

Lighting part **III** standard workshop (SASO 2927:2019)

Saudi Energy Efficiency Program
28/01/2020



المركز السعودي لكفاءة الطاقة
Saudi Energy Efficiency Center

Disclaimer!

The information enclosed within is for presentation purposes only (not to be used as a technical reference). For details please refer to the respective standard documents

The team was formed with following entities



وزارة التجارة والاستثمار
Ministry of Commerce and Investment



وزارة الشؤون
البلدية و القروية
Ministry of Municipal & Rural Affairs

تجريبي



وزارة الصناعة والثروة المعدنية
Ministry of Industry and Mineral Resources



وزارة النقل
TRANSPORT MINISTRY



المملكة العربية السعودية
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كفاءة

المركز السعودي لكفاءة الطاقة
Saudi Energy Efficiency Center

الجمارك السعودية
SAUDI CUSTOMS



الهيئة السعودية للمواصفات والمقاييس والجودة
Saudi Standards, Metrology and Quality Org.



الشركة السعودية للكهرباء
Saudi Electricity Company
نعمل بانفتاح من أجلكم



الهيئة السعودية للمهندسين
SAUDI COUNCIL OF ENGINEERS



الشركة الوطنية لخدمات كفاءة الطاقة
National Energy Services Company

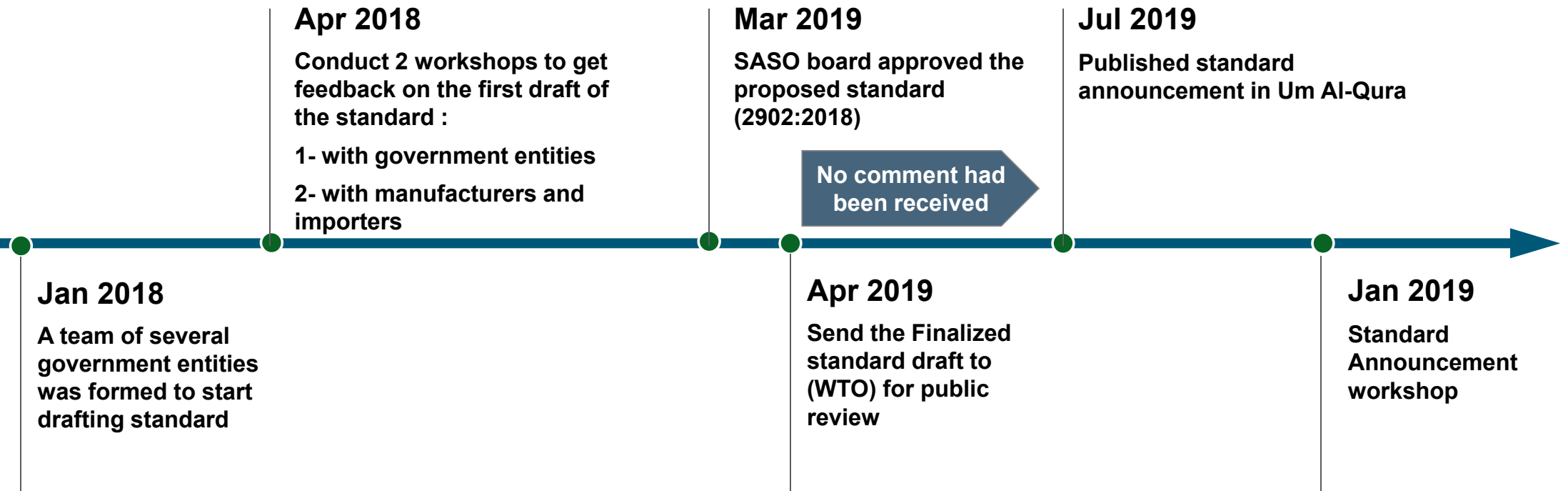
AGENDA

Standard requirements

Enforcement plan

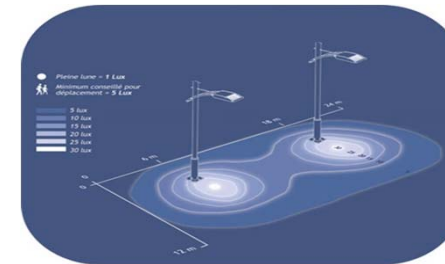
Lighting Products Registration Requirement (Part 3)

Development of the Lighting Products part III standard began in Jan 2018



A new standard for Lighting Part III (**Street Lighting**) (SASO 2927/2019) was introduced with a scope including the specified elements

Classification of street/road lighting



Tunnel Lighting



Technical requirements of lighting products



A new standard for Lighting Part III (**Street Lighting**) (SASO 2927/2019) was introduced with a scope including the specified elements

Classification of street/road lighting

- Using the CIE standard as a reference.
- Benchmarking conducted to find the most efficient practices in the devolved countries.

	M Class	C Class	P Class
Definition	Roads	Intersection	Pedestrians
Classification	(M1-M6)	(C0-C5)	(P1-P6)
Details	Roads used by vehicles	Traffic intersection, bicycles and Parking lot	Pedestrians areas

Tunnel Lighting

- Specifications of lighting requirements during the day and nighttime.

Technical requirements of lighting products

Regulatory Parameters
Energy Efficiency
Functionality / Performance
Mechanical Requirements
Electrical Requirements
Energy efficiency labelling

This standard covers three type of lighting classification (M, C and P)

- Using the CIE standard as a reference.
- Benchmarking conducted to find the most efficient practices in the devolved countries.

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Classification	(M1-M6)	(C0-C5)	(P1-P6)
Details	Roads used by vehicles	Traffic intersection, bicycles and Parking lot	Pedestrians areas

Note: HID lamps include Metal Halide and High-Pressure Sodium

Lighting for motorized areas: parameters for selection of **M** lighting class

Parameter	Option	description	Weighting factor
Speed	Very High	≥ 90 km/h	1
	high	$70 < v < 90$ km/h	0.5
	Moderate	$v \leq 70$ km/h	0
Traffic Volume	Very High	$> 25,000$ vehicles per day	1
	high	$\geq 15,000 \leq 25,000$ vehicles per day	0.5
	moderate	$\geq 7,000 \leq 14,999$ vehicles per day	0
	Low	$\geq 3,000 \leq 6,999$ vehicles per day	-0.5
	Very Low	$< 3,000$ vehicles per day	-1
Traffic Composition	Mixed with High percentage of non-motorized		2
	Mixed		1
	Motorized only		0
Separation of carriageway	Yes		0
	No		1
Intersection density	High	More than 3 intersection per km	1
	Moderate	Less than 3 intersection per km	0
Parked vehicles	Present		0.5
	Not present		0
Ambient Luminance	High		1
	Moderate		0
	Low		-1
Visual Guidance	Poor		0.5
	Moderate to good		0
Equation	M=6 – SWV		Sum of weighting values

Lighting requirements for M-classes

Lighting Class	Road surface			Threshold increment	Surround ratio	
	Dry		Wet			
	L (cd/m ²)	U _o	U ₁			U _o
M1	2.0	0.40	0.70	0.15	10	0.50
M2	1.5	0.40	0.70	0.15	10	0.50
M3	1.0	0.40	0.60	0.15	15	0.50
M4	0.75	0.40	0.60	0.15	15	0.50
M5	0.50	0.35	0.40	0.15	15	0.50
M6	0.30	0.35	0.40	0.15	20	0.50

Lighting for conflict areas: parameters for the selection of **C** lighting class

Parameter	Option	Description	Weighting factor
Speed	Very High	$v \geq 90$ km/h	3
	High	$70 < v < 90$ km/h	2
	Moderate	$60 < v \leq 70$ km/h	1
	Low	$v \leq 60$	0
Traffic Volume	Very High	>25,000 vehicles per day	1
	High	$\geq 15,000 \leq 25,000$ vehicles per day	0.5
	Moderate	$\geq 7,000 < 15,000$ vehicles per day	0
	Low	$\geq 3,000 < 7,000$ vehicles per day	-0.5
	Very Low	< 3,000 vehicles per day	-1
Traffic Composition	Mixed with High percentage of non-motorized		2
	Mixed		1
	Motorized only		0
Separation of carriageway	Yes		0
	No		1
Ambient Luminance	High		1
	Moderate		0
	Low		-1
Visual guidance	Poor		0.5
	Moderate to good		0
Equation	C = 6 – SWV		Sum of weighting values

Lighting requirements for C-classes

Lighting class	Average illuminance over whole of used surface E in lux.	Uniformity of illuminance U _o (E)	threshold increment f _{Ti} in % *	
			High and moderate speed	Low and very low speed
			C0	50
C1	30	0.40	10	15
C2	20	0.40	10	15
C3	15	0.40	15	20
C4	10	0.40	15	20
C5	7.5	0.40	15	25

M and C lighting classes of comparable lighting level for different values of q_0 for the Road surface

Street Classification

Lighting class M			M1	M2	M3	M4	M5	M6
Average luminance L in cd/m ²			2.0	1.5	1	0.75	0.50	0.30
Lighting class C if $q_0=0.05\text{cd/m}^2$			C0	C1	C2	C3	C4	C5
Average illuminance E in lux			50	30	20	15	10	7.5
Lighting class C if $q_0=0.07\text{cd/m}^2$		C0	C1	C2	C3	C4	C5	
Average illuminance E in lux		50	30	20	15	10	7.5	
Lighting class C if $q_0=0.09\text{cd/m}^2$	C0	C1	C2	C3	C4	C5		
Average illuminance E in lux	50	30	20	15	10	7.5		

Lighting for pedestrians areas: parameters for the selection of **P** lighting class

Street Classification

Parameter	Option	Description	Weighting factor
Speed	low	> 5 and ≤ 30 km/h	1
	Very low (walking peed)	≤ 5 km/h	0
Traffic Volume	Very high	5000< traffic volume ≤ 7000 vehicles per day	1
	high	3000< traffic volume ≤ 5000 vehicles per day	0.5
	Moderate	1000< traffic volume ≤ 3000 vehicles per day	0
	low	500< traffic volume ≤1000 vehicles per day	-0.5
	Very low	traffic volume ≤ 500 vehicles per day	-1
Traffic Composition	Pedestrians, cyclists and motorized traffic		2
	Pedestrians and motorized traffic		1
	Pedestrians and Cyclist only		1
	Pedestrians only		0
	Cyclist only		0
Parked vehicles	Present		0.5
	Not present		0
Ambient Luminance	high		1
	moderate		0
	Low		-1
Equation	P =6 – SWV		Sum of weighting values

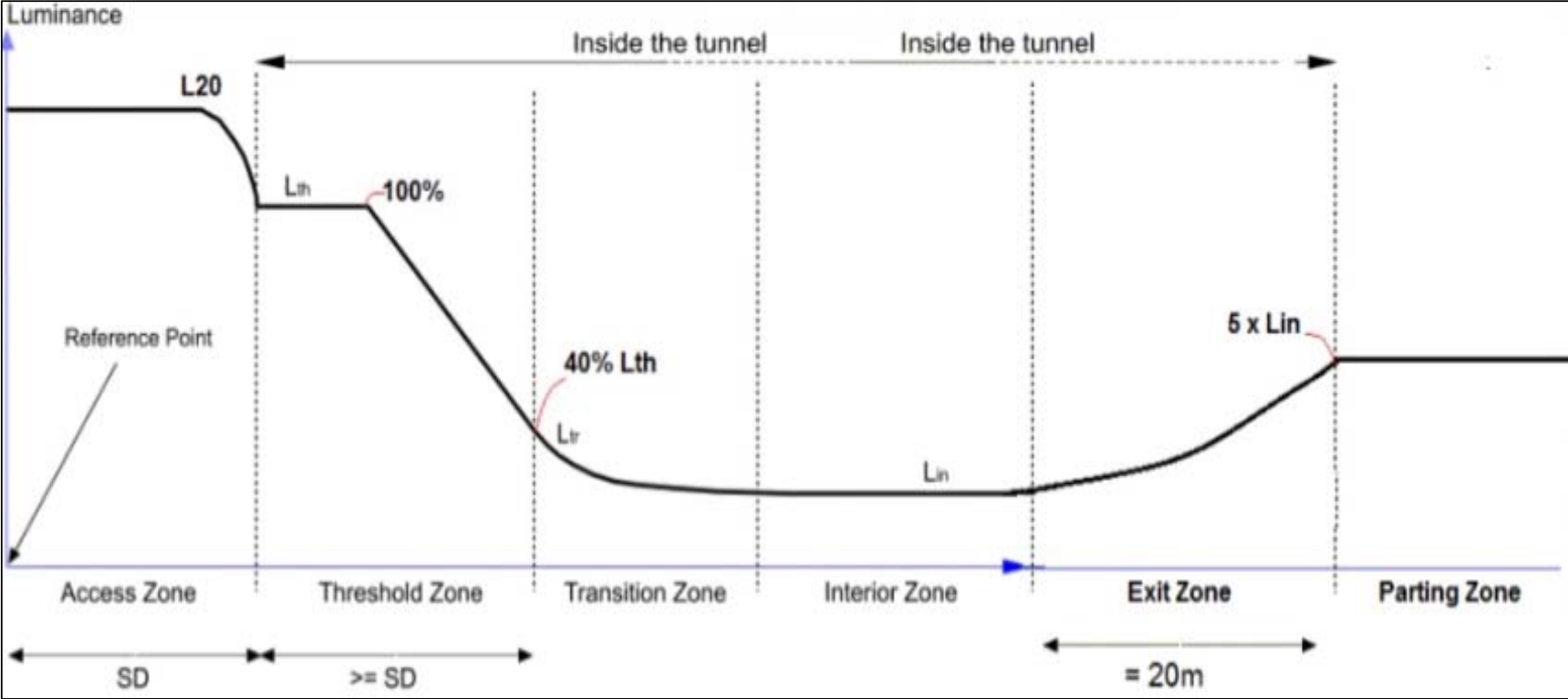
Lighting requirements for P-classes

Lighting class	Average horizontal illuminance ($E_{h_{av}}$) in lux	Minimum horizontal illuminance ($E_{h_{min}}$) in lux	Additional requirement if facial recognition is necessary	
			Minimum vertical illuminance ($E_{v_{min}}$) in lux	Minimum semi-cylindrical illuminance ($E_{sc_{min}}$) in lux
P1	15	3	5	3
P2	10	2	3	2
P3	7.5	1.5	2.5	1.5
P4	5	1	1.5	1
P5	3	0.6	1	0.6
P6	2	0.4	0.6	0.4

Tunnel and underpass lighting

Tunnel zones

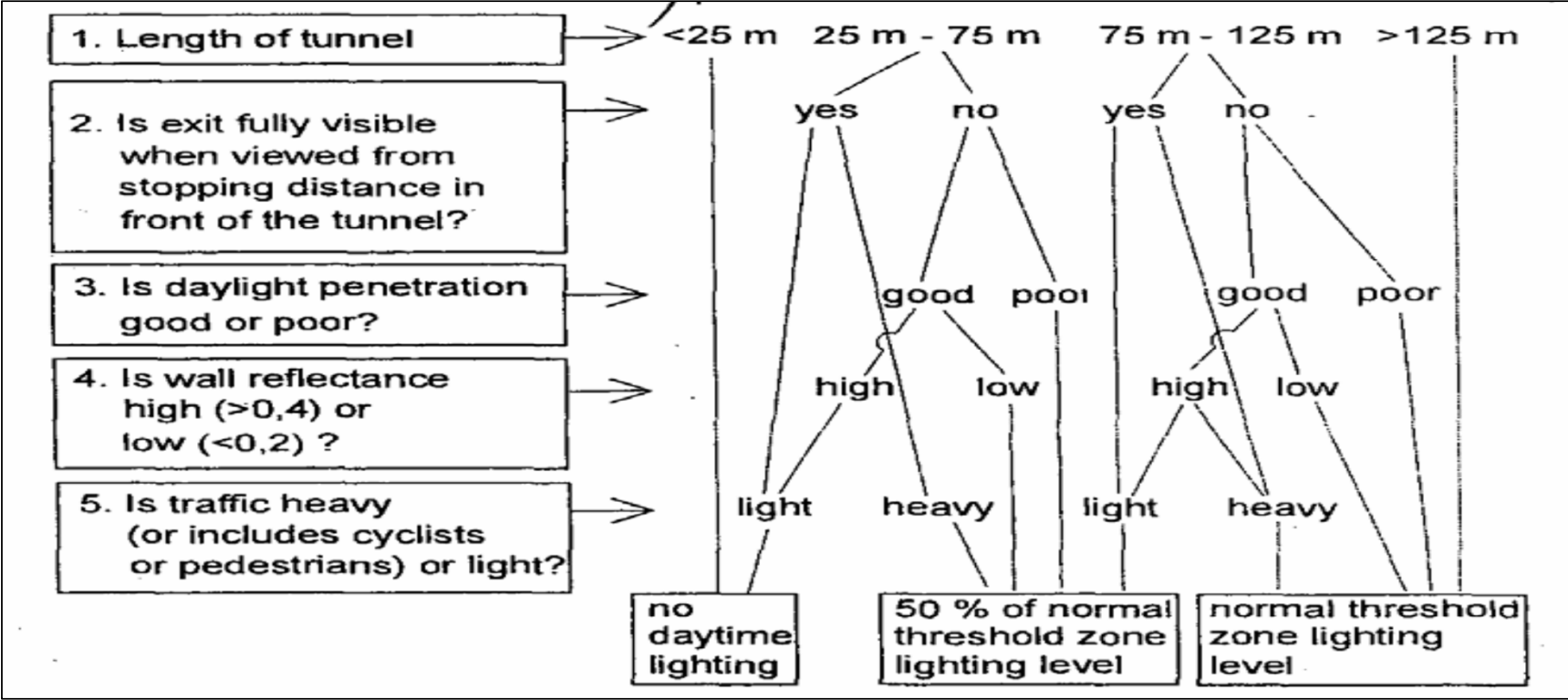
Required luminance levels in the tunnel depend on the tunnel zones as follows:



Tunnel and underpass lighting

Distinction between long and short tunnels:

Lighting level for tunnels is decided based on the following flowchart:



The Lighting part III covers 3 types of Technology

Technology

Lamp category	Lighting Part I	Lighting Part II	Lighting Part III
Incandescent	≤12000 lumen	>12000 lumen	X
Halogen			
CFLi			
LED	Mainly residential	All others	X
CFLni	X	✓	X
LFL	X	✓	X
HID	X	✓	✓
Control gear	X	✓	✓
Integrated Luminaire	X	✓	✓

Base reference

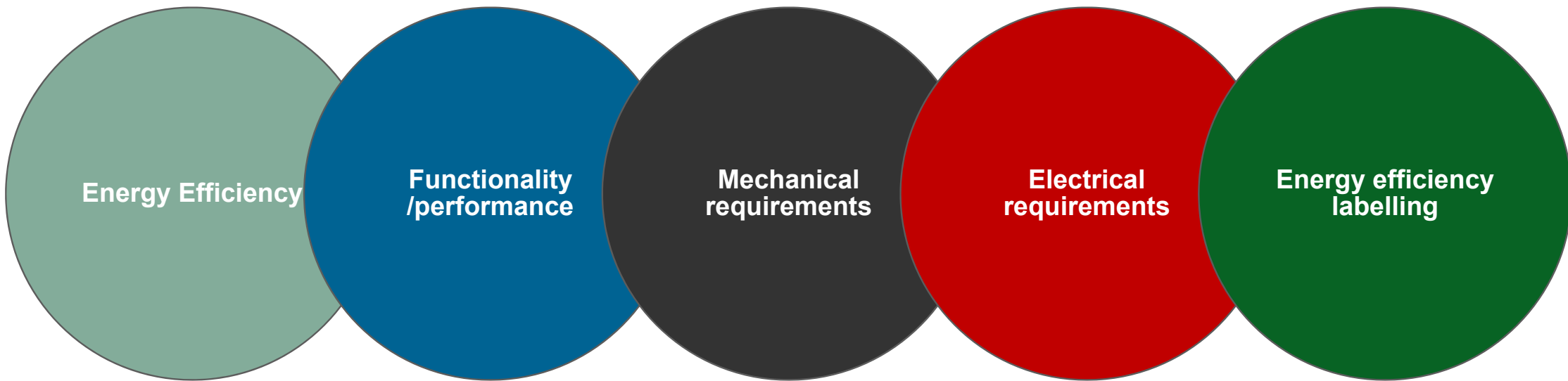
- Energy efficiency classes will be applied to lighting elements as per the Lighting II standard
- HID functionality requirements will be as per the Lighting II standard
- Hazardous material requirements will be as per the Lighting II standard

Other technical requirements added to SASO 2927

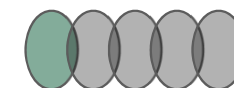
Requirement

Requirements	Lighting Part II	Lighting Part III
Efficacy (lm/w)	65	120
Marking information	✓	✓
Label	✓	✓
IP (Ingress Protection)	X	✓
IK (mechanical impact)	X	✓
vibration test	X	✓
overvoltage protection	X	✓
electrical protection	X	✓

The following main components are covered in the Lighting part III standard



All products in scope of the 2927 standard shall meet the following Efficiency / Efficacy requirements



MEPS for Lamps

Lamp type	Lamp wattage (W)	Efficacy (lm/W) – clear lamps	Efficacy (lm/W) – not clear lamps
HPS* with Ra ≤ 60	Up to 605	60 - 135	60 - 130
HPS with Ra > 60	Up to 405	60 - 85	60 - 75
Metal Halide	Up to 405	70 - 90	65 - 85
Other HID	All wattage	50 - 75	

MEPS for Luminaire

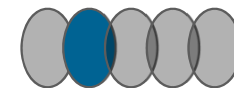
Type	Lamp wattage (W)	Efficacy (lm/W)
LED chip	All wattage	≥ 120 and ≥ 85% of LED chips Efficacy
Integrated luminaire		≥ 140 at 25 °C

MEPS for HID ballasts and LED drivers

• MEPS will be as per the Lighting II standard

* High pressure sodium

All products in scope of the 2927 standard shall meet the following **Functionality requirements**



Functionality Requirement

Technology	Requirements
HID	Metal Halide and High Pressure Sodium (HPS) lamps will follow the functional requirements set in Lighting part II
	No international requirements were found for other HID lamps; thus no specific requirements will be set in this standard
LEDs and Luminaire	The lighting unit shall be designed to operate continuously at external temperature and humidity, taking into account the effects of direct exposure to sunlight and dust storms.
	Life span of LED chips and Luminaire shall be greater than or equal to 70% (L70) after 50,000 hours
	Color temperature must be between 3000 - 6000 K
	The color consistency of the light source or luminaire at the time the system is put into operation shall be within a 5 step MacAdam ellipse.

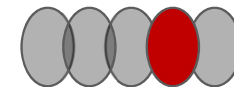
All products in scope of the 2927 standard shall meet the following **Mechanical requirements**



Mechanical Requirement

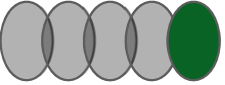
Requirements	
Ingress protection	IP 66
impact protection	IK 08
The control unit enclosure shall be designed to withstand a temperature between -10 and +85.	
The painted parts of the lighting unit are exposed to the external environment and shall exceed the fifth classification after 2,500 hours	
The vibration test of roads and bridges (3 Axis vibration test)	
The luminaire shall be built in such a way that it can withstand wind speed of 150 km/h.	
The Surge Protection Device (SPD) shall be able to work normally at a temperature of 80°C (inside the fixture)	

All products in scope of the 2927 standard shall meet the following
Electrical requirements



Electrical Requirement

Requirements	
Installation overvoltage protection	10 kV
electrical protection	Class I
internal protection to withstand charges	4 kV
Driver program	DALI (preferable) or 0-10V dimmable
Fixture	base for Receptacle 7-pin NEMA Socket capped (short-circuited)
Control unit Voltage	(120-277) Volt AC at 60 Hz
driver and integrated luminaire Power Factor	≥ 0.9
Total Harmonic Distortion	$< 15\%$



Energy efficiency labelling

EEI Calculation

Lamps and integrated luminaires in the scope of this standard shall comply with the Energy efficiency classes and calculation according to SASO 2902/2018 ENERGY EFFICIENCY, FUNCTIONALITY AND LABELLING REQUIREMENTS FOR LIGHTING PRODUCTS (PART 2).

EEI Label

The image shows a template for an Energy Efficiency Label (EEI) for lighting products. At the top, it features the SASO logo and the text 'الهيئة السعودية للمواصفات والمقاييس والجودة' (Saudi Standards, Metrology and Quality Org.) and 'بطاقة كفاءة الطاقة' (ENERGY EFFICIENCY LABEL). Below this is a scale for energy efficiency classes, ranging from 'أ' (A) to 'ز' (Z), with 'أ' being the most efficient (green) and 'ز' being the least efficient (red). The label includes several input fields: 'BRAND NAME' (العلامة التجارية), 'MADE IN' (بلد الصنع), 'MODEL NUMBER' (رقم الطراز), 'LIGHTING TYPE' (نوع الإنارة), and 'REGISTRATION NO' (رقم التسجيل). A QR code is also present. At the bottom, there is a warning in Arabic and English: 'إزالة أو تغطية أو العبث بهذه البطاقة قبل البيع يجعلك عرضة للمسؤولية النظامية' and 'Removing, covering or altering this label before sale can subject you to legal liability'.

Type of documents required for registration

Required Documents

Type of test
datasheets for the Fixture
datasheets for the Driver
datasheets for the LED units
datasheets for the SPD
LM-79-08 test report accredit
LM - 80 -08 and TM - 21 - 11 reports
LM - 82 - 12 report
LM – 84-14 and TM – 28-14 reports at temperature (50°C) at 2000 hr. or 6000 hr.
ISTMT test for the luminaire at 50°C which displays the recorded temp within each part of the luminary (LED chips, Driver)
IP test according to IEC/EN 60598 -1
IK test according to IEC/EN 62262
THD test according to IEC 61000-3-2
Corrosion test according to ISO 9227 for 2500 hours and should obtain Class 5 or above
3-axis vibration test according to ANSI CI136.3-2001, ANSI CI136.31-2001 Minimum 1.5G for road and 3G for bridges and tunnels
Photobiological safety test

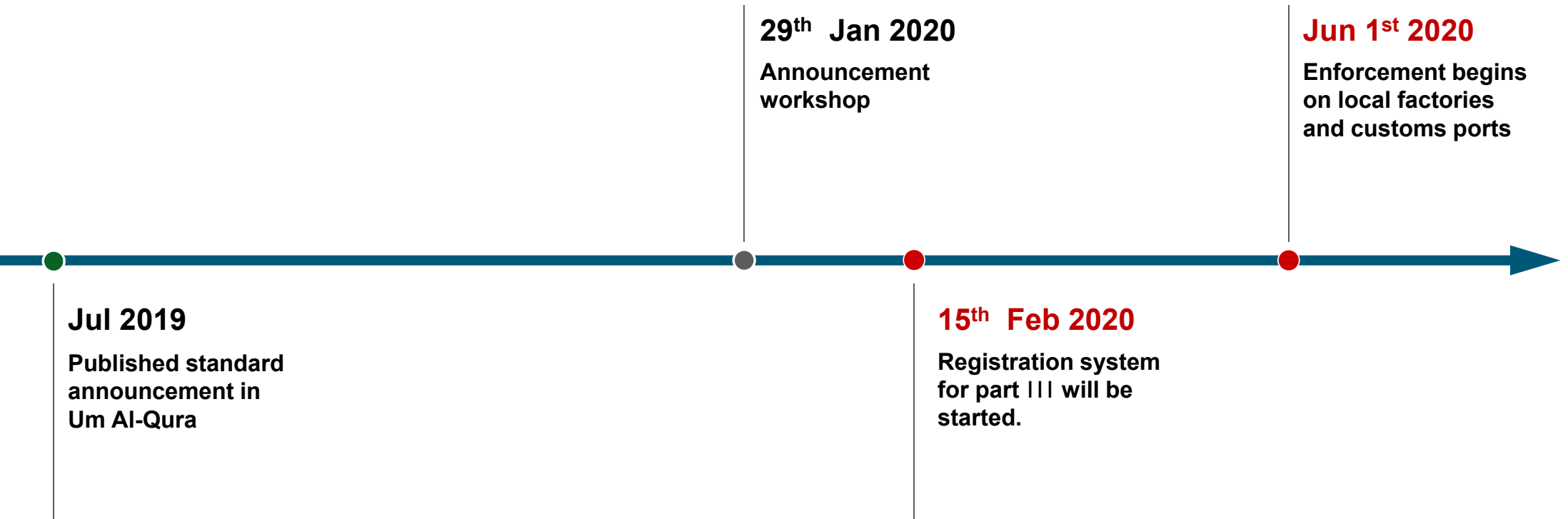
AGENDA

Standard requirements

Enforcement plan

Lighting Products Registration Requirement (Part 3)

Enforcement timeline



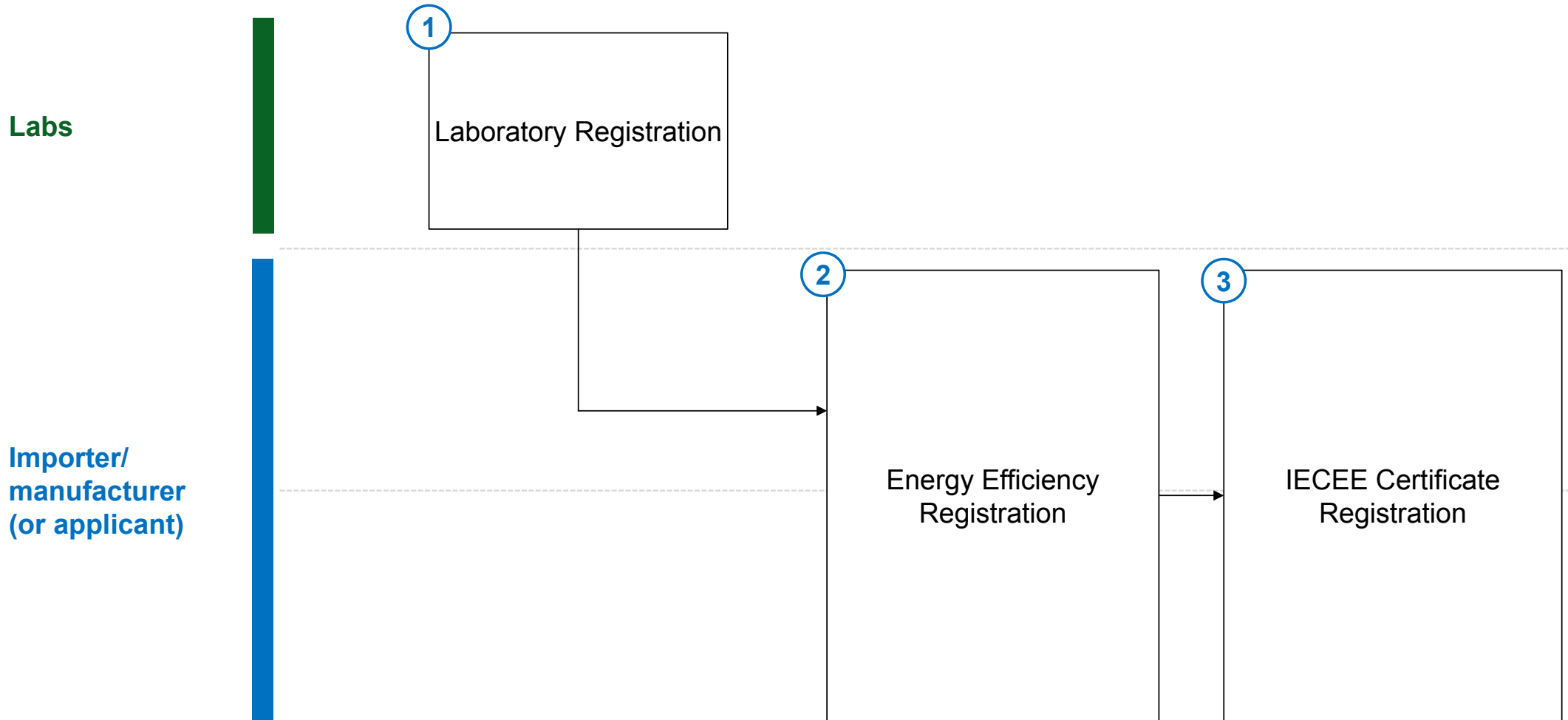
AGENDA

Standard requirements

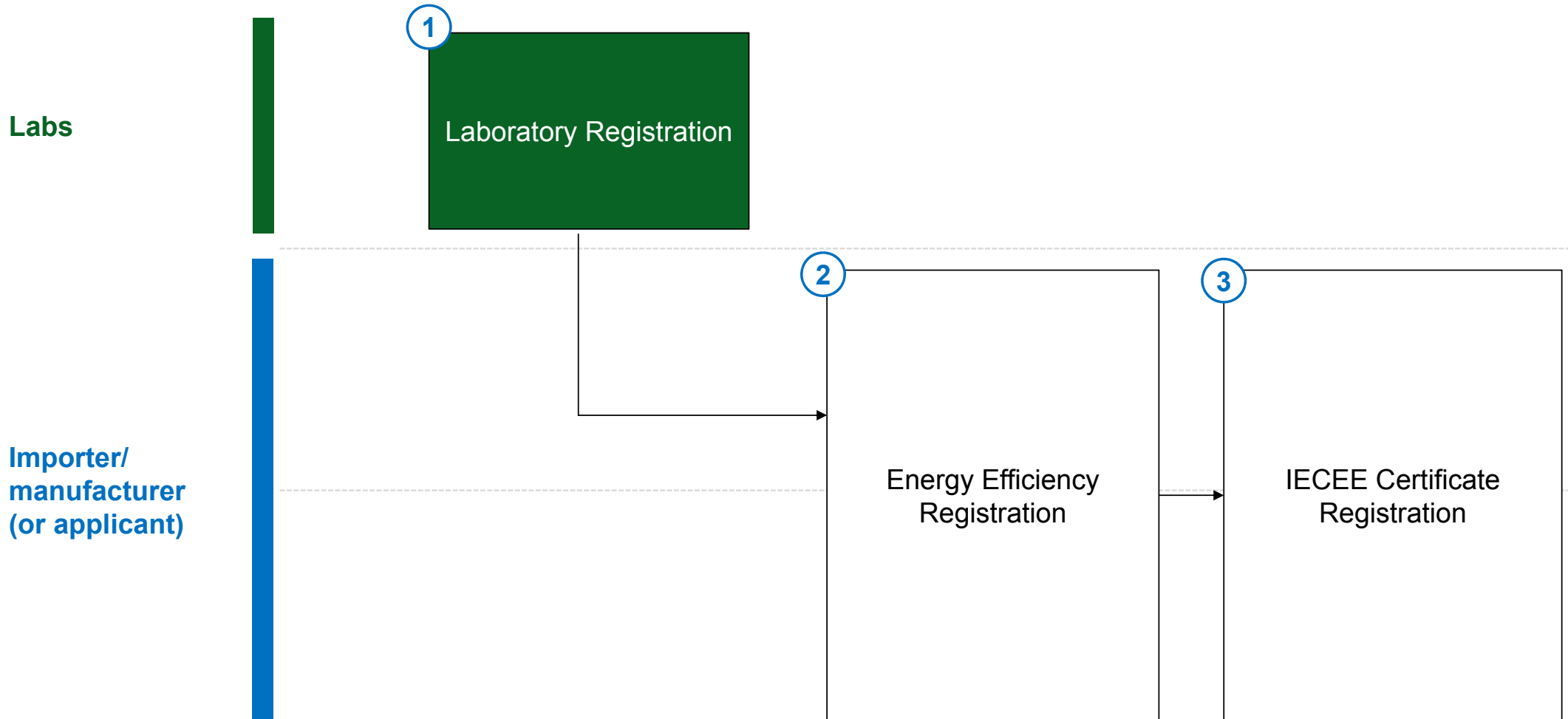
Enforcement plan

Lighting Products Registration Requirement (Part 3)

Lighting Products Registration Requirement (Part 3)



Lighting Products Registration Requirement (Part 3)



Laboratory Registration Requirements

Registration Requirements	متطلبات القبول
❖ Application form for each laboratory.	❖ نموذج تسجيل لكل مختبر على حدة.
❖ Accreditation certificates and scope from Body Full member of (ILAC) or Saudi Accreditation Committee (SAC).	❖ شهادة الاعتماد ومجال الاعتماد من جهاز ذو عضوية كاملة في ILAC أو من جهاز الاعتماد السعودي SAC.
❖ Liability insurance.	❖ تأمين المسؤولية.
❖ Management System: <ul style="list-style-type: none">• Quality manual and related procedure in the scope of registration requested.• Organization chart of the laboratory.• Risk management.• Management of Impartiality.	❖ نظام إدارة الجودة: <ul style="list-style-type: none">• دليل الجودة وجميع الإجراءات ذات العلاقة.• الهيكل التنظيمي للمختبر.• إدارة المخاطر.• إجراء تطبيق الحيادية.
❖ Documents studying and reviewing costs is 10,000 SR for each category in each one location.	❖ دفع تكاليف دراسة ومراجعة الوثائق 10,000 عشرة آلاف ريال لكل صنف للموقع واحد.

You can register by contacting this e-mail: q.cab_req@saso.gov.sa

Issuing the registration certificate and scope



الهيئة السعودية للمواصفات والمقاييس والجودة
Saudi Standards, Metrology and Quality Org.

شهادة قبول جهة تقويم مطابقة For Approval of Certification Body license

The Name of Organization(CBS):	Text	اسم جهة تقويم المطابقة:
RB (Geographical region):	Text	إقليم مجال الجهة المقبولة:
Main Branch Address:	Text	عنوان الفرع الرئيسي:
The Authorized person:	Text	الشخص المسئول:
The address:	Text	العنوان:

The above establishment has been approved as conformity assessment Body further to its request on 22/22/2222 according to SASO decision of (adoption of the regulation approval) No: (1185) Date: 10/11/2015 on to conduct conformity assessment activities listed in annex.

تم قبول المنشأة المذكورة عليه كجهة تقويم مطابقة مقبولة بناءً على الطلب المقدم من قبلهم بتاريخ 22 / 22 / 2222 ووفقاً لقرار اعتماد لائحة القبول الصادر من الهيئة السعودية للمواصفات والمقاييس والجودة برقم (1185) وتاريخ 10 / 11 / 2015 هـ وذلك للعمل في نشاط تقويم المطابقة في المجالات المحددة في الوثيقة المرفقة.

Annex specifies the technical field and sub-branches

يحدد الملحق المجال الفني والفروع الفرعية

Number of approval:	Text	رقم القبول:
---------------------	------	-------------

Date of issue: 22 / 22 / 2222

تاريخ الإصدار: 22 / 22 / 2222

Validity of Certificate: three years from the date of issue

ملاحة الشهادة: ثلاث سنوات من تاريخ الإصدار

نائب محافظ الهيئة للمطابقة والجودة
Deputy Governor of Conformity and Quality Affairs

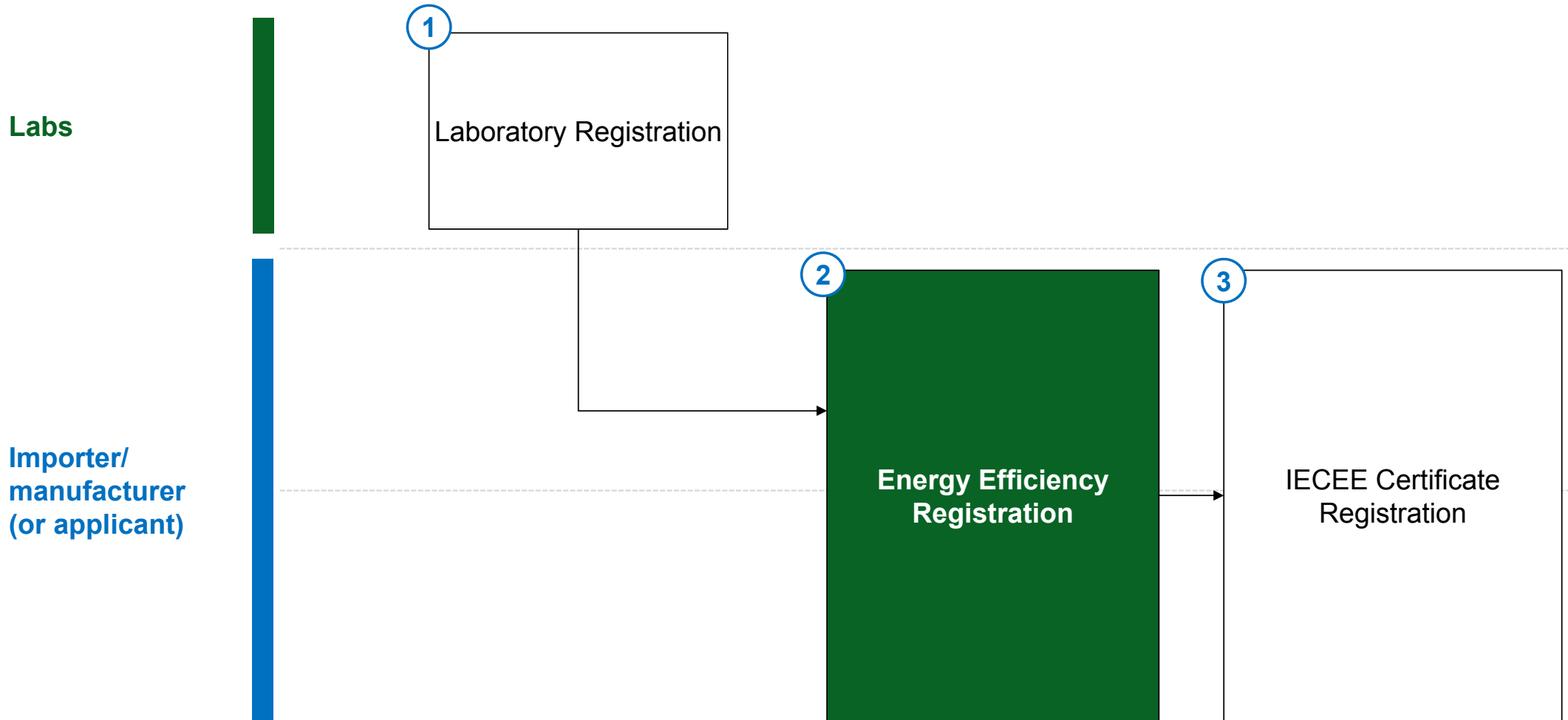
المهندس/ سعود راشد العسكر
Eng. Saud R. AlAskar

(ملحق الفروع - مجال القبول) رقم الشهادة 2018/EE LAB 0000

Appendix (Branches and Scope of Approved)
Certificate No: EE LAB 0000 /2018 .

Name of Technical Regulations (category)	Country and address	Laboratory Name	Registration NO:

Lighting Products Registration Requirement (Part 3)



Energy Efficiency Registration

SLS website

- ▶ <http://www.sls.gov.sa/Pages/ar/signin.aspx>

Test Report & other document

- ▶ Test Report from **3rd Party only** and the result comply with all requirement in standard
- ▶ Declaration of Conformity from factory
- ▶ Declaration of Conformity from importer
- ▶ Industrial license (if the applicant is a Manufacturer)
- ▶ Saudi Commercial License

Marking Information

- ▶ Marking information on the product
- ▶ Marking information on the packaging



Manufacturers and importers who want to register in part 3

SASO 2902 Valid/expired Certificate

Manufacturers and importers can obtain SASO 2927 Certificates without additional cost taking into account additional requirements and can be renewed after the certificate is expired.

We accept the registration of lighting products (LED) that have not been completed the survival factor and lumen maintenance test at 2,000 hours until 31/12/2020 AD

To accept applications, the applicant must provide the following evidence:

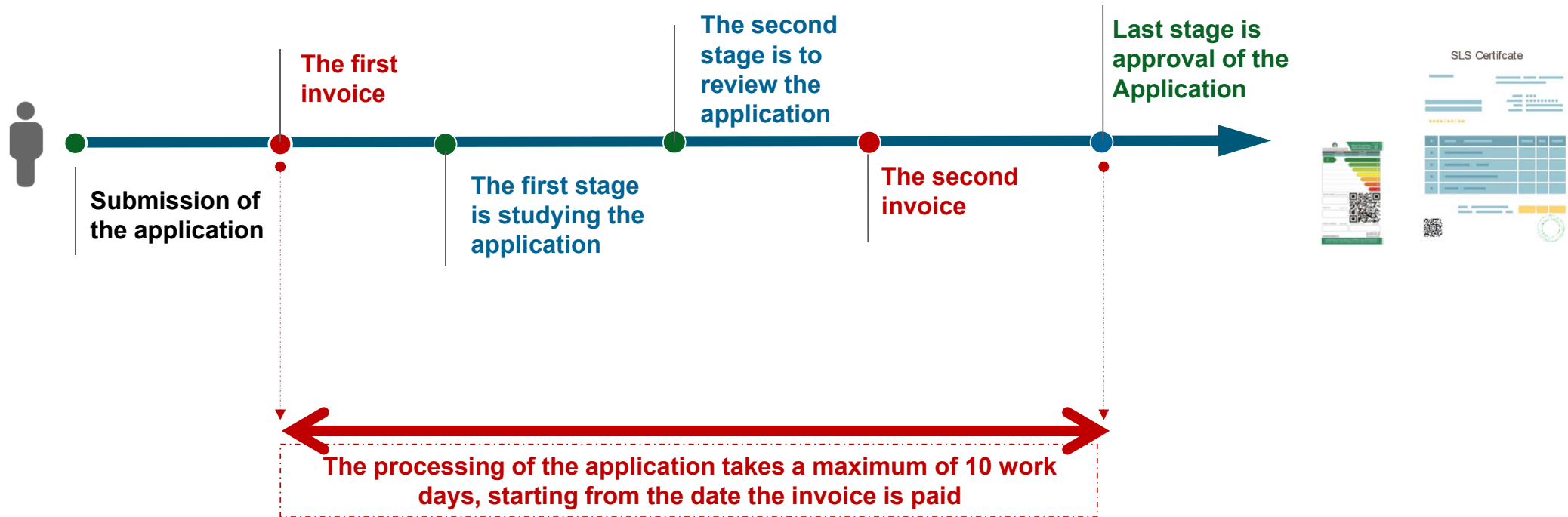
- Undertaking from the manufacturer that they will perform the test and submit the final test report to the system within 30 days from the completion of the test
- Document from 3rd party laboratory confirming receipt of samples and indicating starting and ending date of the test

In case of failure to submit (final test report within 30 days, legal procedures will be taken)

survival factor and lumen maintenance test at 2,000 hours



Stages of obtaining the label and certificate



SLS registration fees

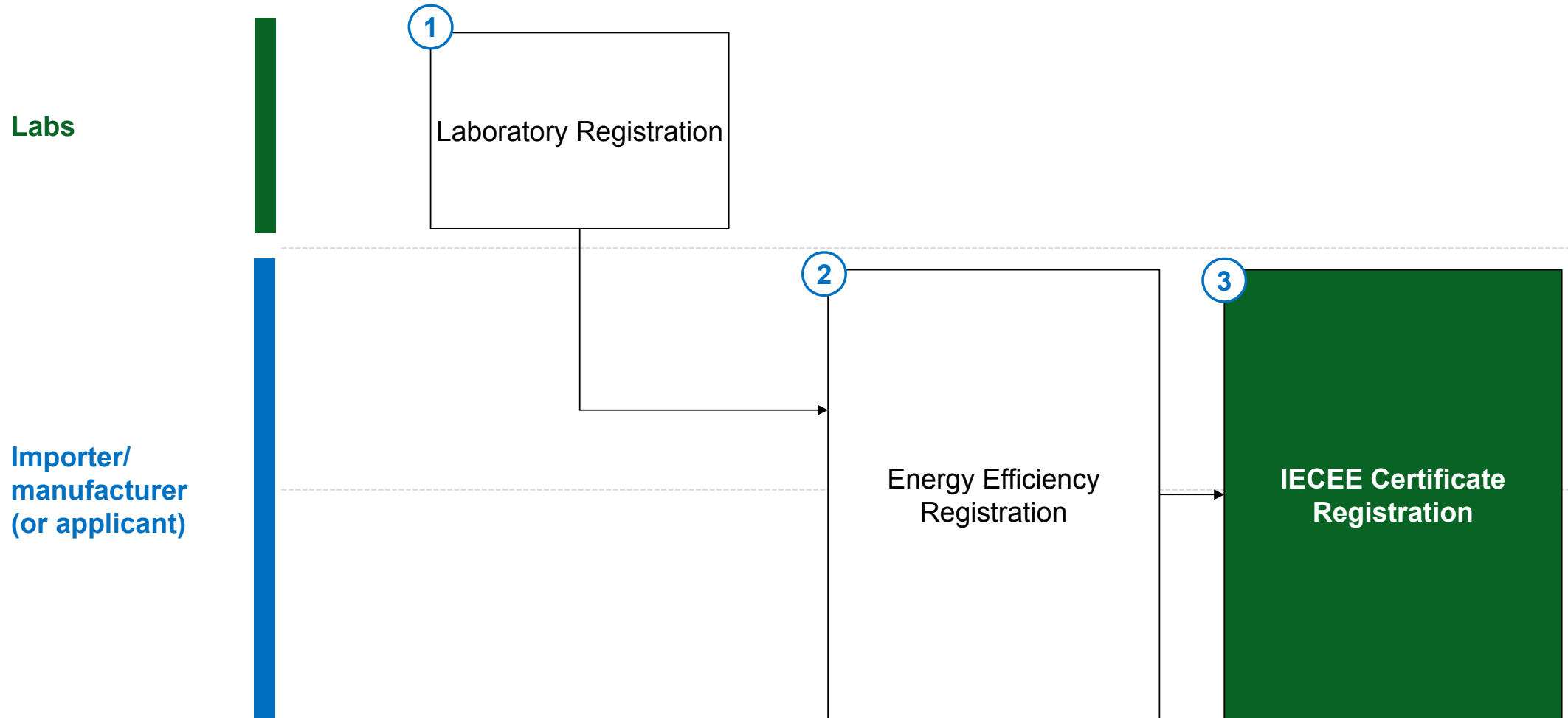
The first Invoice

Item	Cost (SAR)
Request and verification cost	1500

The second Invoice

EE level	Certificate and label cost (SAR)
أ	Free
ب	500
ج	1000
د	1500
هـ	
و	
ز	

Lighting Products Registration Requirement (Part 3)



IECEE certificate introduction

Definition

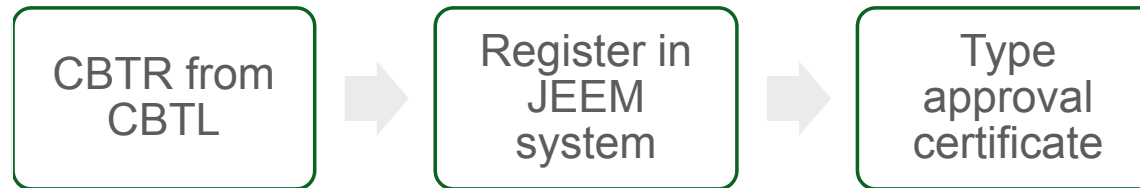
- IECEE, the IEC System for Conformity Assessment Schemes for Electrotechnical Equipment and Components. Its Members use the principle of mutual recognition (reciprocal acceptance) of test results to obtain certification or approval at national levels around the world.
- The IECEE Schemes address the safety, quality, efficiency and overall performance of components.

Scope of implementation

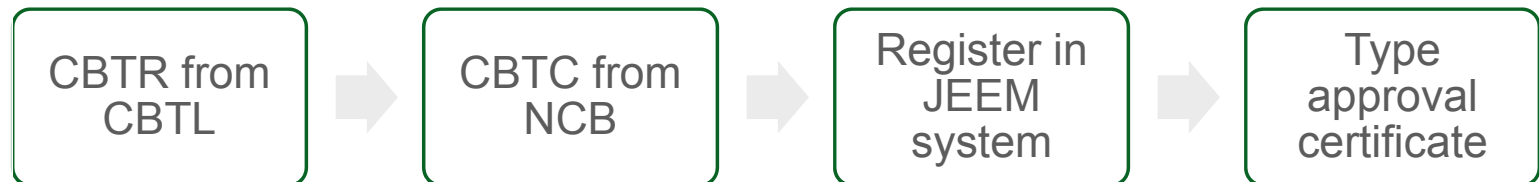
- IECEE is mandatory for all lighting products
- Label and energy efficiency certification are required for the IECEE certificate for:
 - Lighting part I (SASO 2870:2018)
 - Lighting part II (SASO 2902:2018)
 - Lighting Part III (SASO 2927:2019)

IECEE certificate procedure

IECEE Certificate for Local Manufacturer Program



IECEE Recognition Certificate Program



IECEE certificate

**JEEM
website**

**Requirements
for IECEE**

jeem1.saso.gov.sa

- CBTC issued by NCB
- Test report (CBTR) issued by CBTL
- Energy Efficiency Certificate (if EER is required)
- Rating label photo on product and adaptor along with plug photo
- Product Photos & Measurement (if not provided in the CBTR)
- Industrial license (if the applicant is a Manufacturer)
- Commercial license
- Form of Undertaking & Acknowledgement the Importer (Declaration of Conformity from Manufacturer) (will be provided)
- Form of Undertaking & Acknowledgement the Importer (Declaration of Conformity from Importer) (will be provided)
- User manual in Arabic (if applicable)



IECEE certificate registration fees

Item	Cost (SAR)
Submit the application	500
Review and study the application	2500
Finalize the certificate	500
Total	3500

Thank you

