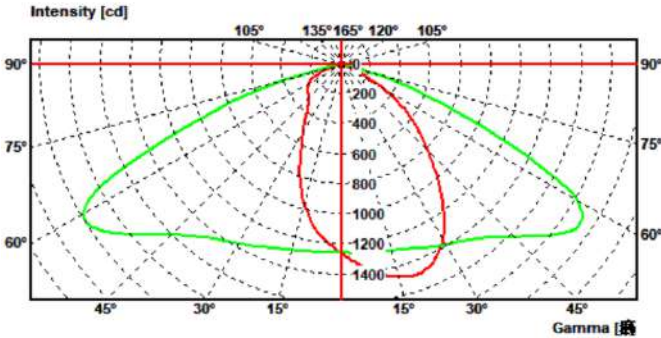
Test Results					
Sample No	Input Voltage (V)	Output voltage (V)		Output current (A)	
		Stabilized	Non- Stabilized (Range)	Stabilized	Non- Stabilized (Range)
/	/	/	/	/	/
	/	/	/	/	/
	/	/	/	/	/
/	/	/	/	/	/
	/	/	/	/	/
	/	/	/	/	/
/	/	/	/	/	/
	/	/	/	/	/
	/	/	/	/	/
/	/	/	/	/	/
	/	/	/	/	/
	/	/	/	/	/

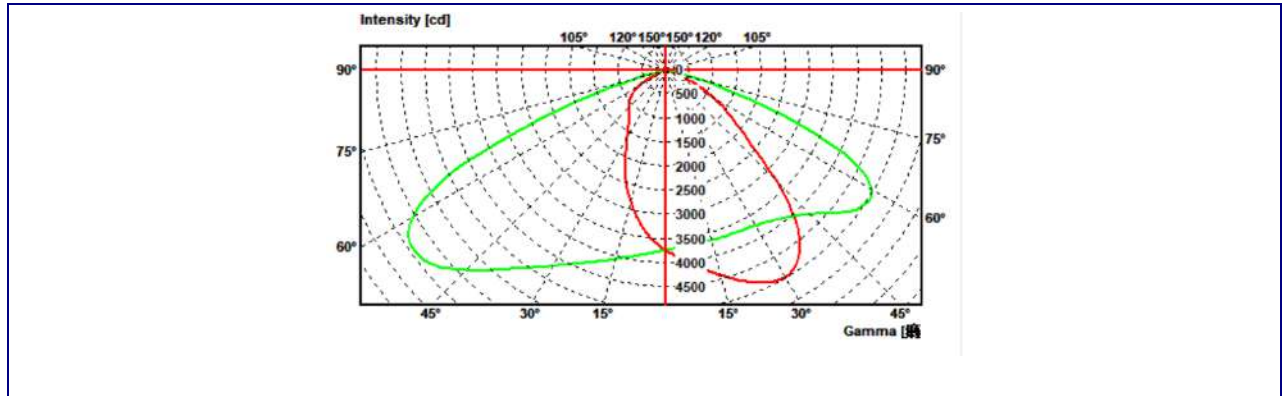
**Table 3: Test Result of Lumen Maintenance:**

Test Results				
Sample No	Test Voltage (V)	$\Phi$ (lm)		Lumen Maintenance
		Initial	6000 H	6000 H
1	/	/	/	/
2	/	/	/	/
3	/	/	/	/
Average / Result	/	/	/	/

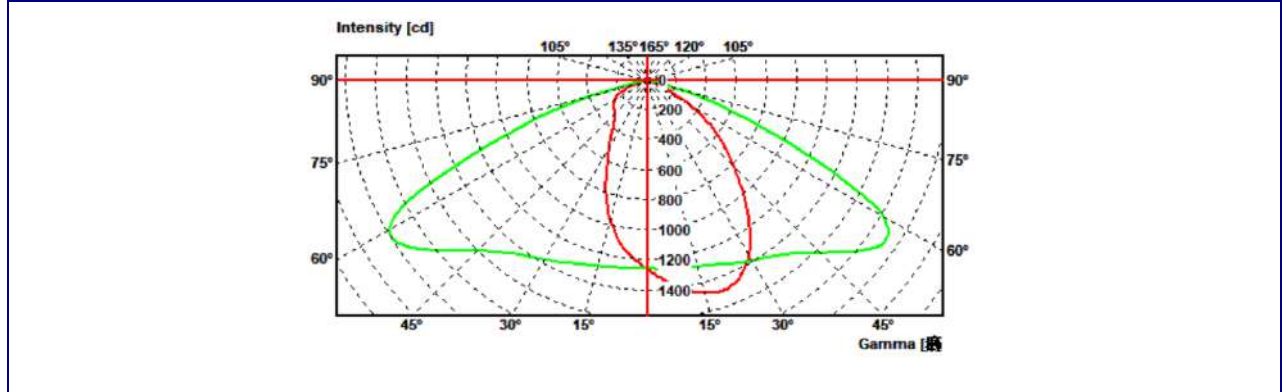
**Table 4: Luminous Intensity Distribution:**

C interval 5° (0°-360°); Gama interval 2,5° (0°-120°):

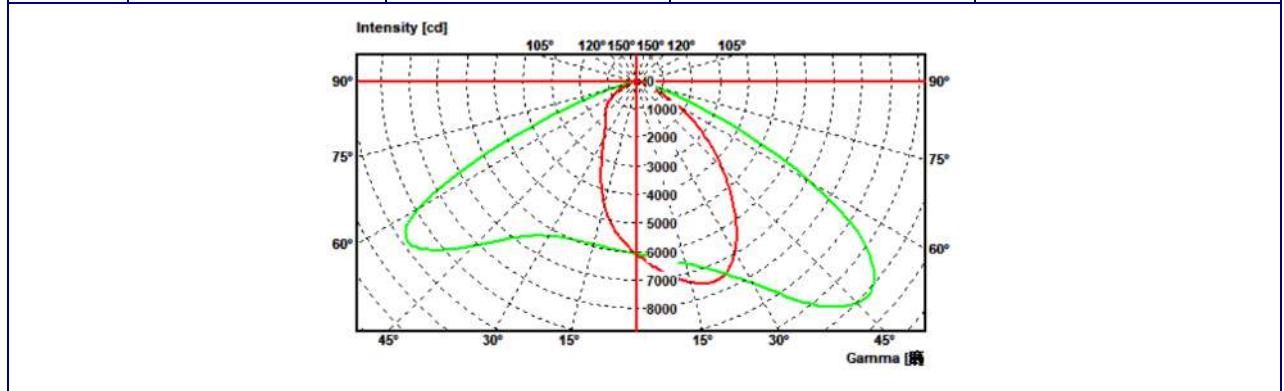
Model	I <sub>max</sub> (cd)	Beam angle (°)	CDL (%)	
			Above 90°	Above 80° and until 90°
RLP20 05E	14881.4	94.6	0.39%	0.62%
				
Model	I <sub>max</sub> (cd)	Beam angle (°)	CDL (%)	
			Above 90°	Above 80° and until 90°
RLP03 05E	1990.9	102.1	0.37%	0.40%
				
Model	I <sub>max</sub> (cd)	Beam angle (°)	CDL (%)	
			Above 90°	Above 80° and until 90°
RLP05 05E	7215.6	101.6	0.43%	0.49%



Model	I <sub>max</sub> (cd)	Beam angle (°)	CDL (%)	
			Above 90°	Above 80° and until 90°
RLP10 05E	10409.2	99.8	0.41%	0.58%



Model	I <sub>max</sub> (cd)	Beam angle (°)	CDL (%)	
			Above 90°	Above 80° and until 90°
RLP15 05E	11072.6	96.8	0.40%	0.58%



**Table 5: In Situ Temperature Measurement Test and Qualification of the electronic control device:**

Type reference .....	RLP2005E
Lamp source used .....	Refer to the <b>Test item particulars</b> mentioned on page 2
LM-80 report No. ....	Refer to the <b>Test item particulars</b> mentioned on page 2
LED driver used .....	Integrated
Mounting position .....	Reference to the TMP <sub>LED</sub> point base on the LM 80 report
Supply wattage (W) .....	191.2
Supply current (A) .....	0.891
Power factor .....	0.968
Measured LED drive current (mA) .....	87,8
Maximum LED current listed on LM-80 report (mA) ....	100
Maximum temperature listed on LM-80 report (°C) .....	115
Table: measured temperatures corrected for ta 1 = 25 C and ta 2 = 35 C (only for tc)	
- test 1: rated voltage .....	220

In-suit Temperature Measurement Point	In-suit Temperature (°C)	
	test 1 (ta 1)	test 1 (ta 2)
TMP <sub>LED</sub> (T <sub>s</sub> )	54.9	--
TMP <sub>driver</sub> (t <sub>c</sub> )	--	--

Time (t) at which to estimate lumen maintenance (hours):	50000
Lumen maintenance at time (t) (%):	80,78
Reported L70(6k) (hours):	54000



Appendix III: LED source LM-80 report



## Test Report Of ANSI/IES LM-80-15

### Approved Method for Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules

Report Number..... : N02A23050461L00901

Client..... : SHENZHEN ZHONGSHUN SEMICONDUCTOR OPTOELECTRONIC CO., LTD.

Address..... : Room no. 1015, 10th Floor, Yizhan Business Building, No. 8 Yizhan 4th Road,  
Shapu Community, Songgang Street, Bao'an District Shenzhen, Postal code  
518105, Guangdong Province, Republic of China

Test Product Family : PCT3030

Test Part Number..... : S-G3030

Brand Name..... :  ZHONG SHUN

Testing Laboratory... : Guangdong Meide Testing Technology Co., Ltd.

Address..... : 1st floor, B Area, Jinbaisheng Industrial Park, Headquarters 2 Road, Songshan  
Lake Hi-tech Industrial Development Zone, Dongguan City, Guangdong Pr., China.

Testing Location..... : As above

Date of receipt..... : 2021-03-22

Date of test ..... : 2021-04-06 to 2023-06-12

Date of report..... : 2023-06-12

Tested by:

*Jarvis Zhang*

Jarvis Zhang/ Test Engineer

Checked by:

*Sandy Chen*

Sandy Chen/ Project Engineer

Approved by:

*Jessie Li*  
Jessie Li/ Technical Manager

Note 1: The test data was only valid for the test sample(s). This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or use in part without prior written consent from Guangdong Meide Testing Technology Co., Ltd. This report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Note 2: This report does not imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

TRF No.: 02-N005-1A  
Web: www.gtggroup.com

TRF Originator: GTG  
E-mail: info@gtggroup.com

TRF Date: 2022-07-01  
Tel.: 86-400 755 8988

**Appendix IV: Photos**

RLP0305E



RLP0505E



RLP1005E



RLP1505E



RLP2005E

**Appendix VIII: list of Uncertainty**

<b>Test</b>	<b>Uncertainty (<math>U_{rel}, K=2</math>)</b>	<b>Uncertainty (<math>U, K=2</math>)</b>
voltage	$2,2 \times 10^{-4}$	
power	$2,2 \times 10^{-4}$	
current	$8,2 \times 10^{-4}$	
power factor	$7,3 \times 10^{-5}$	
luminous flux	1,6%	
color temperature		18K

-----END-----

Curitiba, 29 de Fevereiro de 2024

Prezados Senhores,

A RAJIX COMERCIAL LTDA., inscrita no CNPJ sob nº 46.889.684/0001-25, situado na Rua Av. Rep Argentina, 1505, SALA 2012 – Bairro Agua Verde – Curitiba/Paraná, atesta para os devidos fins que todas as nossas luminárias possuem garantia de 5 anos.

Atenciosamente;



---

**Raphael Gouveia**  
**Supply Chain - Director**

RAJIX COMERCIO LTDA.

CNPJ: 46.889.684/0001-25



**ATESTADO DE CAPACIDADE TÉCNICA**

Atestamos para os devidos fins que a empresa **ACR COMÉRCIO E SERVIÇOS EIRELI**, inscrita no CNPJ sob nº 22.683.848/0001-03, com sede a Rua Francisco Camargo nº 1423, CEP: 83414-010 – Bairro Centro-Colombo – Paraná, já forneceu a esta instituição, **MATERIAL ELÉTRICO E LUMINÁRIAS DE LED** para manutenção e ampliação da Rede de Iluminação Pública para **PREFEITURA MUNICIPAL DE QUATRO BARRAS**.

Dessa forma atestamos a capacidade técnica da empresa supracitada, no cumprimento dos prazos acordados, bem como na qualidade dos produtos fornecidos, nada tendo que a desabone.

E por ser verdade, firmamos á presente, para que surta os efeitos legais.

Quatro Barras, 10 de Janeiro de 2024.

Gilson Sydor  
Matricula nº 2308  
Prefeitura Mun. de Quatro Barras

**GILSON SYDOR**  
MATRÍCULA Nº 2308  
GESTÃO DA ILUMINAÇÃO PÚBLICA  
PREFEITURA MUNICIPAL DE QUATRO BARRAS

Recebemos de Acr Comercio e Servicos Eireli os produtos constantes na nota fiscal indicada ao lado		<b>NF-e</b>
DATA DE RECEBIMENTO	IDENTIFICAÇÃO E ASSINATURA DO RECEBEDOR	Nº 000.000.386
		SÉRIE 001

 <p><b>ACR</b> ILUMINAÇÃO PÚBLICA</p> <p><b>Acr Comercio e Servicos Eireli</b> Rua Francisco Camargo, 1423 Casa 1 - Centro CEP 83414-010 - Colombo, Pr - Fone (41)99887-2440</p>	<p><b>DANFE</b> Documento Auxiliar de Nota Fiscal Eletrônica</p> <p>0 - ENTRADA 1 - SAÍDA <b>1</b></p> <p>Nº 000.000.386 SÉRIE 001 FOLHA 001/001</p>	 <p>CHAVE DE ACESSO <b>4123 0822 6838 4800 0103 5500 1000 0003 8616 8421 1725</b></p> <p>Consulta de Autenticidade no portal nacional da NF-e www.nfe.fazenda.gov.br/portal ou no site da Sefaz Autorizadora</p>
---	--	--

NATUREZA DA OPERAÇÃO <b>VENDAS</b>	PROTÓCOLO DE AUTORIZAÇÃO DE USO <b>141230209879024 14/08/2023 14:25:29</b>
INSCRIÇÃO ESTADUAL <b>9069825793</b>	INSCR. DO SUBST. TRIBUT. <b>CNPJ 22.683.848/0001-03</b>

<b>DESTINATÁRIO / REMETENTE</b>		CNPJ / CPF	DATA DE EMISSÃO
NOME / RAZÃO SOCIAL <b>PREFEITURA MUNICIPAL DE QUATRO BARRAS</b>		<b>76.105.568/0001-39</b>	<b>14/08/2023</b>
ENDEREÇO <b>DOM PEDRO II, 110</b>	BAIRRO / DISTRITO <b>CENTRO</b>	CEP <b>83420000</b>	DATA DE ENTRADA / SAÍDA
MUNICÍPIO <b>Quatro Barras</b>	FONE / FAX	UF <b>PR</b>	INSCRIÇÃO ESTADUAL
HORA DA SAÍDA			

<b>FATURA / DUPLICATA</b>	
30/08/2023	001 233.075,00

<b>CÁLCULO DO IMPOSTO</b>				
BASE DE CÁLCULO DO ICMS	VALOR DO ICMS	BASE DE CÁLCULO DO ICMS ST	VALOR DO ICMS SUBSTITUIÇÃO	VALOR TOTAL DOS PRODUTOS
				<b>233.075,00</b>
VALOR DO FRETE	VALOR DO SEGURO	DESCONTO	OUTRAS DESPESAS ACESSÓRIAS	VALOR TOTAL DO IPI
				<b>233.075,00</b>

<b>TRANSPORTADOR / VOLUMES TRANSPORTADOS</b>						
NOME / RAZÃO SOCIAL		FRETE POR CONTA	CÓDIGO ANTT	PLACA DO VEÍCULO	UF	CNPJ / CPF
ENDEREÇO		9 - Sem Frete			UF	INSCRIÇÃO ESTADUAL
QUANTIDADE	ESPÉCIE	MARCA	NÚMERO	PESO BRUTO	PESO LÍQUIDO	

<b>DADOS DOS PRODUTOS / SERVIÇOS</b>												
CÓD PRODUTO	DESCRIÇÃO DOS PRODUTOS / SERVIÇOS	NCM	CSOSN	CFOP	UNID.	QUANTIDADE	VALOR UNITÁRIO		VALOR TOTAL	B. CALC. ICMS	VALOR ICMS	VALOR IPI
							DESCONTO	ICMS				
153	LUMINARIA PUBLICA DE LED 60 W 5000K 3 PINOS	94054200	0102	5102	UN	1.000.0000		132,1000	132.100,00			
20	LUMINARIA PUBLICA DE LED 100 W 5000K 3 PINOS	94054200	0102	5102	UN	500.0000		201,9500	100.975,00			

<b>CÁLCULO DO ISSQN</b>			
INSCRIÇÃO MUNICIPAL	VALOR TOTAL DOS SERVIÇOS	BASE DE CÁLCULO DO ISSQN	VALOR DO ISSQN

<b>DADOS ADICIONAIS</b>		RESERVADO AO FISCO
INFORMAÇÕES COMPLEMENTARES EMPRESA OPTANTE PELO SIMPLES NACIONAL. NAO GERA DIREITO A CREDITO FISCAL DE ICMS E IPI EMPENHO Nº: 5129/2023 LICITAÇÃO Nº: 63/2023 DADOS BANCÁRIOS: CAIXA ECONÔMICA AG-1632 OP.003 C/C-3722-6		



Recebemos de Acr Comercio e Servicos Eireli os produtos constantes na nota fiscal indicada ao lado		<b>NF-e</b>
DATA DE RECEBIMENTO	IDENTIFICAÇÃO E ASSINATURA DO RECEBEDOR	Nº 000.000.392
		SÉRIE 001

 <p><b>ACR</b> ILUMINAÇÃO PÚBLICA</p> <p><b>Acr Comercio e Servicos Eireli</b> Rua Francisco Camargo, 1423 Casa 1 - Centro CEP 83414-010 - Colombo, Pr - Fone (41)99887-2440</p>	<p><b>DANFE</b> Documento Auxiliar de Nota Fiscal Eletrônica</p> <p>0 - ENTRADA 1 - SAÍDA <b>1</b></p> <p>Nº 000.000.392 SÉRIE 001 FOLHA 001/001</p>	 <p>CHAVE DE ACESSO <b>4123 0922 6838 4800 0103 5500 1000 0003 9211 9236 8826</b></p> <p>Consulta de Autenticidade no portal nacional da NF-e <a href="http://www.nfe.fazenda.gov.br/portal">www.nfe.fazenda.gov.br/portal</a> ou no site da Sefaz Autorizadora</p>
	<p>NATUREZA DA OPERAÇÃO <b>VENDAS</b></p> <p>INSCRIÇÃO ESTADUAL <b>9069825793</b></p> <p>INSCR. DO SUBST. TRIBUT. <b>22.683.848/0001-03</b></p>	

DESTINATÁRIO / REMETENTE		CNPJ / CPF		DATA DE EMISSÃO
NOME / RAZÃO SOCIAL <b>PREFEITURA MUNICIPAL DE QUATRO BARRAS</b>		<b>76.105.568/0001-39</b>		<b>06/09/2023</b>
ENDEREÇO	BAIRRO / DISTRITO	CEP	DATA DE ENTRADA / SAÍDA	
<b>DOM PEDRO II, 110</b>	<b>CENTRO</b>	<b>83420000</b>		
MUNICÍPIO	FONE / FAX	UF	INSCRIÇÃO ESTADUAL	HORA DA SAÍDA
<b>Quatro Barras</b>		<b>PR</b>		

FATURA / DUPLICATA		VALOR TOTAL DOS PRODUTOS		VALOR TOTAL DA NOTA	
<b>21/09/2023</b>	<b>001</b>	<b>106.440,00</b>			<b>106.440,00</b>

CÁLCULO DO IMPOSTO					
BASE DE CÁLCULO DO ICMS	VALOR DO ICMS	BASE DE CÁLCULO DO ICMS ST	VALOR DO ICMS SUBSTITUIÇÃO	VALOR TOTAL DOS PRODUTOS	
				<b>106.440,00</b>	
VALOR DO FRETE	VALOR DO SEGURO	DESCONTO	OUTRAS DESPESAS ACESSÓRIAS	VALOR TOTAL DO IPI	VALOR TOTAL DA NOTA
					<b>106.440,00</b>

TRANSPORTADOR / VOLUMES TRANSPORTADOS					
NOME / RAZÃO SOCIAL		FRETE POR CONTA	CÓDIGO ANTI	PLACA DO VEÍCULO	UF
		<b>9 - Sem Frete</b>			
ENDEREÇO		MUNICÍPIO		UF	INSCRIÇÃO ESTADUAL
QUANTIDADE	ESPÉCIE	MARCA	NÚMERO	PESO BRUTO	PESO LÍQUIDO

DADOS DOS PRODUTOS / SERVIÇOS												
CÓD. PRODUTO	DESCRIÇÃO DOS PRODUTOS / SERVIÇOS	NCM	CSOSN	CFOP	UNID	QTD	VALOR UNITÁRIO DESCONTO	VALOR TOTAL	B. CALC. ICMS	VALOR ICMS	VALOR IPI	VALOR OUTROS
153	LUMINARIA PUBLICA DE LED 60 W 5000K 3 PINOS	94054200	0102	5102	UN	500,0000	132,1000	66.050,00				
20	LUMINARIA PUBLICA DE LED 100 W 5000K 3 PINOS	94054200	0102	5102	UN	200,0000	201,9500	40.390,00				

CÁLCULO DO ISSQN			
INSCRIÇÃO MUNICIPAL	VALOR TOTAL DOS SERVIÇOS	BASE DE CÁLCULO DO ISSQN	VALOR DO ISSQN

DADOS ADICIONAIS	
<p>INFORMAÇÕES COMPLEMENTARES</p> <p>EMPRESA OPTANTE PELO SIMPLES NACIONAL. NAO GERA DIREITO A CREDITO FISCAL DE ICMS E IPI</p> <p>EMPENHO Nº: 5710/2023 LICITAÇÃO Nº: 63/2023</p> <p>DADOS BANCÁRIOS: CAIXA ECONÔMICA AG-1632 OP.003 C/C-3722-6</p>	RESERVADO AO FISCO



## Sistema de Cadastramento Unificado de Fornecedores - SICAF

### Declaração

Declaramos para os fins exigidos na legislação, conforme documentação registrada no SICAF, que a situação do fornecedor no momento é a seguinte:

#### Dados do Fornecedor

CNPJ: **49.956.040/0001-09**  
Razão Social: **ECB AUTOMACAO INDUSTRIAL LTDA**  
Nome Fantasia:  
Situação do Fornecedor: **Credenciado** Data de Vencimento do Cadastro: **20/03/2025**  
Natureza Jurídica: **SOCIEDADE EMPRESÁRIA LIMITADA**  
MEI: **Não**  
Porte da Empresa: **Micro Empresa**

#### Ocorrências e Impedimentos

Ocorrência: **Nada Consta**  
Impedimento de Licitar: **Nada Consta**  
Ocorrências Impeditivas indiretas: **Nada Consta**  
Vínculo com "Serviço Público": **Nada Consta**

#### Níveis cadastrados:

Fornecedor possui alguma pendência no Nível de Cadastramento indicado. Verifique mais informações sobre pendências nas funcionalidades de consulta.

Automática: a certidão foi obtida através de integração direta com o sistema emissor. Manual: a certidão foi inserida manualmente pelo fornecedor.

##### I - Credenciamento

##### II - Habilitação Jurídica

##### III - Regularidade Fiscal e Trabalhista Federal

Receita Federal e PGFN	Validade:	<b>14/02/2025</b>	<b>Automática</b>
FGTS	Validade:	<b>31/10/2024</b>	<b>Automática</b>
Trabalhista ( <a href="http://www.tst.jus.br/certidao">http://www.tst.jus.br/certidao</a> )	Validade:	<b>15/03/2025</b>	<b>Automática</b>

##### IV - Regularidade Fiscal Estadual/Distrital e Municipal

Receita Estadual/Distrital	Validade:	<b>15/11/2024</b>
Receita Municipal	Validade:	<b>22/11/2024</b>



# CONTROLADORIA-GERAL DA UNIÃO

Certidão negativa correcional (ePAD, CGU-PJ, CEIS, CNEP e CEPIM)

Consultado: **ECB AUTOMACAO INDUSTRIAL LTDA**

CPF/CNPJ: **49.956.040/0001-09**

Certifica-se que, em consulta aos sistemas ePAD e CGU-PJ e aos cadastros CEIS, CNEP e CEPIM mantidos pela Corregedoria-Geral da União, **NÃO CONSTAM** registros de penalidades vigentes relativas ao CNPJ/CPF consultado.

*Destaca-se que, nos termos da legislação vigente, os referidos cadastros consolidam informações prestadas pelos entes públicos, de todos os Poderes e esferas de governo.*

Os [Sistemas ePAD e CGU-PJ](#) consolidam os dados sobre o andamento dos processos administrativos de responsabilização de entes privados no Poder Executivo Federal.

O [Cadastro Nacional de Empresas Inidôneas e Suspensas \(CEIS\)](#) apresenta a relação de empresas e pessoas físicas que sofreram sanções que implicaram a restrição de participar de licitações ou de celebrar contratos com a Administração Pública.

O [Cadastro Nacional de Empresas Punidas \(CNEP\)](#) apresenta a relação de empresas que sofreram qualquer das punições previstas na Lei nº 12.846/2013 (Lei Anticorrupção).

O [Cadastro de Entidades Privadas sem Fins Lucrativos Impedidas \(CEPIM\)](#) apresenta a relação de entidades privadas sem fins lucrativos que estão impedidas de celebrar novos convênios, contratos de repasse ou termos de parceria com a Administração Pública Federal, em função de irregularidades não resolvidas em convênios, contratos de repasse ou termos de parceria firmados anteriormente.

Certidão emitida às 13:56:51 do dia 14/10/2024 , com validade até o dia 13/11/2024.

Link para consulta da verificação da certidão <https://certidoes.cgu.gov.br/>

Código de controle da certidão: cJNhus3Kb5k7wrJGTYJw

*Qualquer rasura ou emenda invalidará este documento.*



# CONTROLADORIA-GERAL DA UNIÃO

Certidão negativa correcional (ePAD, CGU-PJ, CEIS, CNEP e CEPIM)

Consultado: **ELAINE CRISTINA BRITO MONTEIRO**

CPF/CNPJ: **531.183.162-68**

Certifica-se que, em consulta aos sistemas ePAD e CGU-PJ e aos cadastros CEIS, CNEP e CEPIM mantidos pela Corregedoria-Geral da União, **NÃO CONSTAM** registros de penalidades vigentes relativas ao CNPJ/CPF consultado.

*Destaca-se que, nos termos da legislação vigente, os referidos cadastros consolidam informações prestadas pelos entes públicos, de todos os Poderes e esferas de governo.*

*Os Sistemas ePAD e CGU-PJ consolidam os dados sobre o andamento dos processos administrativos de responsabilização de entes privados no Poder Executivo Federal.*

*O Cadastro Nacional de Empresas Inidôneas e Suspensas (CEIS) apresenta a relação de empresas e pessoas físicas que sofreram sanções que implicaram a restrição de participar de licitações ou de celebrar contratos com a Administração Pública.*

*O Cadastro Nacional de Empresas Punidas (CNEP) apresenta a relação de empresas que sofreram qualquer das punições previstas na Lei nº 12.846/2013 (Lei Anticorrupção).*

*O Cadastro de Entidades Privadas sem Fins Lucrativos Impedidas (CEPIM) apresenta a relação de entidades privadas sem fins lucrativos que estão impedidas de celebrar novos convênios, contratos de repasse ou termos de parceria com a Administração Pública Federal, em função de irregularidades não resolvidas em convênios, contratos de repasse ou termos de parceria firmados anteriormente.*

Certidão emitida às 13:57:26 do dia 14/10/2024 , com validade até o dia 13/11/2024.

Link para consulta da verificação da certidão <https://certidoes.cgu.gov.br/>

Código de controle da certidão: wVwqnpvPGJbKOnnvKLmx

*Qualquer rasura ou emenda invalidará este documento.*



## PROPOSTA DE PREÇO

Prefeitura do Município de Marmeleiro/PR

**PROCESSO ADMINISTRATIVO Nº 1474/2024**

**PREGÃO ELETRÔNICO N.º 054/2024**

**Objeto: REGISTRO DE PREÇOS para futura e eventual contratação de empresa para fornecimento de Luminárias de LED para iluminação pública nas vias urbanas do município de Marmeleiro, atendendo as necessidades do Departamento de Urbanismo.**

Apresentamos nossa proposta para aquisição do objeto da presente licitação Pregão, na Forma Eletrônica **Nº 054/2024**, acatando todas as estipulações consignadas no respectivo Edital e seus anexos.

### 01 – IDENTIFICAÇÃO:

DADOS DA EMPRESA			
RAZÃO SOCIAL DA EMPRESA: ECB AUTOMACAO INDUSTRIAL LTDA			
CNPJ: 49.956.040/0001-09		INSCRIÇÃO ESTADUAL: 200200801	
ENDEREÇO: RUA CONFÚCIO DE AMORIM, Nº 80, Q 17 LT 01 SALA 01, CEP 74.430-112 – RODOVIÁRIO, GOIÂNIA/GO		MUNICÍPIO: GOIANIA	UF: GO
TELEFONE COMERCIAL: (62) 3920-2847		E-MAIL: <a href="mailto:licit3@alreletrica.com.br">licit3@alreletrica.com.br</a>	
REPRESENTANTE LEGAL PARA ASSINATURA DE ATA E CONTRATO			
NOME COMPLETO: ELAINE CRISTINA BRITO MONTEIRO			
RG: 7404306 SSP/GO		CPF: 531.183.162-68	
ENDEREÇO: RUA C53, 299 - ST. SUDOESTE		MUNICÍPIO: GOIANIA	UF: GO
TELEFONE: (62) 99385-0931		E-MAIL: <a href="mailto:licit3@alreletrica.com.br">licit3@alreletrica.com.br</a>	
DADOS BANCÁRIOS			
BANCO: ITAU - 341		AGÊNCIA: 4676	CONTA: 99648-3

### 02 – PREÇO:

ITEM	DESCRIÇÃO	UNID	QUANT	MARCA	MODELO	VALOR UNI	VALOR TOTAL
5	Luminária - Tipo: Sobrepor, Material Corpo: Plástico Abs, Formato: Retangular, Tipo Lâmpada: Led, Cor: Branca, Dimensões: 231 X 221 X 25 MM, Fluxo Luminoso: 50 LM,	UNID	25	PERFECT LED	HEROS	R\$ 292,60	R\$ 7.315,00



8	Luminária - Tipo: Sobrepor, Material Corpo: Plástico Abs, Formato: Retangular, Tipo Lâmpada: Led, Cor: Branca, Dimensões: 231 X 221 X 25 MM, Fluxo Luminoso: 50 LM,	UNID	75	PERFECT LED	HEROS	R\$ 292,60	R\$ 21.945,00
VALOR TOTAL: VINTE E NOVE MIL E DUZENTOS E SESENTA REAIS.							R\$ 29.260,00

O pagamento será efetuado de acordo com o edital, acompanhado de nota fiscal sob pena de não ser efetuado o pagamento.

**VALIDADE DA PROPOSTA: 60 (sessenta) dias**, a contar da data de sua apresentação;

**PRAZO DE ENTREGA:** O prazo para entrega do objeto será **impreterivelmente de até 15 (quinze) dias úteis após o recebimento da Ordem de Compra por parte da CONTRATADA.**

**PRAZO DE GARANTIA:** O prazo de garantia também é aquele estabelecido na Lei nº 8.078, de 11 de setembro de 1990 (Código de Defesa do Consumidor).

Proponho-me a executar o(s) objeto(s) constante(s) no ANEXO I, obedecendo as quantidades e especificações constantes no edital em anexo.

Goiânia, 14 de outubro de 2024.

ECB AUTOMACAO Assinado de forma digital  
INDUSTRIAL por ECB AUTOMACAO  
INDUSTRIAL  
LTDA:4995604000109  
0109 Dados: 2024.10.14  
16:27:32 -03'00'

**ELAINE CRISTINA BRITO MONTEIRO**  
**ANALISTA DE LICITAÇÕES**  
**ECB AUTOMACAO INDUSTRIAL**  
**CNPJ: 49.956.040/0001-09**



## Sistema de Cadastramento Unificado de Fornecedores - SICAF

### Declaração

Declaramos para os fins exigidos na legislação, conforme documentação registrada no SICAF, que a situação do fornecedor no momento é a seguinte:

#### Dados do Fornecedor

CNPJ: 47.136.740/0001-13  
Razão Social: VM COMERCIO LTDA  
Nome Fantasia: VM COMERCIO  
Situação do Fornecedor: **Credenciado** Data de Vencimento do Cadastro: **08/04/2025**  
Natureza Jurídica: **SOCIEDADE EMPRESÁRIA LIMITADA**  
MEI: **Não**  
Porte da Empresa: **Micro Empresa**

#### Ocorrências e Impedimentos

Ocorrência: **Nada Consta**  
Impedimento de Licitar: **Nada Consta**  
Ocorrências Impeditivas indiretas: **Nada Consta**  
Vínculo com "Serviço Público": **Nada Consta**

#### Níveis cadastrados:

Automática: a certidão foi obtida através de integração direta com o sistema emissor. Manual: a certidão foi inserida manualmente pelo fornecedor.

##### I - Credenciamento

##### II - Habilitação Jurídica

##### III - Regularidade Fiscal e Trabalhista Federal

Receita Federal e PGFN	Validade:	08/02/2025	Automática
FGTS	Validade:	18/10/2024	Automática
Trabalhista ( <a href="http://www.tst.jus.br/certidao">http://www.tst.jus.br/certidao</a> )	Validade:	02/03/2025	Automática

##### IV - Regularidade Fiscal Estadual/Distrital e Municipal

Receita Estadual/Distrital	Validade:	17/10/2024
Receita Municipal	Validade:	30/11/2024

##### VI - Qualificação Econômico-Financeira

Validade: 30/06/2025



# CONTROLADORIA-GERAL DA UNIÃO

Certidão negativa correccional (ePAD, CGU-PJ, CEIS, CNEP e CEPIM)

Consultado: **VM COMERCIO LTDA**

CPF/CNPJ: **47.136.740/0001-13**

Certifica-se que, em consulta aos sistemas ePAD e CGU-PJ e aos cadastros CEIS, CNEP e CEPIM mantidos pela Corregedoria-Geral da União, **NÃO CONSTAM** registros de penalidades vigentes relativas ao CNPJ/CPF consultado.

*Destaca-se que, nos termos da legislação vigente, os referidos cadastros consolidam informações prestadas pelos entes públicos, de todos os Poderes e esferas de governo.*

Os Sistemas ePAD e CGU-PJ consolidam os dados sobre o andamento dos processos administrativos de responsabilização de entes privados no Poder Executivo Federal.

O Cadastro Nacional de Empresas Inidôneas e Suspensas (CEIS) apresenta a relação de empresas e pessoas físicas que sofreram sanções que implicaram a restrição de participar de licitações ou de celebrar contratos com a Administração Pública.

O Cadastro Nacional de Empresas Punidas (CNEP) apresenta a relação de empresas que sofreram qualquer das punições previstas na Lei nº 12.846/2013 (Lei Anticorrupção).

O Cadastro de Entidades Privadas sem Fins Lucrativos Impedidas (CEPIM) apresenta a relação de entidades privadas sem fins lucrativos que estão impedidas de celebrar novos convênios, contratos de repasse ou termos de parceria com a Administração Pública Federal, em função de irregularidades não resolvidas em convênios, contratos de repasse ou termos de parceria firmados anteriormente.

Certidão emitida às 13:52:40 do dia 14/10/2024 , com validade até o dia 13/11/2024.

Link para consulta da verificação da certidão <https://certidoes.cgu.gov.br/>

Código de controle da certidão: MwajPhAehNVRh81Li6Jm

*Qualquer rasura ou emenda invalidará este documento.*





# CONTROLADORIA-GERAL DA UNIÃO

Certidão negativa correccional (ePAD, CGU-PJ, CEIS, CNEP e CEPIM)

Consultado: **VINICIUS CAMPOS DE MOURA**

CPF/CNPJ: **001.741.881-02**

Certifica-se que, em consulta aos sistemas ePAD e CGU-PJ e aos cadastros CEIS, CNEP e CEPIM mantidos pela Corregedoria-Geral da União, **NÃO CONSTAM** registros de penalidades vigentes relativas ao CNPJ/CPF consultado.

*Destaca-se que, nos termos da legislação vigente, os referidos cadastros consolidam informações prestadas pelos entes públicos, de todos os Poderes e esferas de governo.*

Os [Sistemas ePAD e CGU-PJ](#) consolidam os dados sobre o andamento dos processos administrativos de responsabilização de entes privados no Poder Executivo Federal.

O [Cadastro Nacional de Empresas Inidôneas e Suspensas \(CEIS\)](#) apresenta a relação de empresas e pessoas físicas que sofreram sanções que implicaram a restrição de participar de licitações ou de celebrar contratos com a Administração Pública.

O [Cadastro Nacional de Empresas Punidas \(CNEP\)](#) apresenta a relação de empresas que sofreram qualquer das punições previstas na Lei nº 12.846/2013 (Lei Anticorrupção).

O [Cadastro de Entidades Privadas sem Fins Lucrativos Impedidas \(CEPIM\)](#) apresenta a relação de entidades privadas sem fins lucrativos que estão impedidas de celebrar novos convênios, contratos de repasse ou termos de parceria com a Administração Pública Federal, em função de irregularidades não resolvidas em convênios, contratos de repasse ou termos de parceria firmados anteriormente.

Certidão emitida às 13:53:30 do dia 14/10/2024 , com validade até o dia 13/11/2024.

Link para consulta da verificação da certidão <https://certidoes.cgu.gov.br/>

Código de controle da certidão: LjJ0yN0u7s5lm5nCPLZK

*Qualquer rasura ou emenda invalidará este documento.*