

ET SAEBIT TECH INC.
THERMAL MANAGEMENT SYSTEMS
INTRODUCTION



ET GROUP
Eternal Treasure Group



*“The best way
to predict the future is
to create it”*

Peter Drucker

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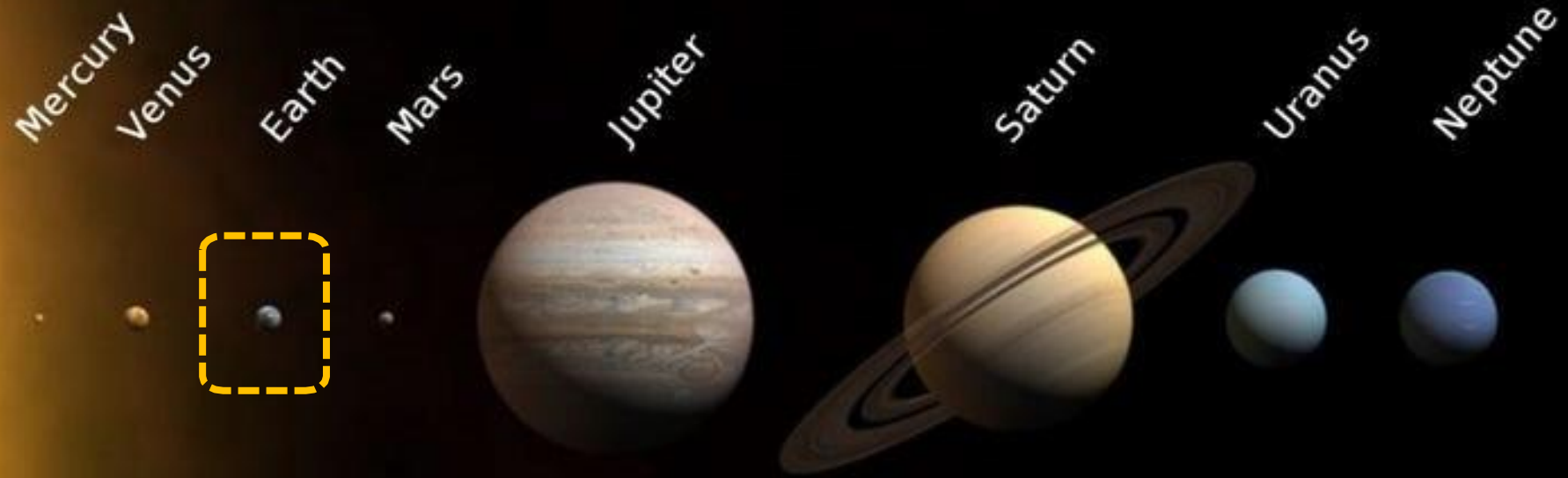
ET SAEBIT Thermal Management Core Competencies

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Thermal Management System for Vehicles

The most complete thermal management system



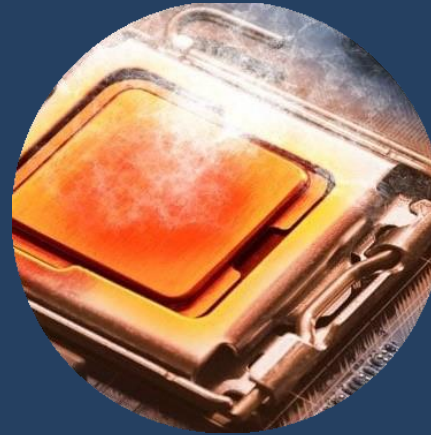
"If the distance between the sun and the earth gets a little closer, the ice in the polar regions will disappear and everyone will burn to death. If the distance between the sun and the earth is a little farther away, it will be cold and everyone will freeze to death."

"NASA Solar System Exploration, 2022"



Left: Nikola Tesla / Photo: Napoleon Sarony via Wikimedia Commons; Right: Thomas Edison / Photo: Louis Bachrach via Wikimedia Commons

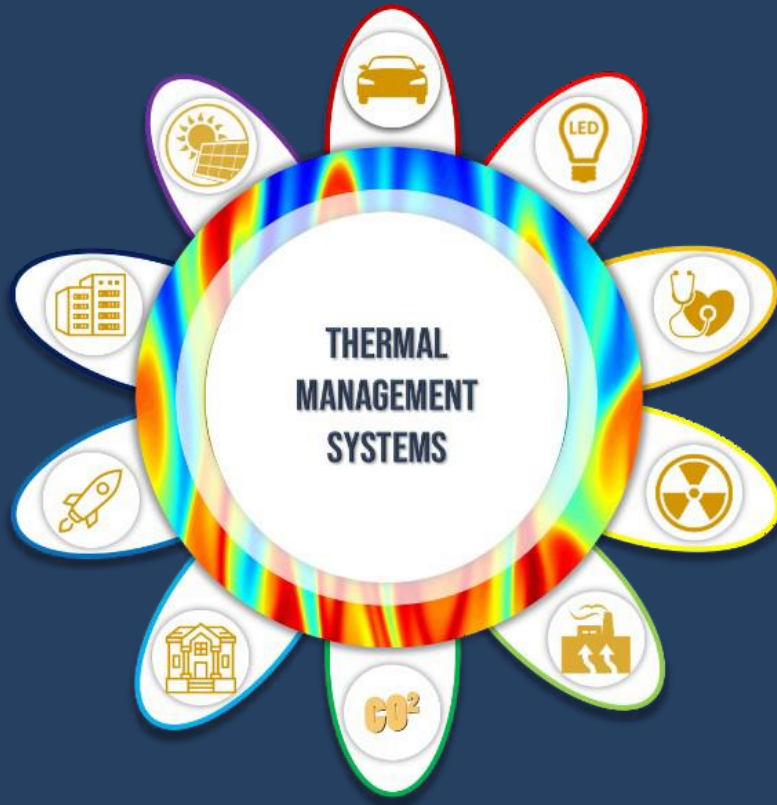
Nikola Tesla (genius scientist) and Thomas Edison (genius inventor), the invention of these two people made electricity change the history of mankind most dramatically. Electricity is essential to the extent that modern civilization would collapse soon without electricity. Electricity is a means of survival for brightening dark places, keeping out cold or hot, and storing food. The invention of electricity and electronics, computers, communication, and the Internet changed the history of mankind, and artificial intelligence is currently developing rapidly to the extent that it is applied to almost all industries, cultures, and lives.



But

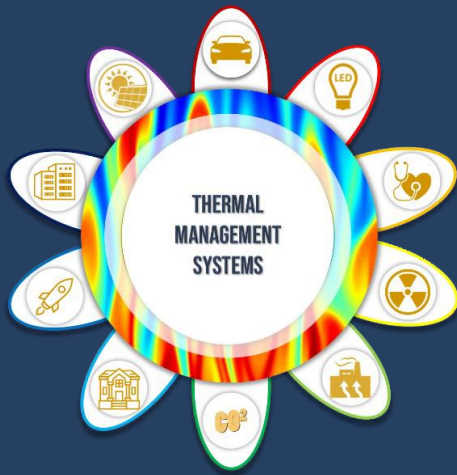
The field of 'thermal management' is a field that is absolutely necessary for most science and technology that is rapidly developing, but has not reached the speed of development yet. 'Thermal management' is essential for a means of survival that brightens a dark place, prevents cold or heat, and stores food. 'Thermal management' is essential in all areas of computers, communications, and the Internet, and is essential in almost all industries, cultures, and lives, including autonomous driving and artificial intelligence. 'Thermal management' is an important topic directly related to human life and safety, and also a very important solution to environmental problems. The development of 'thermal management' means the development of safety that protects human life along with the development of science and technology.

THERMAL MANAGEMENT SYSTEMS

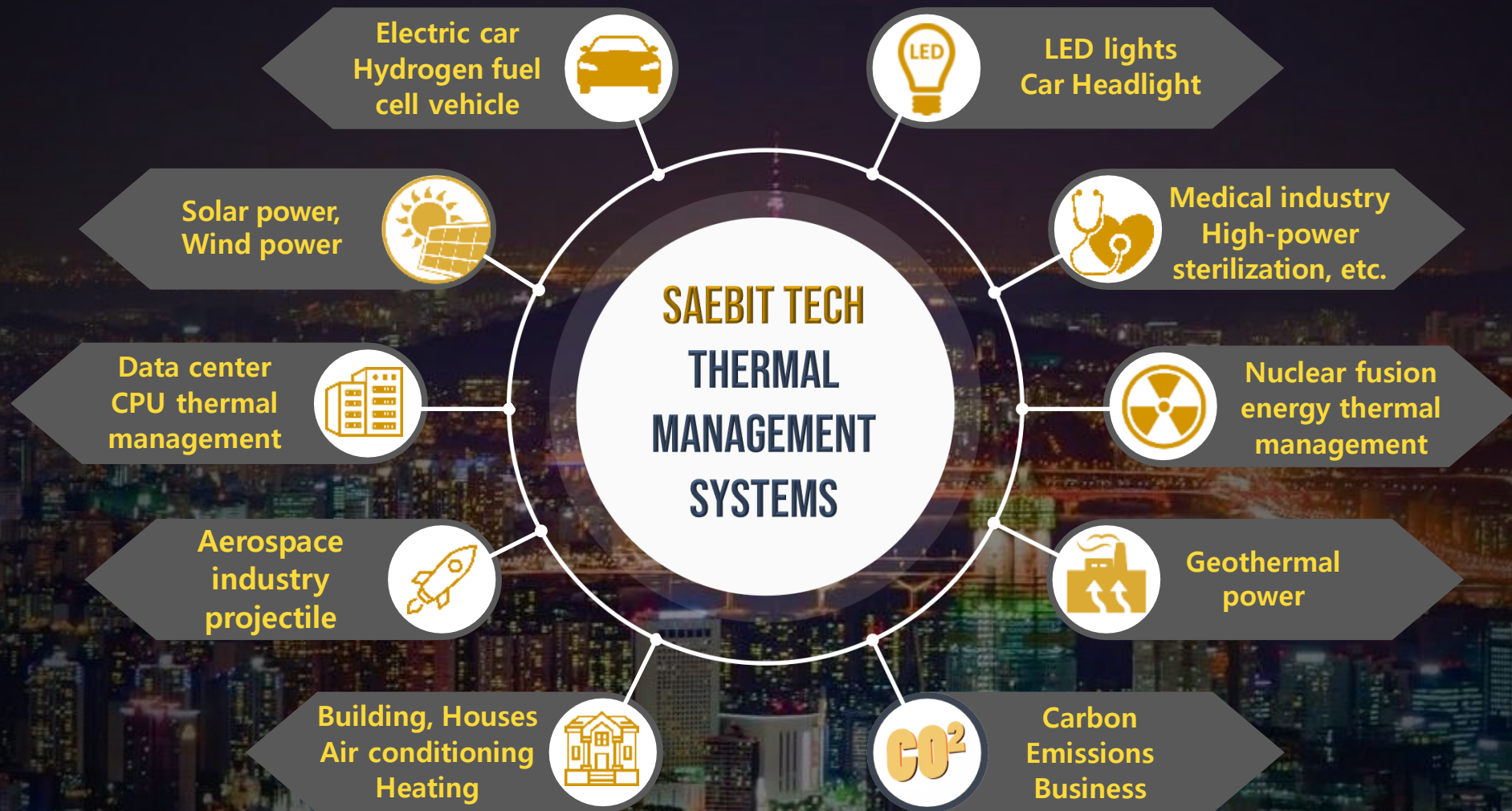


- Thermal management technology is essential in most industrial areas in the 4th industrial era, but it is a technology area that is very underdeveloped compared to the level of breakthrough in other technology areas such as IT.
- In the case of automobiles, which are a collection of high-tech industrial technologies, artificial intelligence robots drive, but a water-cooled cooling method in which water is rotated and cooled is used as a heat control method such as an engine, motor, and battery generated during operation.
- About 10 methods are used for thermal management, such as water-cooled cooling, heat conduction modules, and surface treatment. However, the most efficient and economical heat dissipation technology is the thermal management method using heat pipes.

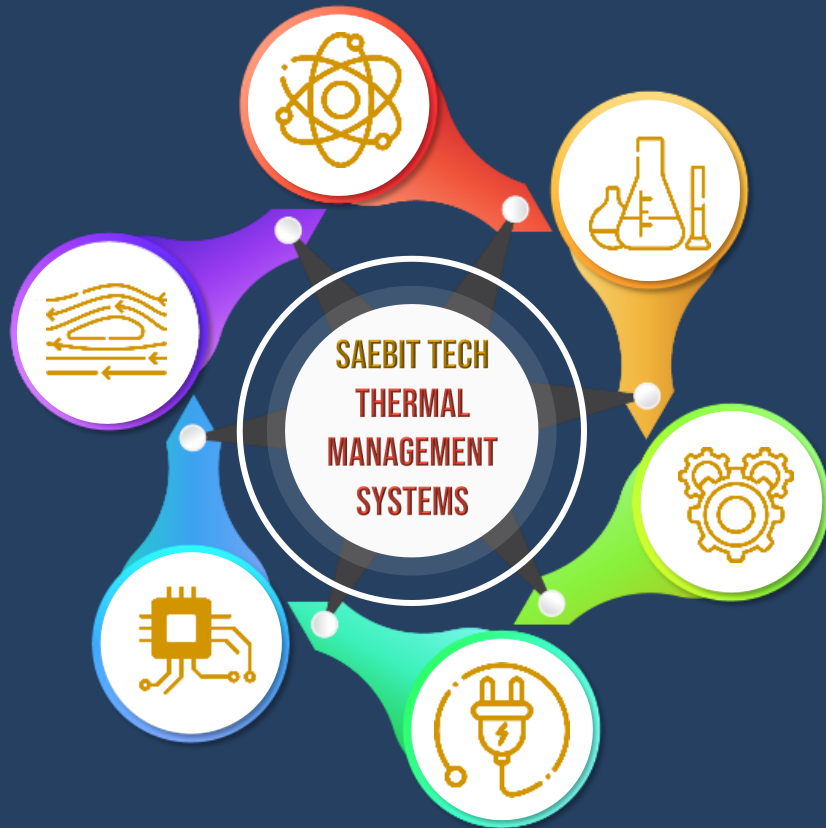
THERMAL MANAGEMENT SYSTEMS



- However, thermal management technology is not only made using heat pipes, but is the highest level of convergence technology in which scientific technologies in various fields are converged and combined.
- In addition, although the theory of heat pipe manufacturing technology has been established, it is not possible to achieve the three key elements of heat pipe, which are **Stability, Economic Feasibility, and Mass Productivity**, due to the lack of manufacturing technology and application technology in the commercialization stage.
- Currently, a heat pipe in which water is added to a copper pipe is used as a high technology, and is at a very low level compared to the level of technological development in other fields.
- The **ET SAEBIT Thermal Management System** is developed with its own technology and produces **ET SAEBIT Heat Pipes** that have obtained invention patents in the United States, Japan, and China.



Core competencies



Images by Freepik

- Most of the new products that require advanced technology in the digital industry absolutely require thermal management technology.
- In general, other companies target one or two fields of thermal management (eg car battery field, LED lighting field, etc.), but ET SAEBIT Thermal Management System has technology that can be applied to most industrial fields that require thermal management.
- The ET SAEBIT Thermal Management System is the highest level of high-tech technology achieved through the convergence of technologies such as physics, chemistry, mechanics, electricity, electronic material engineering, and aerodynamics.

Core competencies



- **New Product**

ET SAEBIT Thermal Management System has the world's best thermal management technology and is currently producing the world's only products in the field of industrial lighting. Possess the ability to develop new products at any time if needed in a new field.

- **Price**

The core technology is a 100% self-reliant technology that independently solves the development and production of products and has no dependence, so it can set prices stably.

- **Market Share**

ET Sabit thermal management system, ET Sabit heat pipe, street light, search light, heater, etc. There is no competitor in the same level of quality in the global market, so exclusive supply is possible.

- **Scalability & Cycle**

In general, repurchase inevitable occurs every five years, which greatly increases demand. It is difficult to develop alternative products, and the life cycle is long.



ET SAEBIT TECH

Background

1

ET SAEBIT Tech's convergence thermal management system is a **100% independent and self-supporting technology**.

In-house production of vacuum and inspection equipment, which are essential equipment for production

2

We have perfect thermal management technology in the most vulnerable technology field in the 4th industry..

3

Technology and quality certified in the international market, such as **winning the Korea Excellent Patent Award and registering invention patents in the United States, China, and Japan**

4

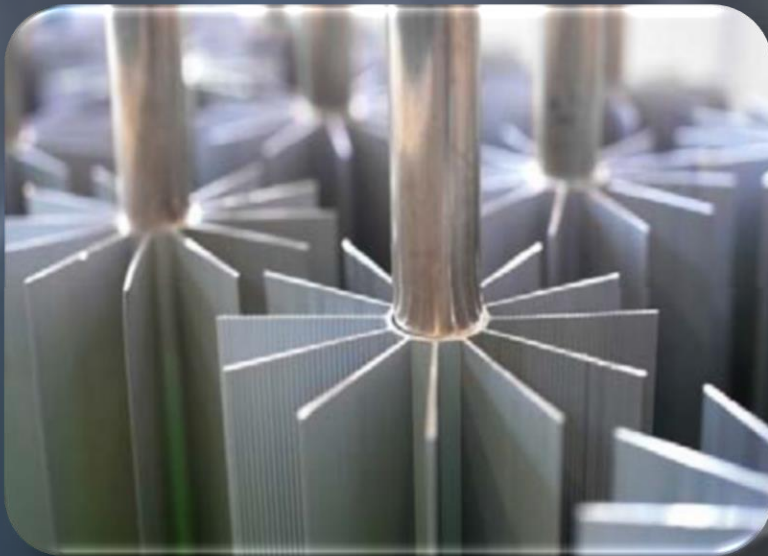
Production of the world's highest quality heat pipe Perfectly equipped with the three important factors of **economy, safety, and productivity**

5

It has the best thermal management technology and advanced product development capabilities that no other company in the world has.

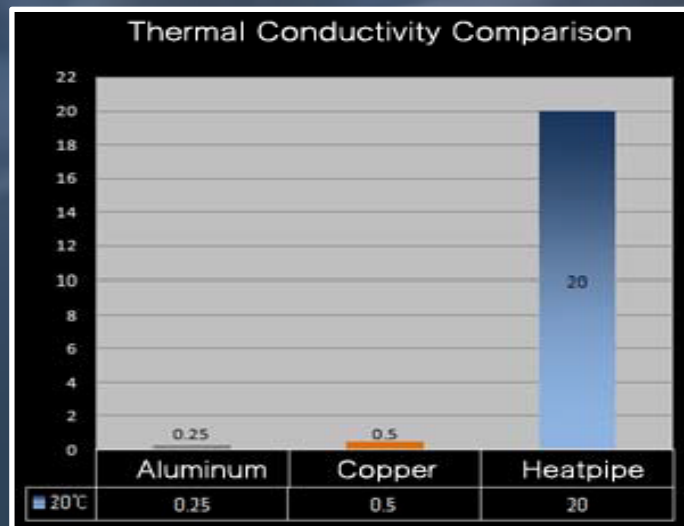


ET SAEBIT HEAT PIPE



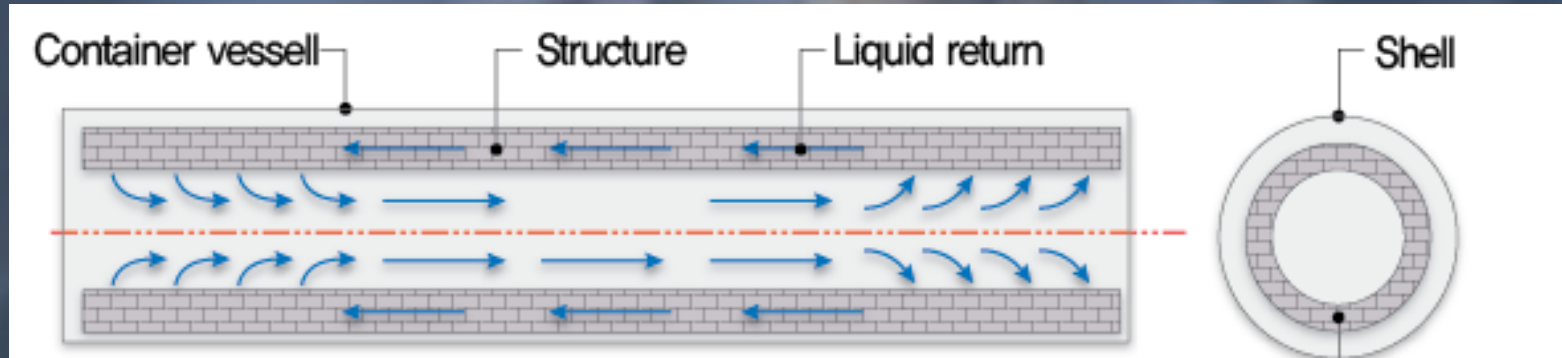


ET SAEBIT HEAT PIPE



ET SAEBIT heat pipe is a realization of technology that transfers heat in real time (3m/sec).

**About 500 times more than platinum,
About 1,300 times more than copper,
About 2,000 times higher thermal conductivity than
general hot water pipes.**



Production of the world's best heat pipe with technology for introducing a special medium to maximize Brownian motion and heat conduction in a vacuum state of 1/1,000mmHg, and precise drawing know-how using volume ratio based on quantitative calculation.

Heat dissipation Brownian motion occurs in devices such as LED only when an accurate volume ratio and 5 types of medium are frozen and drawn in.



ET SAEBIT EQUIPMENTS





ET SAEBIT Heat pipe Production Vacuum Equipment

General vacuums have no choice but to produce one part at a time, which reduces production efficiency and makes it impossible to work in a closed room due to the gas generated during vacuum, so the outlet must be connected to the outside. Difficulty working on upper floors due to vibration and noise.

ET SAEBIT Vacuum (Self-designed equipment)

1. 4 parts can be produced at the same time (mass production is possible and parts can be supplied at low prices)
 2. 2. No gas generated in vacuum (can work even in a closed indoor environment)
 3. 3. Minimize vibration or noise generated during vacuum
 4. 4. Possible to produce various types of parts at the same time by replacing the jig
 5. 5. No risk of corrosion by using 100% stainless steel and aluminum
-

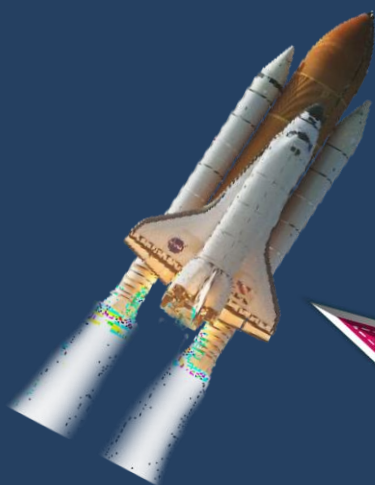


ET SAEBIT Heat Pipe Inspector

In the vacuum heat pipe, vacuum is lost even with a very small gap, and the inherent function of the vacuum heat pipe is lost and a fatal problem may occur. However, it is currently not easy to check the status of most vacuum heat pipe products upon shipment. In addition, it is unproductive and uneconomical because it takes a lot of time and money to inspect the entire quantity in case of mass supply.

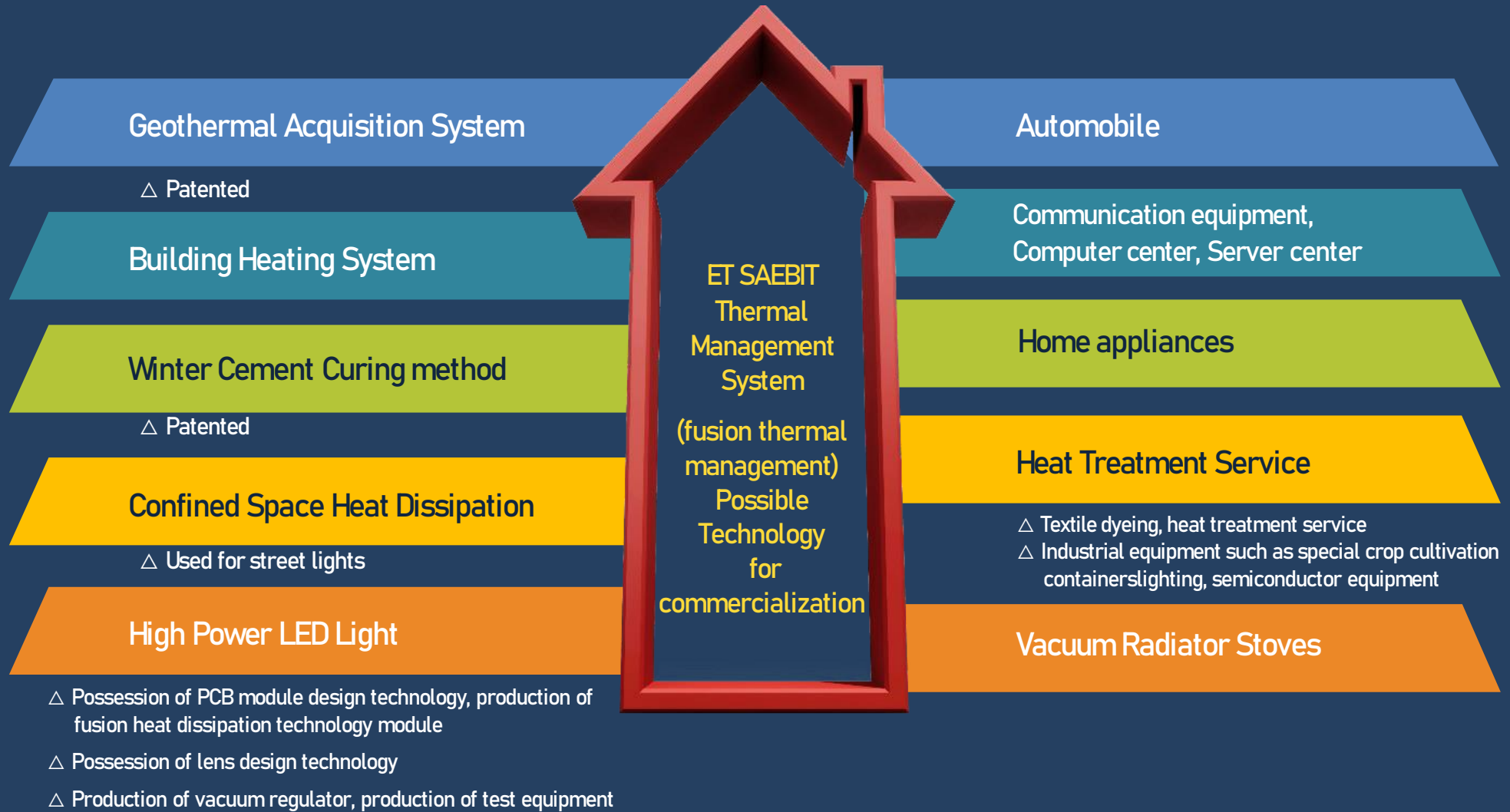
ET Sabit High Temperature Vacuum Heat Pipe Inspector (Self-designed equipment)

1. 10 parts can be inspected at the same time (if necessary, more than 10 parts can be inspected at the same time)
 2. 100% defects can be checked before parts are shipped through high-temperature overload test.
 3. Quick time and low cost, 100% inspection possible
-



Until now, most of the application fields of heat pipe technology have been applied only to the electric and electronic industries, but ET SAEBIT heat pipes and ET SAEBIT Thermal Management Systems have been applied to the electric and electronic industries, the aerospace industry, the transportation industry such as electric vehicles and hydrogen cars, the industrial heat exchanger industry, and the solar thermal system. It can be applied and applied to all geothermal power generation industries, etc..





Differentiation

80% global market share of global top 3 heat pipe manufacturers

Basic material of heat pipe of 3 companies: Copper

ET SAEBIT heat pipe thermal conductivity:

500 times than platinum. 1,300 times than copper

 AVID
THERMACORE

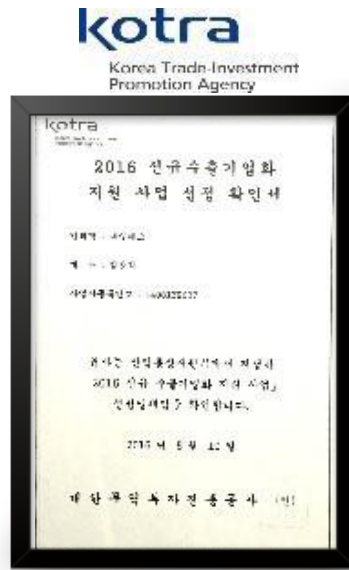


 FURUKAWA
ELECTRIC GROUP



 Fujikura

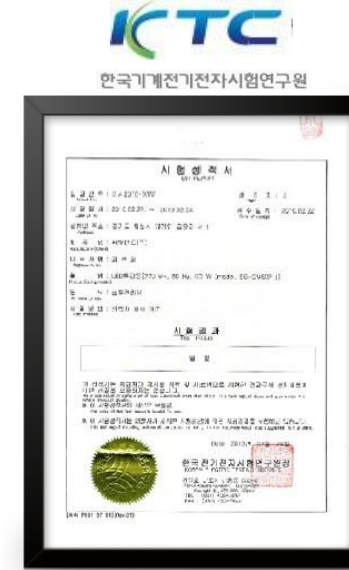




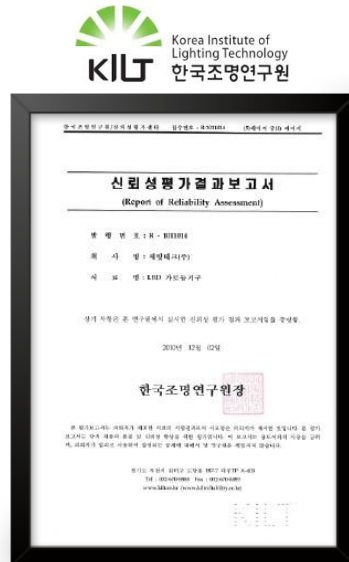
코트라 수출 기업화 지원 사업 선정



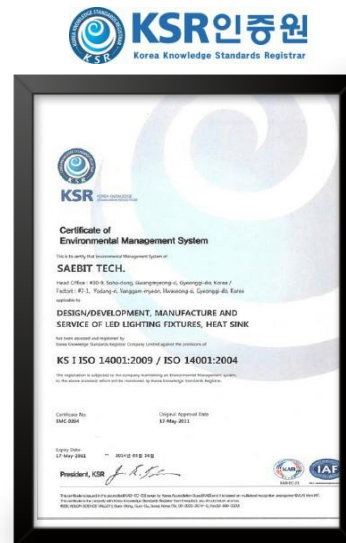
Korea Excellent Patent Award



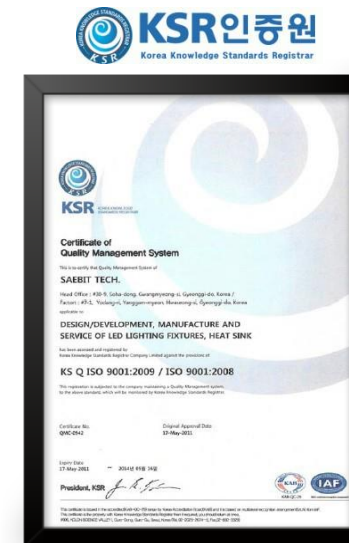
KTC 시험성적서



한국 조명 연구원 신뢰성 평가



ISO 14001

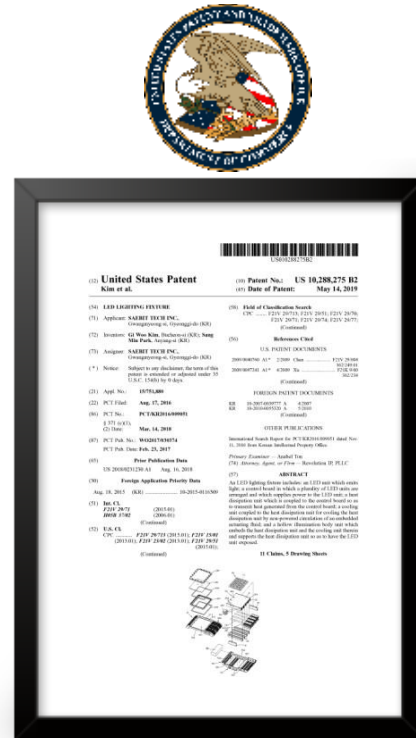


ISO 9001

Patents and Certifications



US patent



GERMAN CERT ISO 9001, 14001



Patents and Certifications



Chinese patent



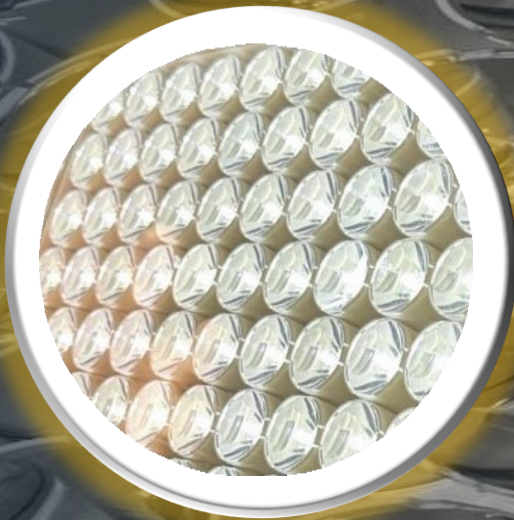
Japanese patent

Patents and Certifications





ET SAEBIT LED LIGHTS





ET SAEBIT LED LIGHTS

1

The world's only LED LIGHTS with energy efficiency of **94 lumens per 1W**

2

The world's first ultra-vacuum heat pipe heat dissipation technology

3

Preventing the temperature rise of the heat sink by Brownian motion (non-powered)

Realization of the world's best performance and quality by applying the ET SAEBIT heat pipe technology (the world's only specially manufactured expansion equipment, 700kg/cm² pressure)

4

ET SAEBIT LED outdoor lights(street lights, security lights, flood lights, port lights, factory lights).

80% lower power consumption than incandescent lamps and 30% lower power consumption than fluorescent lamps

5

The world's brightest and lightest LED light for the same electricity consumption
Low price competitiveness compared to other products



New Technology	High power industrial LED lighting				New Market/ Replacement Market
	Street Lamp	Search Light	High ceiling lights, tunnel lights	Car Headlight	
▷ 100% independent technology ▷ Korea Excellent Patent Award ▷ The world's highest quality heat pipe ▷ Equipment, optical technology Thermal management technology used ▷ Physics, chemistry, mechanics, etc. Convergence Science Thermal Management Technology	▷ Recognition of quality and technology in the international market ▷ No. 1 in technology competition with over 600 companies worldwide ▷ Minimum Power Consumption: ET SAEBIT: 110w Third party: 150w ▷ Demonstration of excellent quality through pilot operation for more than 4 years	▷ 1KM visibility with 300W ▷ Registered finished product invention patent in the United States ▷ The world's only product ▷ Optimization complete 7.5w : 10w LED chip ▷ Smallest, lightest ▷ Field test for 3 years (USA, Canada, etc.) ▷ Excellent quality certification	▷ A/C Direct chip ▷ No converter replacement required ▷ 150m, 200W, 300W ▷ Commercialized the world's first 150W or higher high ceiling light ▷ Tunnel lights ▷ A/C Direct chip	▷ World's first 42W production (Required quality: 36W) ▷ Current use quality: 30W(Benz, BMW, etc.) ▷ Replacing metal lights with LEDs ▷ Demand: 2 per car ▷ Required quality 36W ▷ No supplier	▷ Industrial LED lights ▷ Suspension of supply due to short lifespan of LED lights (World market trend) ▷ Replace every 3 to 5 years ▷ High market penetration with high price competitiveness

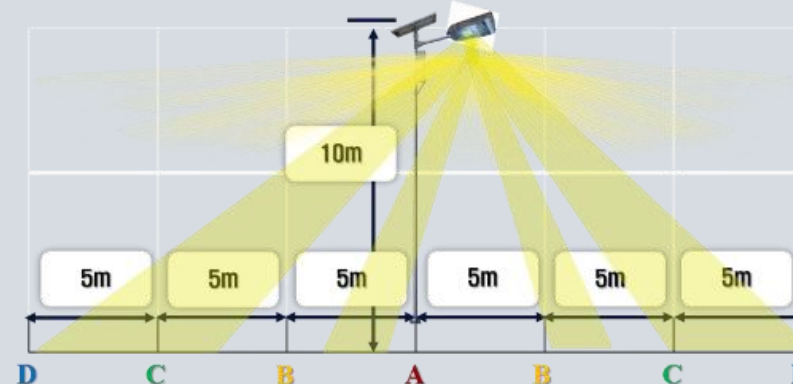


ET SAEBIT LED LIGHTS

- ET SAEBIT LED 120W street light: realization of over 50 Lux direct illumination.
- Securing more than 80% of direct sunlight within 15m from the installation site.
- There is no dark spot in the 30m area where the lighting is installed.

Minimum power consumption:
ET SAEBIT: 110w (other companies: 150w)

Point A	50 Lux
Point B	46 Lux
Point C	43 Lux
Point D	40 Lux





ET SAEBIT LED LIGHTS

	ET SAEBIT LED	metal lamp	sodium lamp	electrodeless lamp
Usage	No usage restrictions	Commercial, building, parking lot	sparsely populated area	indoor, underpass
(lm/W)	95	68	100	70
Market	30W ~1,000W	100W ~ 250W	70W ~ 250W	40W ~ 165W
Sources of electricity	LED Driver/SMPS	high pressure sodium ballast	metal halide ballast	Non-electrode exclusive stabilizer
Colors	Soft color (5500k~6000k)	cold and pale	single yellow poor color rendering	Natural color
Maintain light intensity	little change	degraded	degraded	degraded
Lamp heat	60°C (Room temp.+25°C)	300~400°C	300~400°C	80~90°C
Fire/explosion	no risk	risk of explosion	risk of explosion	risk of explosion
eco	friendly	harmful gas	hazardous waste	harmful gas
mercury content	doesn't exist	30 mg or less	30 mg or less	5 mg or less
electric shock	doesn't exist	risk of discharge	risk of discharge	risk of discharge
operating	immediately	need time	need time	need time



ET SAEBIT LED LIGHTS



- Thailand Power Authority (PEA) street light bidding test
 - Approximately 600 companies participated (GE, Philips, Osram, Kumho Electric, etc.)
- ET SAEBIT Tech is the only one to acquire EXCELLENT grade 1st place in participating product test
 - ※ 2 years Field Test

PEA ENCOM International

เลขที่ ENCOM 1069 /2554 วันที่ 21 ส.ค. 2554

เรื่อง ผลการทดสอบโคมไฟถนนหลอด LED

เรียน ผู้จัดการบริษัท ซี.อี.ที. อินเทอร์เน็ต จำกัด

สิ่งที่ส่งมาด้วย สำเนารายงานผลการทดสอบโคมไฟถนนหลอด LED ของสำนักงานคณะกรรมการวิทยาศาสตร์และเทคโนโลยีแห่งชาติ (สวทช.) กระทรวงวิทยาศาสตร์และเทคโนโลยี เลขที่ STRG/54765 ลงวันที่ 17 ตุลาคม 2554 จำนวน 6 หน้า

ตามที่ บริษัท ซี.อี.ที. อินเทอร์เน็ต จำกัด ได้จัดซื้อโคมไฟถนนหลอด LED รุ่น SBTLED 105W ให้บริษัท ซี.อี.ที. อินเทอร์เน็ต จำกัด ใช้ในการทดสอบโคมไฟถนนหลอด LED ที่บริษัท ซี.อี.ที. อินเทอร์เน็ต จำกัด ได้ประกาศเชิญชวนผู้ผลิตหรือผู้จำหน่ายโคมไฟถนนหลอด LED ส่งคุณสมบัติของโคมไฟถนนหลอด LED นั้น

บริษัท ซี.อี.ที. อินเทอร์เน็ต จำกัด ได้ร่วมกับสำนักงานคณะกรรมการวิทยาศาสตร์และเทคโนโลยีแห่งชาติ (สวทช.) กระทรวงวิทยาศาสตร์และเทคโนโลยี ในการทดสอบโคมไฟถนนหลอด LED ที่บริษัท ซี.อี.ที. อินเทอร์เน็ต จำกัด ได้ประกาศเชิญชวนผู้ผลิตหรือผู้จำหน่ายโคมไฟถนนหลอด LED ส่งคุณสมบัติของโคมไฟถนนหลอด LED นั้น

1. ทดสอบคุณสมบัติในวันที่ 7 ตุลาคม 2554 ณ บริเวณถนนพหลโยธิน-ลาดพร้าว กม. ที่ 17/300

2. คุณสมบัติโคมไฟถนนหลอด LED ที่ผ่านและค่าความสว่างที่ได้ออกมา

Illuminance on Roadway		Electrical Characteristics @ 230V±10%	
Average Illuminance (E_{avg} Lux) Group 1	≥ 21.5	Power (W)	≤ 110
Average Illuminance (E_{avg} Lux) Group 2	≥ 15	Power Factor	≥ 0.9
Minimum/Average (E_{min}/E_{avg})	≥ 0.4	THD (%)	≤ 15 %
Minimum/Maximum (E_{min}/E_{max})	≥ 0.167		

Details of Luminaire Installation: Pole Distance 40 m, Mounting Height 10 m, Width of Road 8 m

Illuminance on Roadway		Electrical Characteristics @ 230V±10%	
Average Illuminance (E_{avg} Lux) Group 1	22.15	Power (W)	109.5 - 109.8
Average Illuminance (E_{avg} Lux) Group 2	-	Power Factor	0.956 - 0.976 leading
Minimum/Average (E_{min}/E_{avg})	0.41	THD (%)	12.6 - 14.1
Minimum/Maximum (E_{min}/E_{max})	0.19		

หมายเหตุ : คุณสมบัติโคมไฟถนนหลอด LED ที่ผ่านการทดสอบในข้อนี้

จึงเรียนมาเพื่อโปรดทราบ

ลงชื่อ..... (นาย).....

ตำแหน่ง.....

PEA ENCOM INTERNATIONAL CO., LTD.
200 Ngimwongwong Road, Chokchai, Bangkok 10900 Thailand
Telephone : (662) 590-9404 Fax : (662) 590-9405



ET SAEBIT LED LIGHTS



300W visual distance 1km

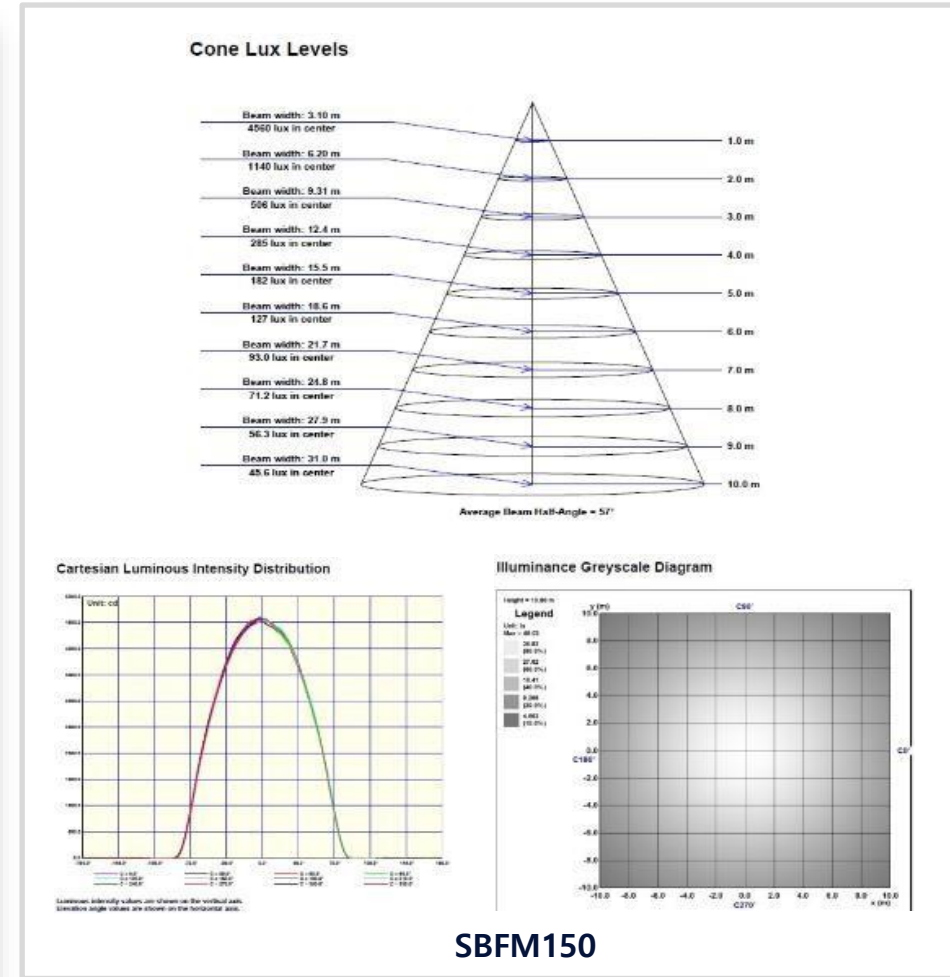
Complete Thermal
Management System

The surface of the high power
floodlight is not hot to touch
(No risk of fire or burns)



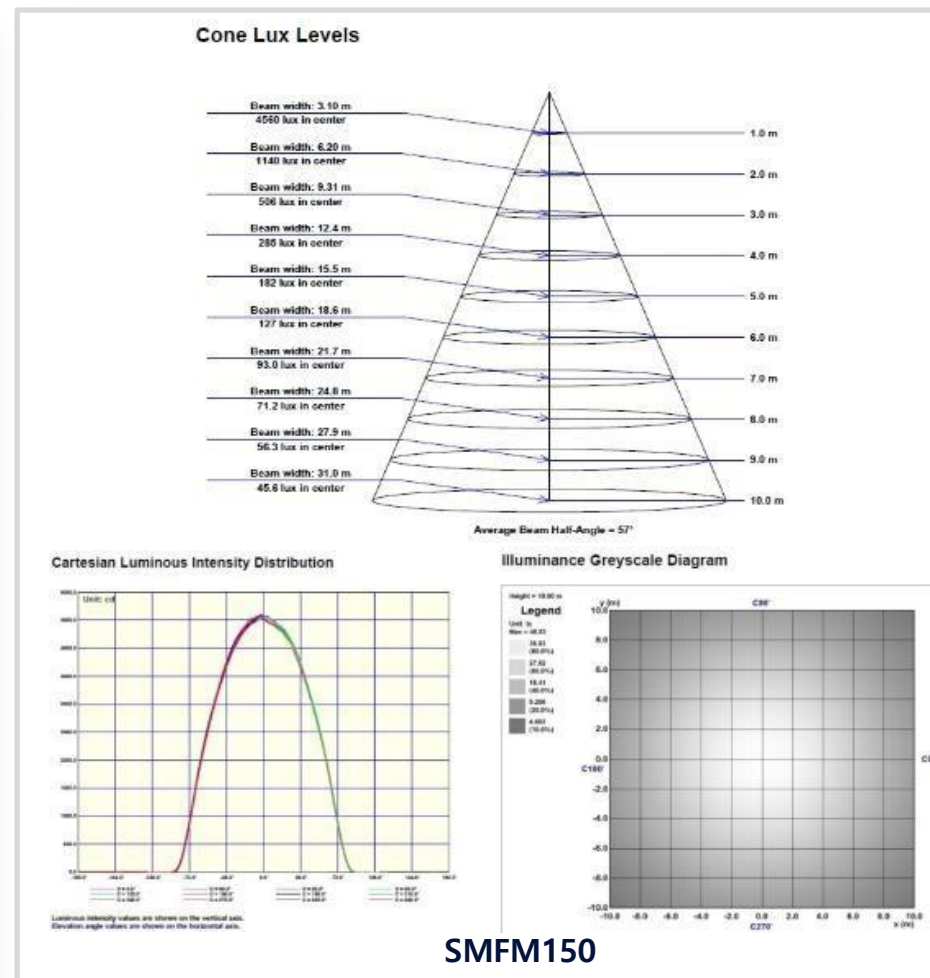
Flood Light (SMPS)

NO.	High Bay Flood Light (SMPS TYPE)		
	Model	SBFM200	SBFM300
1	Voltage	AC220V / 60Hz	AC220V / 60Hz
2	Power Consumption	200W	300W
3	Power Factor	0.9<	
4	Type of stabilizer	SMPS (IP 67)	
5	Dimming	X	
6	Manufacturer of light source	CREE XM-L2	
7	Total luminous flux(Lumen)	23,000	29,800
8	Luminous efficacy (lm/w)	115	99
9	Color temperature (K)	5,200 ~ 5,700	5,200 ~ 5,700
10	CRT	80<	80<
11	Illuminance (lux)		
12	Life time	+3year	
13	Operation Temperature	50℃ ~ 60℃	
14	Size	Ø300 x 250	
15	Angle of light distribution	115° / 60° / 40° / 20°	
16	weight	4.7kg (Exclude SMPS)	
17	Certification	KC, KS (SMPS)	KC, KS (SMPS)



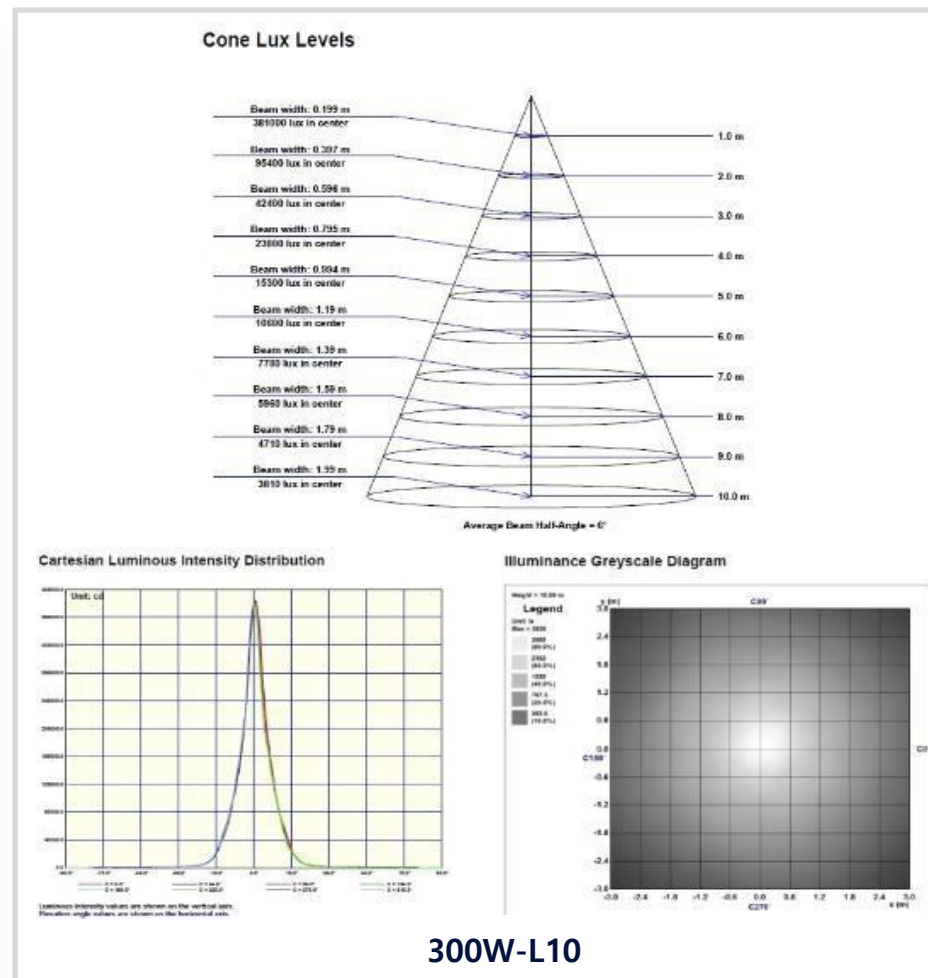
High Bay Flood Light (A/C Direct Type)

NO.	High Bay Flood Light (AC DIRECT TYPE)		
	Model	SBFM100	SBFM150
1	Voltage	AC220V / 60Hz	AC220V / 60Hz
2	Power Consumption	100W	150W
3	Power Factor	0.9<	
4	Type of stabilizer	A/C Direct Type	
5	Dimming	Triac Dimming	
6	Manufacturer of light source	LG innotek (Power LED)	
7	Total luminous flux(Lumen)	10,398	13,796
8	Luminous efficacy (lm/w)	104.50	89.70
9	CCT	5,571	6,010
10	CRT	83.5	84
11	Illuminance (lux)	11,500/1m(45°)	
12	Life time	+3year	
13	Operation Temperature	50℃ ~ 60℃	
14	Size	Ø300 x 250	
15	Angle of light distribution	115° / 65° / 45°	
16	weight	4.8kg	
17	Certification	KC , 고효율	KC



Search, Sports, Golf Etc. Light

NO.	Search, Sports, Golf Etc. Light			
	Model	300W-Lxx	400-Lxx	500W-Lxx
1	Voltage	AC220V / 60Hz	AC220V / 60Hz	AC220V / 60Hz
2	Power Consumption	300W	400W	500W
3	Power Factor	0.9<		
4	Type of stabilizer	SMPS (IP 67)	SMPS (IP 65)	SMPS (IP 65)
5	Dimming	X		
6	Manufacturer of light source	CREE XM-L2		
7	Total luminous flux (Lumen)	35,759	44,000	51,500
8	Luminous efficacy (lm/w)	117.5	110	103
9	Color temperature (K)	5,200 ~ 5,700	5,200 ~ 5,700	5,200 ~ 5,700
10	CRT	80<	80<	80<
11	Illuminance (lux)	381,000 /1m(10°)	470,000	550,000
12	Life time	+3year		
13	Operation Temperature	50℃ ~ 60℃		
14	Size	310 x 480 x 140		
15	Angle of light distribution	115° / 60° / 40° / 20° / 10°		
16	weight	7.3kg (Exclude SMPS)		
17	Certification	KC, KS (SMPS)	UL, CE (SMPS)	UL, CE (SMPS)





ET SAEBIT HEAD lights





ET SAEBIT HEAD lights

1

World's first 42w production
(required quality: 36W)
Current use quality: 30w
(Benz, BMW, etc.)

2

Resolving the heat dissipation/condensation problem, which is the biggest problem of automobile and motorcycle headlamps
(Accredited certification authority analysis/verification completed)

3

Simplification of installation (replacement)
- Securing the space inside the lamp and bonnet (removing internal interference)

4

Miniaturization of installation (replacement)
- Various designs can be applied

5

Required quality 36W - **No supplier**
High price competitiveness as there is no available product

Comprehensive Automotive Thermal Management System

	Current situation	ET SAEBIT Thermal Management System
hydrogen fuel generator	There are many hydrogen fuel generator manufacturers, but it is difficult to commercialize them due to insufficient thermal management technology.	The best way to solve the root problem is to introduce a perfect thermal management system. Hydrogen vehicles can be produced at low cost, and thermal management is economically feasible and has a safe solution. Possession of technology that can secure safety by integrating and managing heat generated from hydrogen fuel generators, electric batteries, control boxes, etc., and reduce manufacturing costs by reducing weight and size.
electric battery	If perfect thermal management technology is applied, the size and weight can be significantly reduced. The biggest problems are fire, explosion, charge/discharge time and lifetime.	
electric charger	High-speed charging is difficult due to insufficient thermal management technology during charging. Need to increase mileage by increasing charging amount (70% charging needs to be increased by 90% or more)	
AI autonomous driving	Safe operation is not guaranteed due to lack of thermal management technology. Sudden acceleration, sudden heat problem when driving on a long hill	
small car, large car	In battery production, materials and parts are used more than small cars, and they are heavy and large, so the mileage is short. High production cost	
electric car	Electric vehicles using only electric batteries are difficult to completely solve problems such as size, weight, mileage, charging time, and charging method.	
hydrogen fuel cell	It is absolutely necessary to introduce a self-charging system. As a prerequisite, the size and weight of the hydrogen fuel cell should be smaller than that of conventional batteries.	
productivity	If the generated heat is not completely radiated, problems such as safety, high manufacturing cost, and convenience cannot be solved.	

“The reason why existing companies have not been able to use High Power LEDs in modern times where advanced technology has developed is that heat dissipation technology is absolutely necessary for 1W or more. This is because when the output power increases from 1W to 2W, the heat increases by a squared amount rather than simply a 1+1 concept. The fact that the heat dissipation efficiency of existing products increased by 20~30% means that the increase of 1.2~1.3W from 1W did not properly manage the heat. This means that the heat management problem can be solved only when the efficiency of heat dissipation is increased several hundred times or more than a thousand times.”

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We are partners.

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