



HEATING JACKET SYSTEM

DIRECTLY TECHNOLOGY CO., LTD.

WuXi Directly Technology CO.,LTD



Agenda

- ☐ **DTC Profile**
- ☐ **Customer installed base**
- ☐ **Product introduction**
- ☐ **Product certification**



A Brief History of DTC

- 2003 – *Founded in Hsinchu / Taiwan.*
 - 2005 – *Signed contract with Fenwal for thermocouple company.*
 - 2012 – *New Heating jacket manufacturing building open in Hsinchu.*
 - 2017 – *WUXI DIRECTLY ELECTRONIC TECHNOLOGY CO., LTD was established in April 2017.*
 - 2018 – *We obtained aerogel heating jacket patent certification*
 - 2021 – *Second Heating jacket manufacturing building open in Hsinchu.*
 - 2024 – The heating jacket factory was established in Kaohsiung
 - 2025 – Overseas subsidiaries were established in Japan and U.S
- * A new office building is planned to be established at the Hsinchu plant in 2026, covering an area of 4600 square meters (1,400 ping).*******



DTC-3



Heating jacket system installed base

Semiconductor (Taiwan)

Item	Plant	Area
1	APPLE	Taoyuan
2	台積電tsmc	FAB2
3	台積電tsmc	FAB3
4	台積電tsmc	FAB5
5	台積電tsmc	FAB6
6	台積電tsmc	FAB7
7	台積電tsmc	FAB8
8	台積電tsmc	FAB12
9	台積電tsmc	FAB14
10	台積電tsmc	FAB15
11	台積電tsmc	FAB18
12	台積電tsmc	FAB20
13	台積電tsmc	FAB22
14	力積電PSMC	P1
15	力積電PSMC	P2
16	力積電PSMC	P3
17	力積電PSMC	8A
18	力積電PSMC	8B
19	旺宏電子MXIC	FAB1
20	旺宏電子MXIC	FAB2

Item	Plant	Area
21	旺宏電子MXIC	FAB5
22	世界先進VIS	FAB2
23	華邦Winbond	FABA
24	華邦Winbond	FABB
25	華邦Winbond	FABC
26	華邦Winbond	Kaohsiung
27	華亞HWA YA(林口美光)	Taoyuan
28	瑞晶Rexchip(台中美光)	Taichung
29	聯電UMC	FAB8AB
30	聯電UMC	FAB8CD
31	聯電UMC	FAB8E
32	聯電UMC	FAB12
33	漢磊EPISIL	Hsinchu
34	宏捷AWSC	Tainan
35	穩茂Winfoundry	FABB(P1)
36	元隆電子Ampi	Hsinchu
37	精材科技XINTEC	Line A / Line C
38	合晶Waferworks	Longtan
39	愛思強Aixtron	Taoyuan
40	東京威力TEL	Hsinchu



Heating jacket system installed base

Semiconductor (China)

Item	Plant	Area
1	台積電tsmc(F10)	Shanghai
2	台積電tsmc(F16)	Nanjing
3	聯芯集成Leadcore	Xiamen
4	中芯國際SMIC	Shenzhen
5	中芯國際SMIC	Tianjin
6	中芯國際SMIC	Shanghai
7	中芯國際SMIC	Beijing
8	中芯寧波NSEMI	Ningbo
9	中芯南方SMSC	Shanghai
10	中芯京城SMBC	Beijing
11	中芯東方SMOC	Shanghai
12	中芯國際新技術SMIC	Shanghai
13	深圳潤鵬	Shenzhen
14	長鑫集成CXMT	Hefei
15	士蘭集成Silanic	Xiamen
16	武漢新芯XMCWH	Wuhan
17	英諾賽科Innoscience	Zhuhai
18	德州儀器(TI)	Chengdu
19	廣州粵芯Cansemitech	Guangzhou
20	和艦科技HJTC	Jiangsu
21	合肥晶合Nexchip	Hefei
22	英特爾Intel	Dalian

Item	Plant	Area
23	金瑞泓JRH	Ningbo/Quzhou
24	華潤微電子CR Micro	Chongqing/Shanghai
25	武漢楚興	Wuhan
26	華虹宏力	Shanghai
27	青島芯恩Sienidm	Qingdao
28	時代中車CRRC	Hunan/Yixing
29	士蘭集成Silan	Xiamen
30	晉華集成JHICC	Quanzhou
31	昇維旭SwaySure	Shenzhen
32	杭洲積海Hangzhou HFC	Hangzhou
33	杭州富芯FULLSEMI	Hangzhou
34	上海積塔GTA	Shanghai
35	北方華創NAURA	Beijing
36	長江存儲YMTC	Wuhan
37	上海新進芯微	Shanghai
38	中微AMEC	Shanghai
39	無錫微導	Beijing
40	上海至純	Shanghai
41	上海鼎泰	Shanghai
42	北電集成	Beijing



Heating jacket system installed base

Semiconductor(overseas)

Item	Plant	Area
1	台積電tsmc(F21)	USA(AZ)
2	台積電tsmc(F23)	JP(Kumamoto)
3	SILTERRA	Malaysia
4	X-FAB	Malaysia
5	GLOBAL FOUNDRIES	Singapore
6	SSMC	Singapore
7	INFINEON	Malaysia Kulim P2
8	INFINEON	Malaysia Kulim P3
9	OSRAM	Malaysia (BCTP)



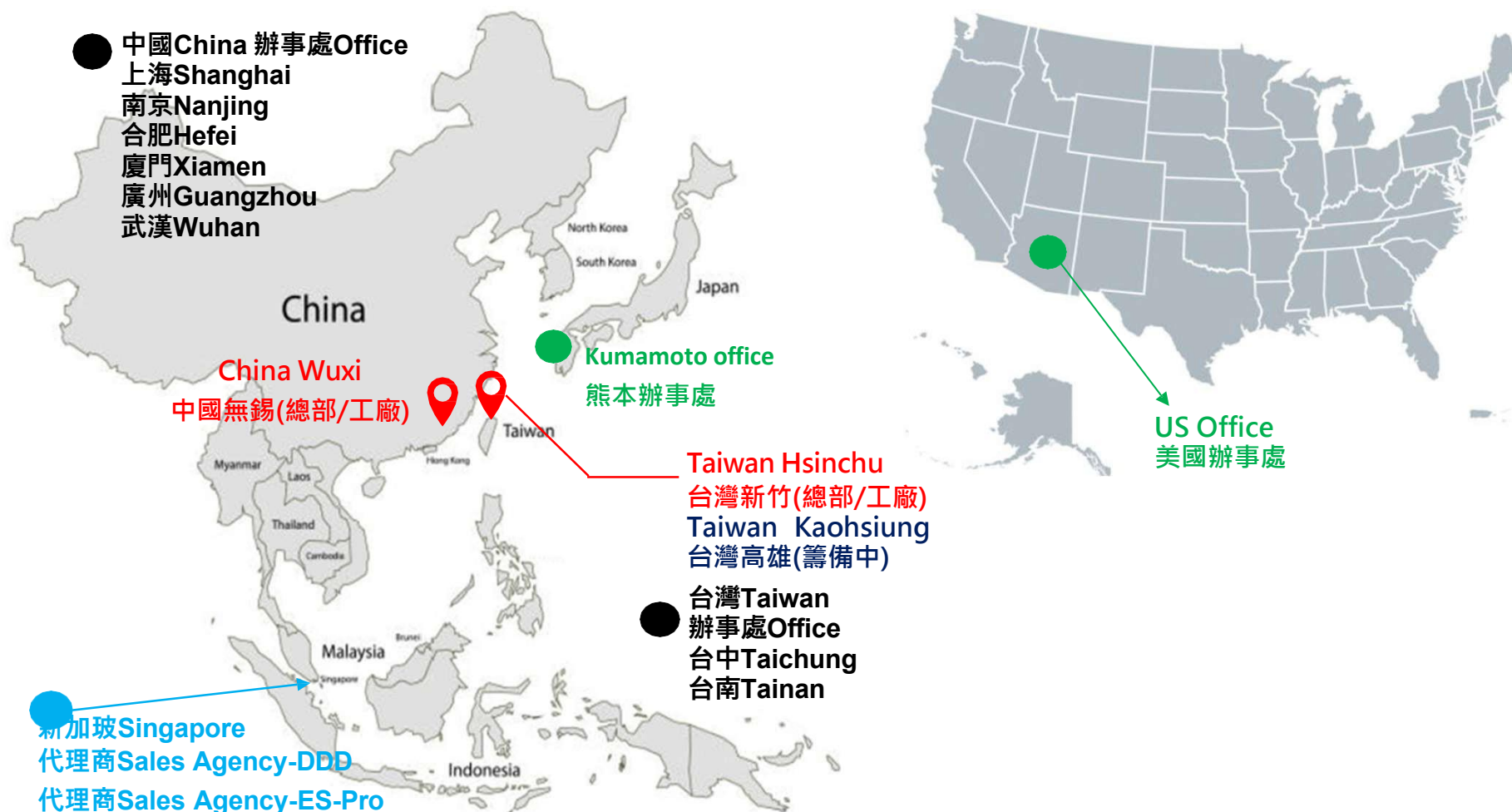
Aerogel heating jacket installed base

Item	User	plant	Dimension
1	AUO	L5C,L6K	TFT LCD
2	tsmc	FAB6	90nm
		AP3	Test
		AP6	Test
		12A	40nm
		12B	5nm/7nm/10nm
		T12P8	3nm/5nm/RD
		14A	40nm
		14B	16nm/20nm
		18A	3nm/5nm
		18B	3nm
3	HKC	Anhwei, China	6 OLCD
4	SDP	Guangdong, China	TFT LCD
5	Winbond	F6	20nm
		F7	20nm
6	Powerchip	P2	130nm
7	MXIC	F5	19nm
8	UMC	P6	28nm



DIRECTLYTEK OFFICE

★ The U.S. and Japan factories will open in 2026





Aerogel heating jacket installed base(Taiwan)



Item	Plant	Area	Process	Dimension
1	友達AUO	L5C	LED	G5.5
2	台積電tsmc	FAB3	90nm	200mm
3	台積電tsmc	FAB6	90nm	200mm
4	台積電tsmc	AP3	Test	300mm
5	台積電tsmc	AP6	Test	300mm
6	台積電tsmc	FAB12A	40nm	300mm
7	台積電tsmc	FAB12B	5nm/7nm/10nm	300mm
8	台積電tsmc	FAB12P8	3nm/5nm/RD	300mm
9	台積電tsmc	FAB14A	40nm	300mm
10	台積電tsmc	FAB14B	16nm/20nm	300mm
11	台積電tsmc	FAB18A	3nm/5nm	300mm
12	台積電tsmc	FAB18B	3nm	300mm
13	台積電tsmc	FAB20	2nm	300mm
14	台積電tsmc	FAB22	20nm	300mm
15	華邦Windond	F6/F7	20nm	300mm
16	力積電PSMC	8B	130nm	200mm
17	力積電PSMC	P1.2	40nm	300mm
18	力積電PSMC	P5	28nm	300mm
19	旺宏MXIC	F5	19nm	300mm
20	聯電UMC	12A	28/14nm	300mm
21	聯電UMC	8S	110nm	200mm



Aerogel heating jacket installed base

Semiconductor(China)

Item	Plant	Area	Process	Dimension
1	友達AUO L6K	Kunshan	LCD	G6
2	超視堺SDP	Guangdong	TFT LCD	G10.5
3	昇維旭SwaySure	Shenzhen	28nm	300mm
4	杭洲積海Hangzhou HFC	Hangzhou	14nm	300mm
5	宜興中車Zhuzhou CRRC Times	Yixing	130nm	200mm

Semiconductor(overseas)

Item	Plant	Area	Process	Dimension
1	台積電tsmc FAB21	USA(AZ)	5nm	300mm
2	台積電tsmc FAB23	JP(Kumamoto)	28nm	300mm
3	SSMC	Singapore	130nm	200mm



Aerogel jacket installed base

Item	User	plant	Dimension
1	tsmc	FAB6	90nm
		12A	40nm
		12B	10nm/7nm/5nm
		14A	40nm
		14B	20nm/16nm
		15A	14nm



Heating jacket
(Existing)

+



Aerogel jacket

=



Heating jacket
(Existing)

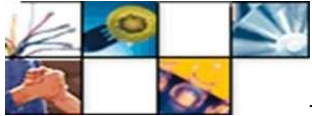
+

Aerogel jacket



Heating jacket system

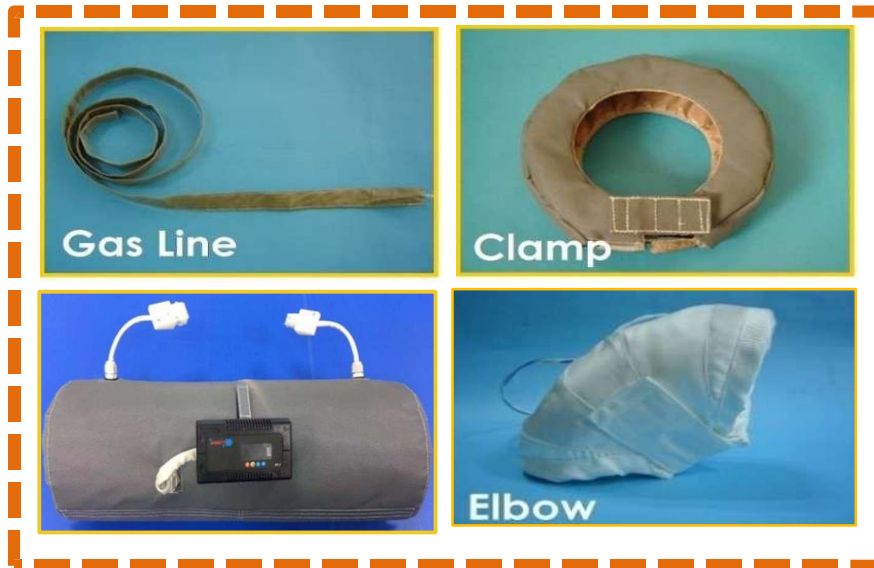
Product introduction



Heating jacket customized design picture

Heating Jackets customized according to the following requirements:

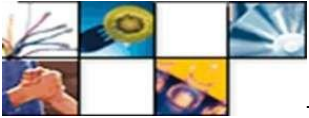
1. Heating jacket reverse engineering.
2. Special pipe fittings provided (such as Gas line/Valve/Panel heater...)
3. Drawing and sample pipe fitting provided.



Standard product



Customized product



Heating jacket installed picture

Installed base pictures in DIFF, T/F, ETCH.

All wires are all in one.





The components of heating jacket

Item	表層 Surface layer1	保温層(玻纖) Insulation 2	保温層(氣凝膠) Insulation 2 (Aerogel)	加熱層 Heating layer 3	內層 Inner 4
Function	• Heating Jacket Materials • We recommend the use of different materials in different environments	• Insulation, reducing heat loss and the surface temperature of heating jacket • Thickness: 25T	• Insulation, reducing heat loss and the surface temperature of heating jacket • Standard Thickness: 25T • Energy saving reaches 33%.	Can follow customer demand temperature with the use of different heating wire shop Design approach	• Heating Jacket Materials • We recommend the use of different materials in different environments
Image					
Material	PTFE Coated Cloth Heat resistance up to 260°C Glass Fiber 400°C	Glass Fiber Heat resistance up to 650°C	Aerogel Heat resistance up to 650°C	Nickel-Chrome PTFE Coated Cloth Heat resistance up to 260°C Glass Fiber 400°C	PTFE Coated Cloth Heat resistance up to 260°C Glass Fiber 400°C
Feature	§ Properties: 1. Nonflammable 2. Soft and light 3. Excellent formability 4. Long fiber particle free character, nocontamination. 5. Good texture and durable for long-term usage. 6. High production costs 7. Suitable for particle restricted environment.	§ Properties: 1. Nonflammable Option 1	§ Properties: 1. Nonflammable 2. Energy saving reaches 33%. Option 2 DTC-17	§ Properties: 1. Nonflammable 2. Soft and light 3. Excellent formability 4. Long fiber particle free character, no contamination. 5. Good texture and durable for long-term usage. 6. High production costs 7. Suitable for particle restricted environment.	§ Properties: 1. Nonflammable 2. Soft and light 3. Excellent formability 4. Long fiber particle free character, nocontamination. 5. Good texture and durable for long-term usage. 6. High production costs 7. Suitable for particle restricted environment.

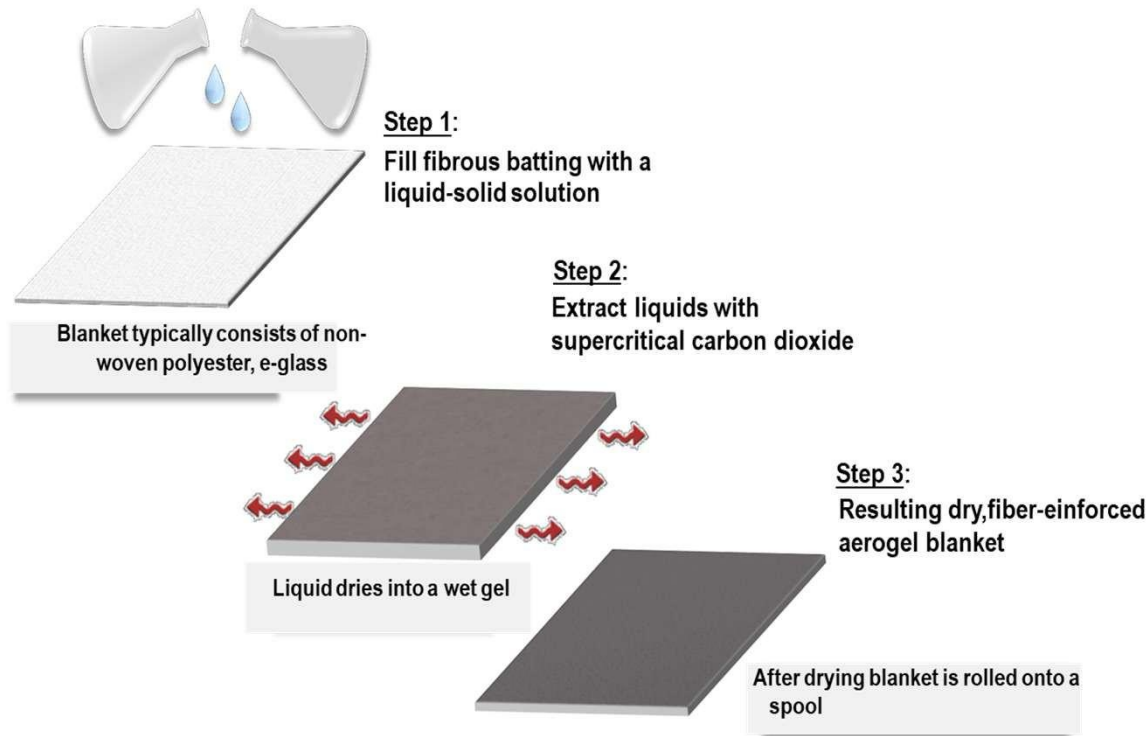


Aerogel heating jacket presentation

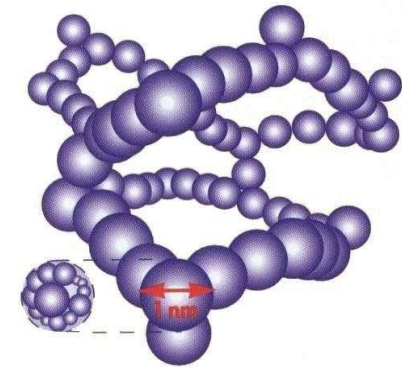
Aerogel

Is an extremely low-density solid with several remarkable properties, most notably its effectiveness as a thermal insulator reducing heat flow.

Aerogel glass fiber making process



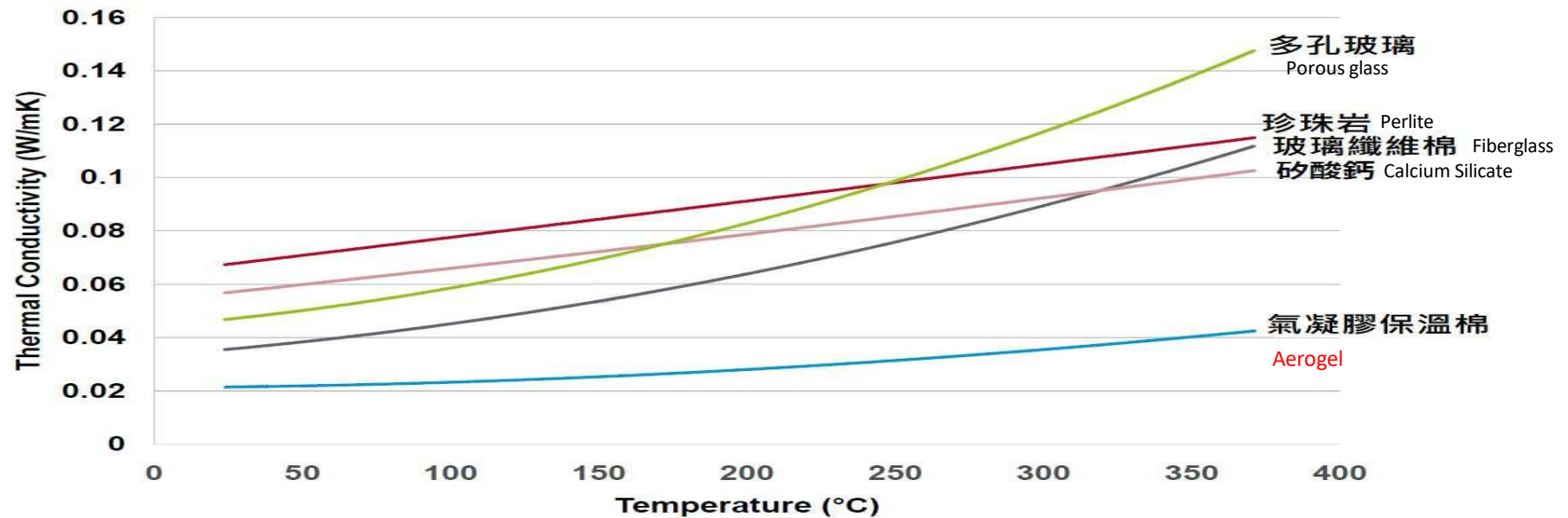
DTC-18





Thermal Conductivity

Material name	Aerogel	Air	Fiberglass	Calcium silicate	porous glass	Perlite
Typical thermal conductivity [W/(M*K)]	0.022	0.026	0.037	0.05	0.04	0.07





Efficacy of aerogel heating jacket

Test conditions:

1. Temperature setting: 180°C
2. Thickness: as below
3. Heating jacket size: 2 inch

4. Length: 1 meter
5. Voltage: 220V
6. Room temperature: 25°C
7. Record after stabilizing temperature 1 hour

For new tool

Temperature setting	Item	Silicone rubber 15mmT	Glass fiber 13mmT	Glass fiber 25mmT	Aerogel 25mmT
180°C	Surface temperature(°C)	91.6°C	61.5°C	47.8°C	37.8°C
	1 meter length kWh	0.164	0.106	0.08	0.053
	Wattage	≐164W	≐106W	≐80W	≐53W
	Current	≐0.69A	≐0.45A	≐0.34A	≐0.22A
	Energy-saving (silicone rubber 15mmT)	0.00%	35.36%	51.21%	67.68%
	Energy-saving (Glass fiber 13mmT)		0.00%	24.53%	50.00%
	Energy-saving (Glass fiber 25mmT)			0.00%	33.75%
	Energy-saving (Aerogel 25mmT)				0.00%



Cost-saving for electricity bill

Test conditions:

4.Length: 1 meter

Test conditions :

4. Length : 1 meter

1.Temperature setting: 180°C 5. Voltage: 220V

1. Temperature : 180°C 5. Voltage : 220V

2. Thickness: as below

6. Room temperature: 25°C

2 thickness : as follows

6. Ambient temperature : 25°C

3. Heating jacket size: 2 inch

7. Record after stabilizing temperature 1 hour

3.SIZE : 2 inch

7. The data was recorded
1 hour after the test.

For new tool

Item	Silicone rubber 15mmT	Glass fiber 13mmT	Glass fiber 25mmT	Aerogel 25mmT
1h/kWh	0.164	0.106	0.08	0.053
24h/kWh	3.936	2.544	1.92	1.272
365D/kWh	1436.64	928.56	700.8	464.28
Electricity rate (NTD \$4.29 /kWh) 1M/Year	\$6,163	\$3,984	\$3,006	\$1,992
50000M (t company 53k/Year)	\$308,159,280	\$199,176,120	\$150,321,600	\$99,588,060
Compare conditions.: silicone rubber 15mmT	Cost-saving	\$0	\$108,983,160	\$157,837,680
	Energy-saving	0.00%	35.36%	51.21%
Compare conditions.: Glass fiber 13mmT	Cost-saving		\$0	\$48,854,520
	Energy-saving		0.00%	24.52%

Compare conditions.: Glass fiber 25mmT	Cost-saving			\$0	\$50,733,540
	Energy-saving			0.00%	33.76%



Cost-saving for electricity bill

Test conditions:

1. Temperature setting: 180°C
2. Thickness: as below
3. Heating jacket size: 2 inch

4. Length: 1 meter
5. Voltage: 220V
6. Room temperature: 25°C
7. Record after stabilizing temperature 1 hour

For new tool

Item	Silicone rubber 15mmT	Glass fiber 13mmT	Glass fiber 25mmT	Aerogel 25mmT
1h/kWh	0.164	0.106	0.08	0.053
24h/kWh	3.936	2.544	1.92	1.272
365D/kWh	1436.64	928.56	700.8	464.28
Electricity rate (USD \$0.07/kwh)	\$101	\$65	\$49	\$32
50000m (t company 53k)	USD 5,028,240	USD 3,249,960	USD 2,452,800	USD 1,624,980
Cost-saving (Aerogel 25mmT)	\$3,403,260	\$1,624,980	\$827,820	\$0

	Energy-saving performance (Aerogel 25mmT)	Cost-saving for electricity bill 67.68%	50.00%	38.75%	0.00%
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Efficacy of aerogel jacket

Test conditions:

1. Temperature setting: 180°C
2. Thickness: as below
3. Heating jacket size: 2 inch

4. Length: 1 meter
5. Voltage: 220V
6. Room temperature: 25°C
7. Record after stabilizing temperature 1 hour

For existing heating jacket

Temperature setting	Item	Silicone rubber 15mmT	Glass fiber 13mmT
180°C	Surface temperature(°C)	91.6°C	61.5°C
	1 meter length kWh	0.164	0.106
	Wattage	≐164W	≐106W
	Current	≐0.69A	≐0.45A
	Energy-saving performance (silicone rubber 15mmT)	0.00%	35.36%
	Energy-saving performance (Glass fiber 13mmT)		0.00%
	Energy-saving performance (Silicone rubber 15mmT+ Aerogel 10mmT)		
	Energy-saving performance (Glass fiber 13mmT+ Aerogel 10mmT)		

Aerogel jacket

Silicone rubber 15mmT+ Aerogel 10mmT	Glass fiber 13mmT+ Aerogel 10mmT
43°C	41.7°C
0.071	0.06
≐71W	≐66W
≐0.30A	≐0.26A
56.7%	63.41%
33.01%	43.4%
0.00%	15.5%
	0.00%



Cost-saving for electricity bill

Test conditions:

1. Temperature setting: 180°C
2. Thickness: as below
3. Heating jacket size: 2 inch

4. Length: 1 meter
5. Voltage: 220V
6. Room temperature: 25°C
7. Record after stabilizing temperature 1 hour

For existing heating jacket

Item	Silicone rubber 15mmT	Silicone rubber 15mmT+ Aerogel 10mmT	Glass fiber 13mmT	Glass fiber 13mmT+ Aerogel 10mmT
1h/kWh	0.164	0.071	0.106	0.06
24h/kWh	3.936	1.704	2.544	1.44
365D/kWh	1436.64	621.96	928.56	525.6
Electricity rate (USD 0.07/kwh)	\$101	\$44	\$65	\$37
50000m (t company 53k)	\$5,028,240	\$2,176,860	\$3,249,960	\$1,839,600
Cost-saving	\$2,851,380		\$1,410,360	
Energy-saving performance	56.7%		43.4%	

Aerogel further reduces heat flow, saving not only money (carbon tax) but also energy for sustainable development.



Cost-saving for electricity bill



Customer data VS Directlytek data

Customer data V.S Directlytek data						
Description	t company (tsmc 18P3) ETCH test data		Directlytek Test data			
	Temperature setting 120℃		Temperature setting 120℃		Temperature setting 180℃	
	Pipe size: 2"+4"		Pipe size: 2"			
kWh/Cost	Glass fiber 25mm	Aerogel 25mm	Glass fiber 25mm	Aerogel 25mm	Glass fiber 25mm	Aerogel 25mm
kWh/ 1 Meter 1H	0.079	0.052	0.041	0.028	0.08	0.053
kWh/1 Meter 24H	1.896	1.248	0.984	0.672	1.92	1.272
kWh/1 Meter 365days	692	456	359.16	245.28	700.8	464.28
1 Year /1 Meter (0.07USD/kWh)	US\$ 48.44	US\$ 31.92	US\$ 25.14	US\$ 17.17	US\$ 43.54	US\$ 28.82
Energy-saving performance	0.00%	34.10%	0.00%	31.71%	0.00%	33.75%

The energy-saving performance test in t company is 34.1% higher than the Directlytek test report 31.71%.

Therefore, the 33.75% energy-saving performance of 180°C is enough to be trusted!!!



News of aerogel heating jacket use in tsmc



台積電導入低耗能管路加熱系統 2025年起每年再省8千萬度電

更新時間：2020/12/31 12:53



台積電導入低耗能管路加熱系統自2025年起每年再省8千萬度電。台積電提供

圖片來源：蘋果新聞網

台積電（2330）實踐綠色製造、持續優化製程能源使用效率，2020年領先業界將「低耗能管路加熱系統」導入先進製程，透過高效熱絕緣體減少熱散失，成功的使機台加熱管減少約25%能耗。目前已導入晶圓15廠第7期廠區，預計將於2025年進一步導入台灣全數12吋晶圓廠區及晶圓18B廠的3奈米與2奈米製程，每年預計將節省8000萬度電。

- ◆ tsmc introduced a low-energy pipeline heating jacket system to replace glass fiber with Aerogel.
- ◆ Aerogel heating jacket can reduce the energy consumption and save **80 million kWh** which is approximately **5 million USD dollars** per year.

Industrial electricity rate in Arizona :0.07 \$ /kWh (Reference: ELECTRICITY LOCAL)
 $80,000,000(\text{kWh}) \times 0.07(\$ /\text{kWh}) = 5,224,000$



News of aerogel heating jacket use in tsmc



TSMC's Green Upgrade Initiative for Equipment Piping Saves 44.61 Million kWh of Electricity per Year

2023/11/07



C.C. Chiang



Chyi-Tsong Ni



Scott Chang



C.N. Chang

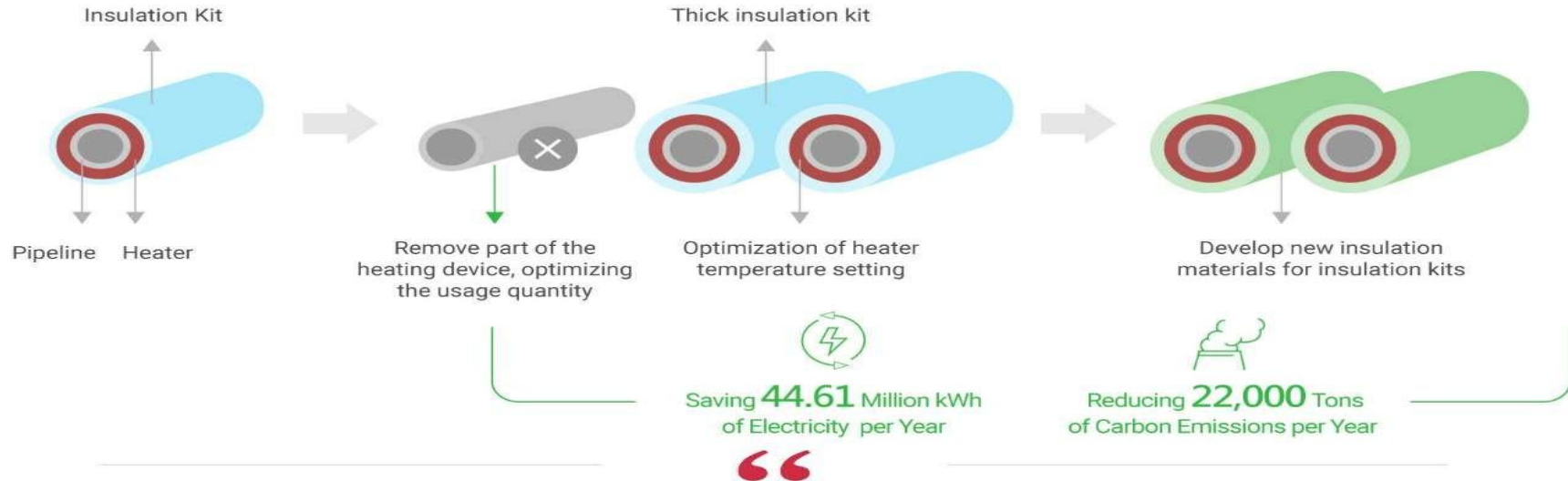
- In response to the United Nations Sustainable Development Goal 7, TSMC actively improves energy efficiency through innovative thinking to address the increasingly complex semiconductor manufacturing process. To create more green actions, TSMC launched the "Energy-saving and Heat-reducing Two-stage Project" targeting pipeline heating devices for advanced process tools. By optimizing existing devices and developing new materials, TSMC successfully reduces heat loss and improves energy-saving performance. As of November 2023, all 1,261 pipeline heating devices in domestic and overseas factories have been optimized and adjusted, resulting in electricity savings of 44.61 million kWh and a reduction of 22,000 tons of carbon emissions per year. This is equivalent to the annual carbon dioxide absorption of 57 Daan Forest Parks, fulfilling the commitment of TSMC's "[Environmental Protection Policy](#)".
- Optimizing Existing Devices and Introducing New Materials to Enhance Energy Efficiency
- During the operation of semiconductor processing equipment, the reaction gases produced are transported through the pipeline system to relevant processing equipment. Generally, heating devices are installed outside the pipeline to reduce the risk of pipeline blockage caused by crystallization due to temperature changes during gas transportation. To keep energy consumption from increasing as the number of production tools and heating devices increase, TSMC launched a two-stage plan in 2018. The first stage was to optimize existing devices. By conducting a comprehensive inventory of the characteristics and flow rate of reaction gases produced by different processing equipment and testing the degree of pipeline blockage, a total of 508 heating devices were removed and 209 heating devices were adjusted based on process requirements to optimize the temperature settings and increase the thickness of insulation. This not only improved the overall energy efficiency but also reduced the workload of pipeline maintenance for employees, resulting in total energy savings of 36.12 million kWh.
- In the second stage, TSMC developed a new type of aerogel material for insulation materials. The high insulation and low thermal conductivity properties of the aerogel were verified to effectively reduce heat dissipation. Compared with the original fiberglass material, this new method can save an additional 20-30% energy. This innovative approach was recognized with the first [TSMC ESG AWARD](#) and has been implemented. Currently, 544 existing devices have been retrofitted, saving 8.49 million kWh, while new heating devices have been directly introduced into new Fabs. The updated procurement specifications have been included in the future standard equipment, strengthening the energy-saving effect.



News of aerogel heating jacket use in tsmc

Pipeline Heating Device Energy-saving and Heat-reducing Two-stage Project

Pipeline Heating Device



TSMC continues to explore opportunities for energy conservation and carbon reduction by optimizing the efficiency of tool pipeline heating devices and introducing innovative insulation materials, promoting environmental sustainability.

- Hui-Hsin Tseng, Deputy Director of Green Manufacturing Department at TSMC

TSMC is committed to maximizing energy efficiency in its production tools as part of its sustainability goals. In addition to maintaining the efficiency of existing tool heating systems, the company has introduced new heating systems in new factories. In 2024, TSMC will initiate an energy-saving verification program, with a goal to save 80 million kWh by 2030 in order to achieve its zero-emission vision.

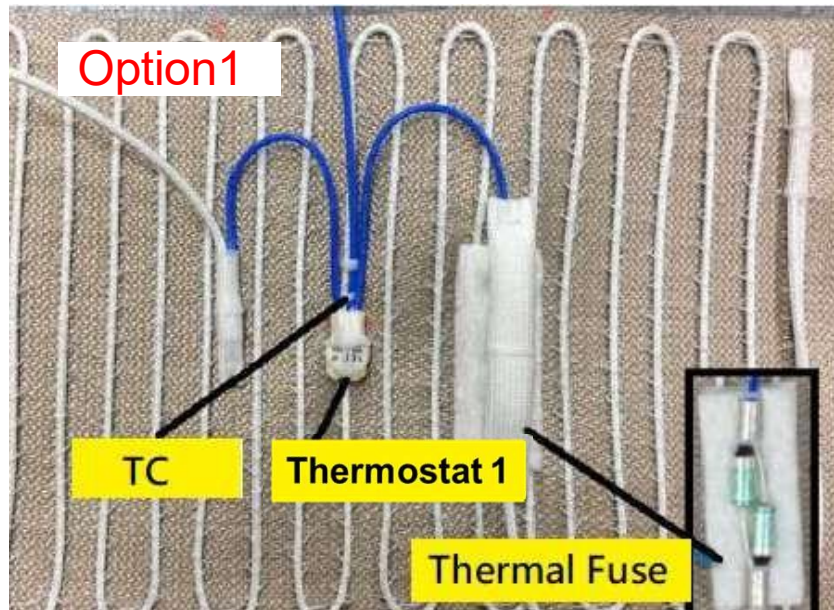


The safety and interlock of heating jacket

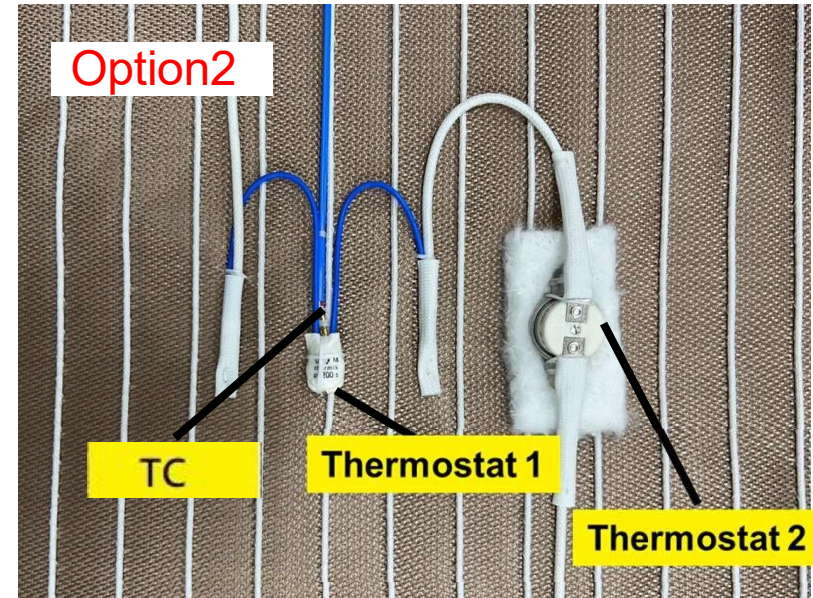
In Heating Jacket :

Each heating jacket will be equipped with thermostat and thermal fuse.

When temperature exceeded a safe value, the power will be cut off immediately, require engineer to fix it.



- *Thermostat 1 : **Resettable**
- *Thermal Fuse : **Non resettable**



- *Thermostat 1 : **Resettable**
- *Thermostat 2 : **Resettable**

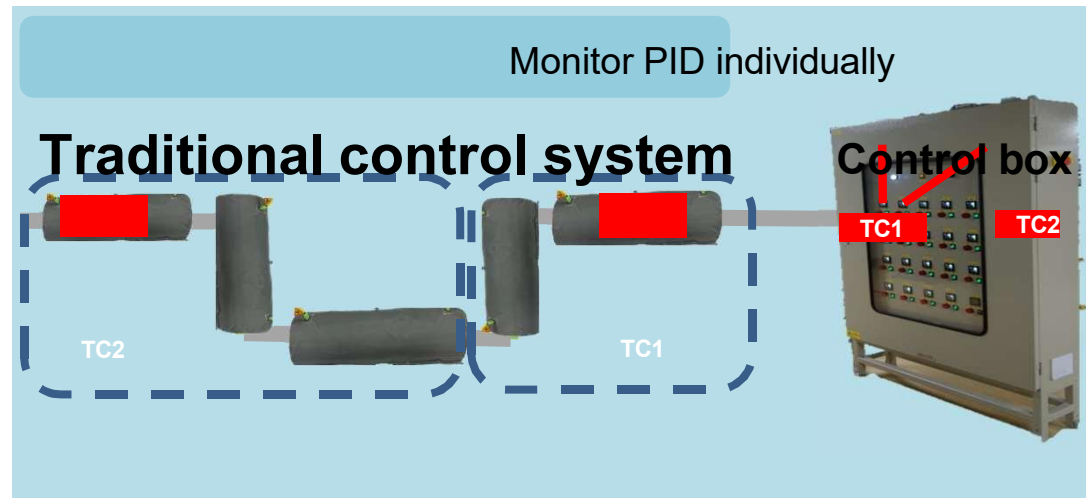


HMI control VS Traditional control

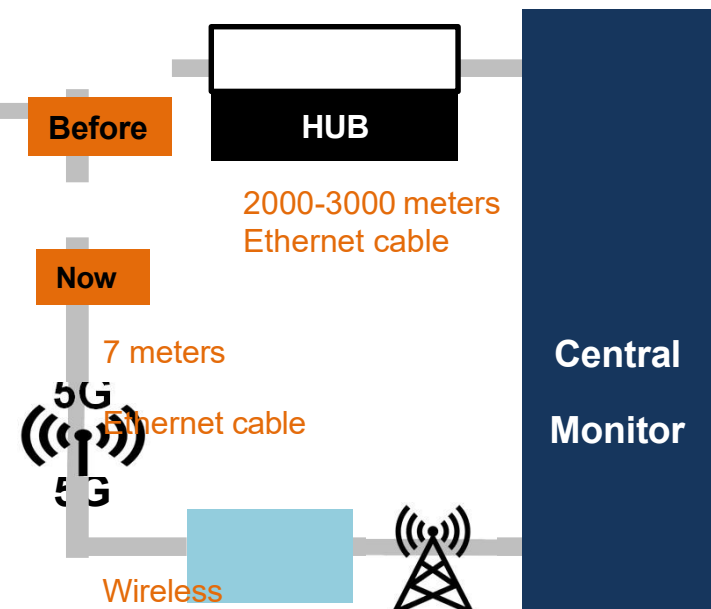
HMI control system



Traditional control system



CMS (Central Monitor System)



Base Transceiver Station
by telecommunications operator

2~3 pieces of heating jacket in dashed line are monitored by only one temperature control (zone control)

HMI control VS Traditional control



Benefits of HMI

1. Accurate temperature

Independent thermostat for each segment to ensure accurate temperature.

2. Independent thermostat

Depending on the need each temperature can be adjusted individually.

3. Monitor individually

HMI can monitor abnormal temperature for each individual segment.

4. Safety

HMI has safety device that can cut off the power immediately during abnormal temperature such as O-ring hardening and damage inside of the vacuum tube.

5. All in one

Wire and connector are bagged in the heating jacket.



The image displays four distinct certificates, each representing a different standard or organization:

- FM Certificate of Compliance:** Issued by FM Approvals, Inc. to DIRECTLY TECHNOLOGY CO., LTD. for their HEATING JACKET SYSTEM & POWER BOX. The certificate includes test standards (EN8126-1:2011 Class A, EN8126-1:2013, EN8126-1:2013 Class A) and is signed by the Director of Engineering.
- CE Certificate of Test:** Issued by WE HUBERT CERTIFY THAI to DIRECTLY TECHNOLOGY CO., LTD. for their HEATING JACKET SYSTEM & POWER BOX. The certificate includes test standards (EN8126-1:2011 Class A, EN8126-1:2013, EN8126-1:2013 Class A) and is signed by the Director of Engineering.
- UL Certificate of Compliance:** Issued by UL (Underwriters Laboratories) to DIRECTLY TECHNOLOGY CO., LTD. for their HEATING JACKET SYSTEM & POWER BOX. The certificate includes test standards (UL 499, Edition 14, Issue Date 2014-11-07, Revision Date 2022-06-14) and is signed by the Director of Engineering.
- ISO9001 Certificate of Registration:** Issued by DNV GL to DIRECTLY TECHNOLOGY CO., LTD. for their HEATING JACKET SYSTEM & POWER BOX. The certificate includes test standards (ISO 9001:2015) and is signed by the Director of Engineering.

The End