正泰電熱股份有限公司 SINCE 1971

CHENG TAY HEATER & INSTRUMENT CO., LTD.

CT HEATERS

more than heaters!

www.ctheaters.com

INTRODUCTION

Established in 1971, **CHENG TAY HEATER & INSTRUMENT CO., LTD.** is known as "**CT HEATERS**" or **"CT"** has been in the business of developing and introducing the latest machinery while pioneering new electrical heating techniques. We have the engineering and manufacturing capabilities to be or define world-class quality. Therefore, made us the only specialists in Taiwan that can supply tailor-made or prototype heating elements for the entire scientific and industrial spectrum. Our years of experience have enabled us to even help our clients to solve their own machinery problems or improving its performance.

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OUR COMMANDMENT

- For over 47 years, our name has stood for quality, flexibility and innovation. Our clients come to us with the knowledge that whatever their heating needs are, we have the solution for them.

- We are committed to continually building our reputation, knowledge and respond quickly to the world's changing needs. Our business approach is to meet our client's needs and to offer a competitive price.

- "From **A SINGLE ITEM TO A LARGE SCALE PROJECT**, we can supply all your heater and thermocouple needs. ALL INQUIRIES ARE WELCOME!"

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CATEGORY

- Photovoltaic industry
- Optronic industry
- Vacuum technology
- Optical industry
- Wafer processing equipment
- Semiconductor processing equipment
- Plastic industry (Hot runner system)
- PCB industry
- Food industry
- Packaging industry
- Science and Aerospace industries
- Medical and Chemical industries
- Research & Development institutions

PRODUCT CATEGORY

Heating Elements

- Square, Flat and Tubular Heaters
- Cartridge Heaters
- Micro Heaters
- Finned Heaters
- Hot Air Generators
- Air Heaters
- Radiant Heating Elements
- Mica Heaters
- Flexible Heaters
- Cast-In Heaters
- Immersion Heaters
- Titanium Heaters

Sensors

- TC Wafer
- Thermocouples
- RTD
- Thermostats
- EGO

Controls/Instruments

- Temperature controllers (Digital/Analog)
- Paperless recorder (touch panel available)
- Human Machine Interfaces (HMI)
- SCR Power Controls
- Power Switch
- Controller Box Assembly

Materials

- Heater Hook-up wires, Resistant wires, High Temperature Materials/Alloy, Al2O3 materials, and much more.

Services

- Thermo Image Analysis
- Custom Design
- Reverse Engineering
- Custom Improvement Project (CIP)
- Non-destructive Elemental Analysis (X-ray fluorescent (XRF) analyzer for Alloy)
- Special Surface Treatments
- Laser Welding
- Tungsten Inert Gas Welding (TIG Welding)
- Silver Soldering
- Intricate Geometry Tube Bending

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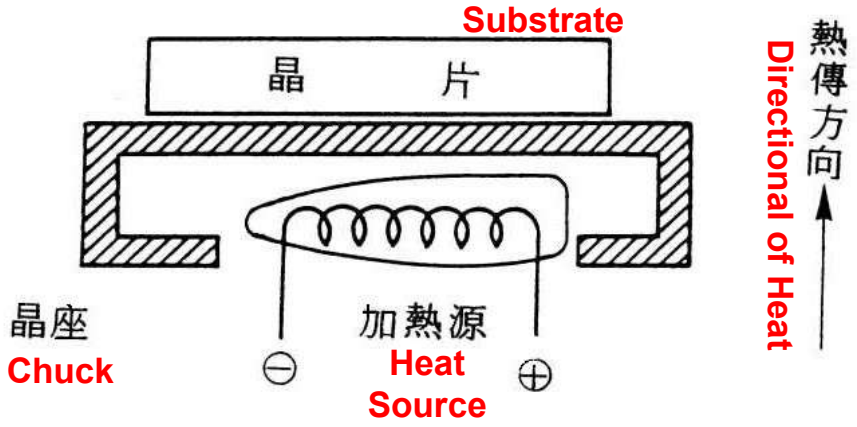
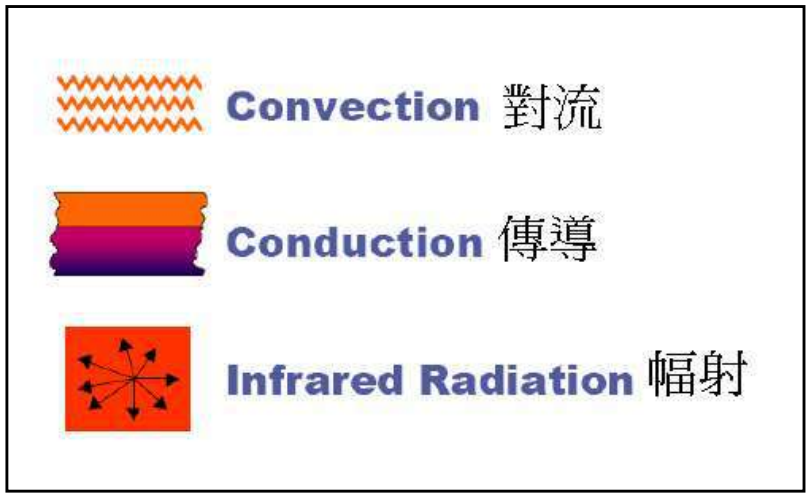
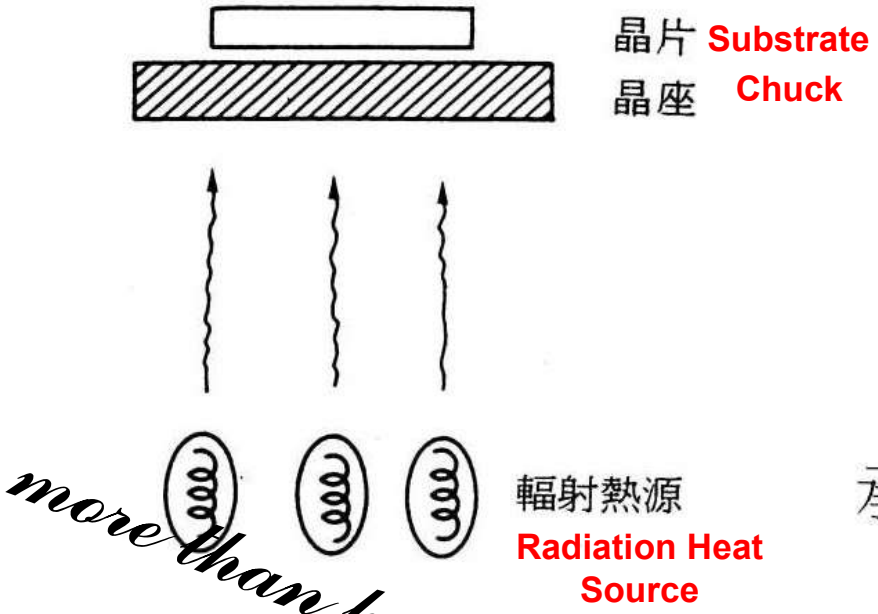
BASIC METHOD OF HEAT TRANSFER

Conduction

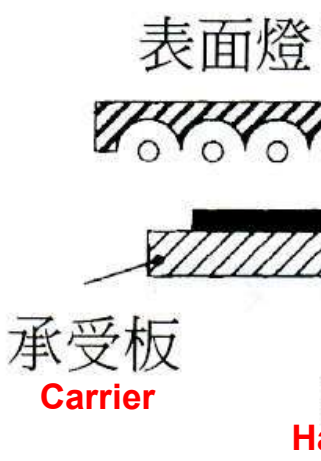




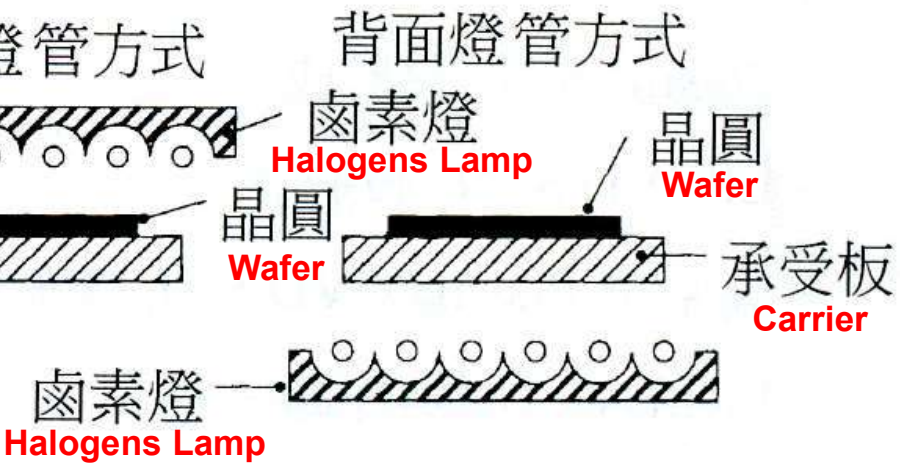
Infrared Radiation



Direct Radiant Heating



Indirect Radiant Heating



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SHEATH HEATING ELEMENT

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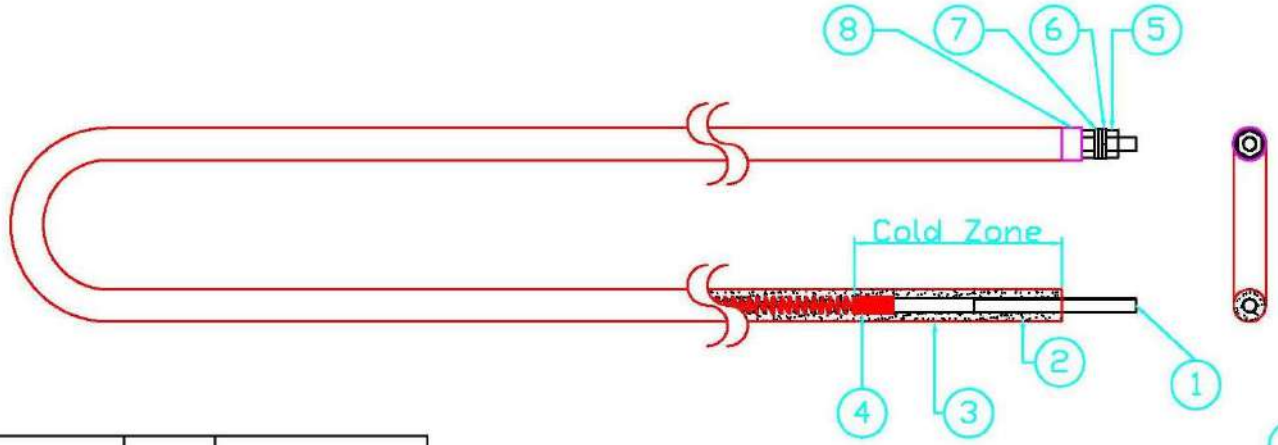
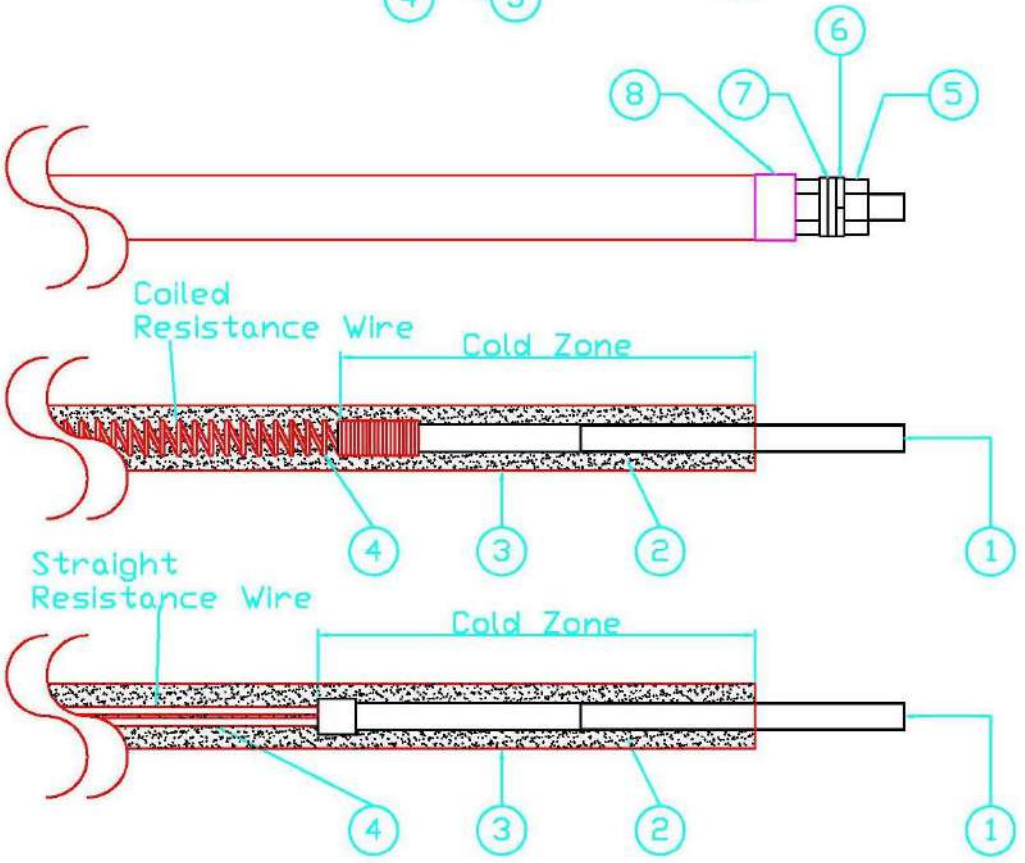
BASIC CONSTRUCTION OF HEATER ELEMENT



NO	DESCRIPTION	QTY	MATERIAL
1	Conductor 電極	2	SUS or Ni200
2	Insulation 絕緣材料	1	Fused MGO
3	Sheath Material 金屬外管	1	SUS or AL
4	Resistance Wire電阻線	1	Ni-Cr
5	Nut螺母	4	SUS
6	Spring Wahser 彈簧華司	2	SUS
7	Wahser 華司	4	SUS
8	Ceramic 碍子	2	Ceramic



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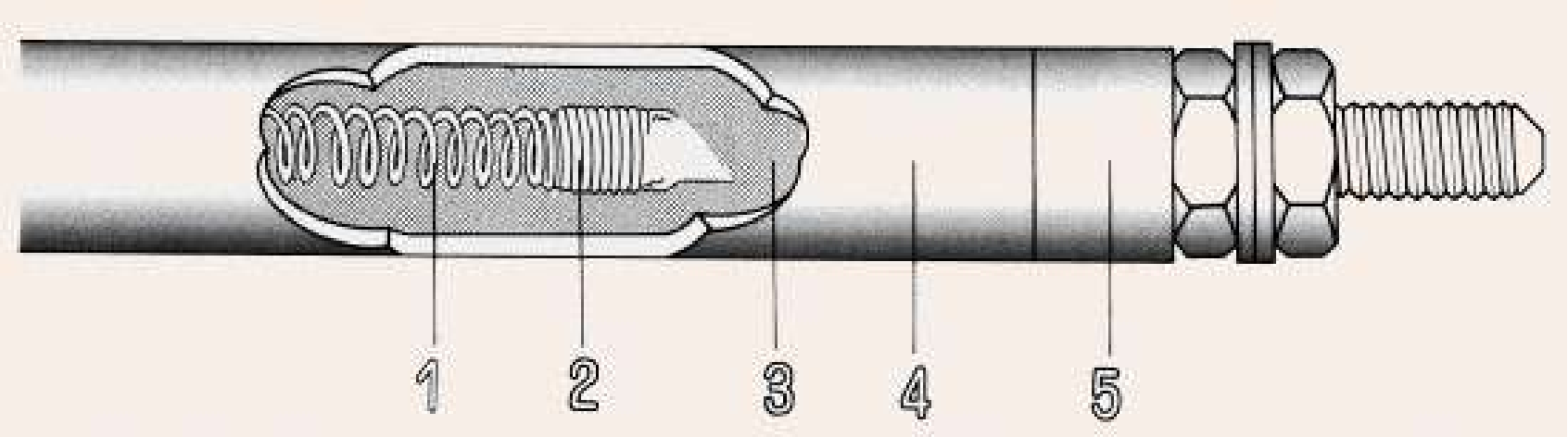
BASIC CONSTRUCTION OF HEATER ELEMENT Con't



1. Resistance Wire
2. Jointed (Beginning of Cold Zone)
3. Insulation：High Grade of fused MgO
4. Sheath Material：Bronze, Copper, Aluminum, Stainless Steel, Incoloy, Inconel, Titanium, etc.
5. Ended Insulation：Silicone Rubber, Mica, Ceramic, etc.

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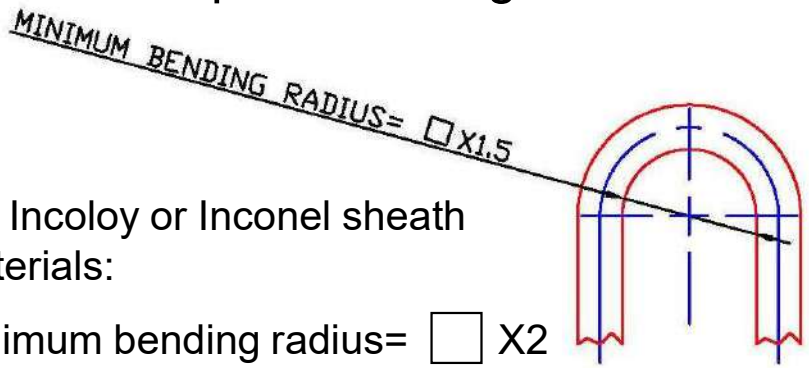
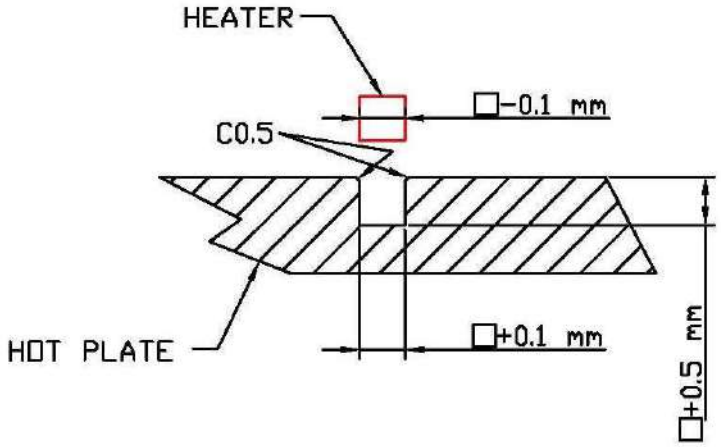
HEATING ELEMENT BENDING PRECAUTION

Square heating element

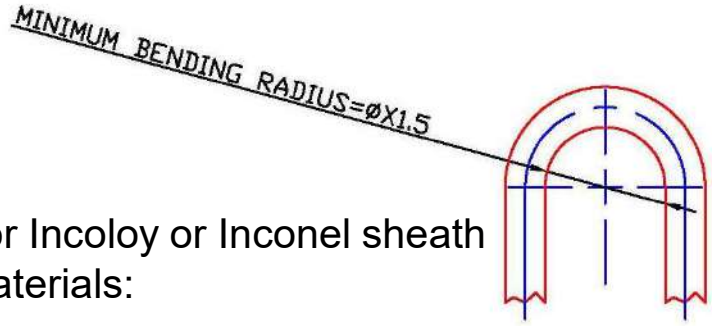


For Incoloy or Inconel sheath materials:

minimum bending radius= □ X2

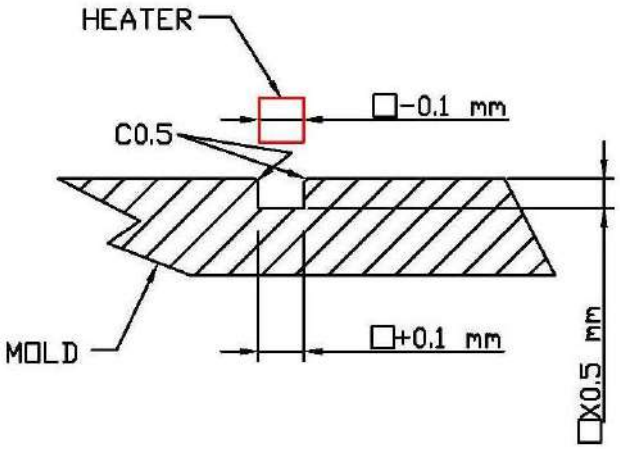


Tubular heating element



For Incoloy or Inconel sheath materials:

minimum bending radius= ◯ X2



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Heating Elements for Vacuum Technology

Variety of sheath selection

SQUARE TUBING		FLAT TUBING		TUBULAR TUBING	
Sheath Diameter (mm)		Sheath Diameter (mm)		Sheath Diameter (mm)	
Q3 X 3	Q5.65 X 5.65	F1.1 X 1.5	F2 X 2.85	Φ1.45~1.5	Φ5.4
Q3.1 X 3.1	Q6 X 6	F1.15 X 1.58	F3.8 X 2.2	Φ1.6	Φ6
Q3.2 X 3.2	Q7 X 7	F1.2 X1.57	F4 X 2.2	Φ1.8	Φ6.35
Q3.5 X 3.5	Q8.45 X 8.45	F1.23 X 1.9	F4.15 X 2.2	Φ2	Φ6.7
Q3.7 X 3.7	Q9.5 X 9.5	F1.3 X 1.8~1.9	F4.2 X 2.2	Φ2.3~2.4	Φ8
Q3.8 X 3.8	Q10.8 X 10.8	F1.3 X 2.3	F4.3 X 3.8	Φ2.8	Φ10.9
Q3.9 X 3.9	Q11 X 11	F1.3 X 3.4	F4.3 X 2.5	Φ3.2	
Q4.6 X4.6		F1.4 X 1.8	F5 X 2.4~2.5	Φ3.4	
Q4.8 X 4.8		F1.6 X 2.1	F5 X 9.8	Φ4	
Q5 X 5		F1.8 X 3.2	F6 X 15	Φ4.8	

※※ 加熱元件及測溫元件本身是屬於耗材如同印表機的墨水匣或色帶，並無保固!! ※※

※※ No warranty shall attach to all consumable parts (including the heater elements, IR heating elements, thermocouples, etc.), therefore, you are requested to observe the above conditions. ※※

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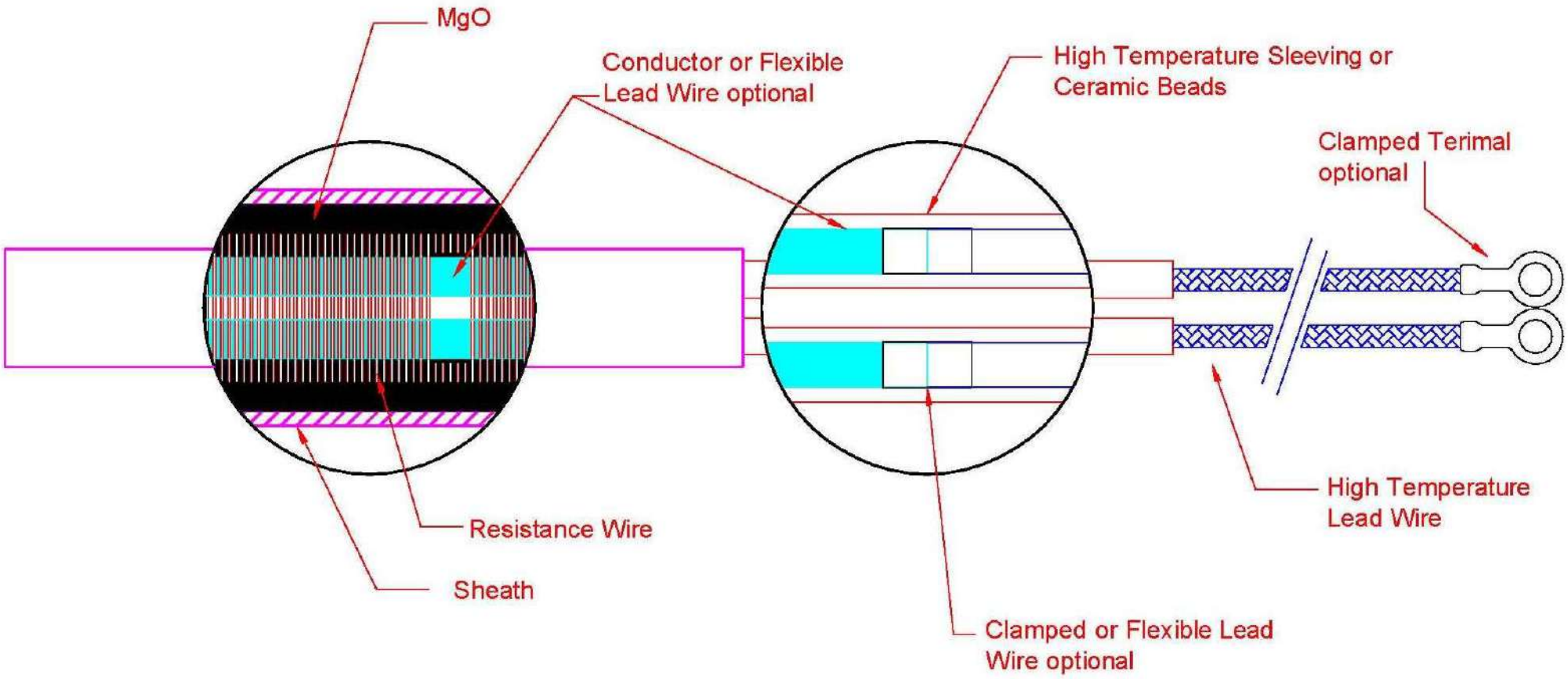
BASIC CONSTRUCTION OF CARTRIDGE HEATER



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Cartridge Heater for General Application

Variety of sheath selection

TUBULAR TUBING					
OD (mm)	Built-in TC	OD (mm)	Built-in TC		
Φ1	N/A	Φ12	Optional		
Φ2.6		Φ13.5			
Φ3		Φ14			
Φ4	Optional	Φ15.8			
Φ6		Φ19			
Φ8		Φ20			
Φ9.5					
Φ10					
Φ10.8					

※※ 加熱元件及测溫元件本身是屬於耗材如同印表機的墨水匣或色帶，並無保固!! ※※

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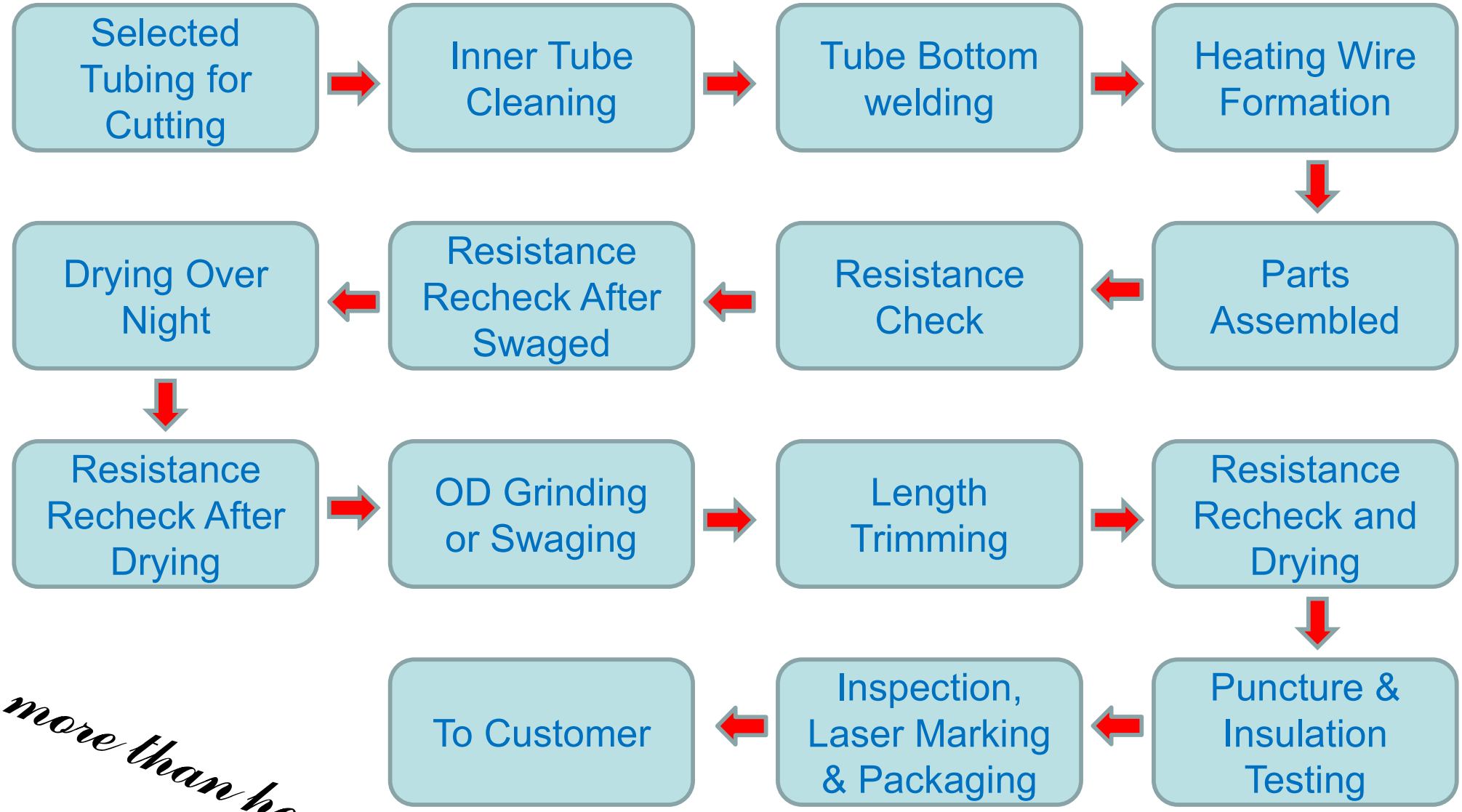
Process for Making Heater



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PRECAUTIONS

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- Many of heaters are hygroscopic in nature due to MgO contents. If kept unused for longer period, there is moisture deposition on the terminals. Therefore CT HEATERS recommend you to de-moisture the heaters prior to installation by heating them at 90~120℃ in an oven for at least 2 hours or use controllers with soft start function. This will help evaporate any moisture present inside.

- Stabilized voltage supply increases the life of the heater as well as increases the wattage output. Grounding connection is must at all the time (green color coded wire).

- Unheated zone once bent should not be re-bent or de-coiled. This will lead to breakage. Sharp edges along the lead wire path areas should be protected from combustible gases & liquid to avoid short-circuits.

- CT HEATERS dose not warrant any PRODUCT against damage from corrosion, contamination, misapplication, improper specification or wear and tear and operational conditions beyond CT HEATERS' control.

UNDERSTANDING OF PRODUCTION NUMBER

Production Number : $\underset{1}{C}\ \underset{23}{15}\ \underset{45}{08}\ \underset{67}{14} - \underset{8}{027} - \underset{9}{1}$

1 →	From Chungli Plant
2&3 →	Year of 2015
4&5 →	Month (i.e. August)
6&7 →	Date(i.e. 14)
8&9 →	CT HEATERS I.C.N.

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HEATING ELEMENTS for VACUUM TECHNOLOGY

Source from：INNOVAC

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HEATERS APPLICATION

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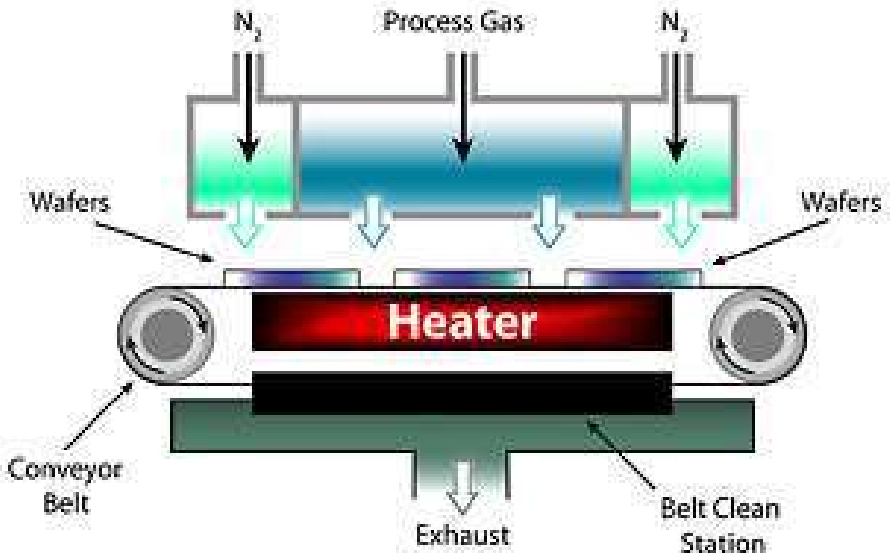
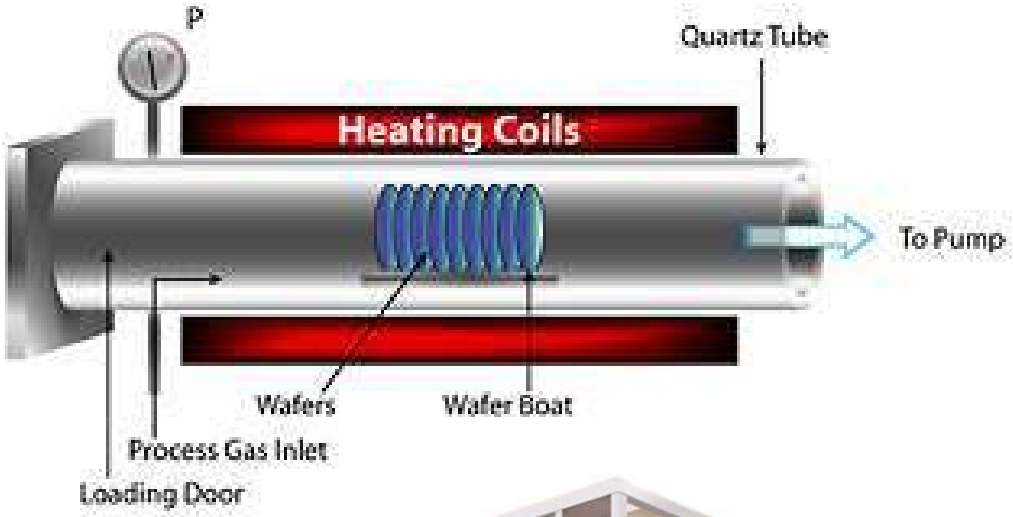
APCVD Reactor



LPCVD System



Source from：ITRI

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HEATERS APPLICATION Con't

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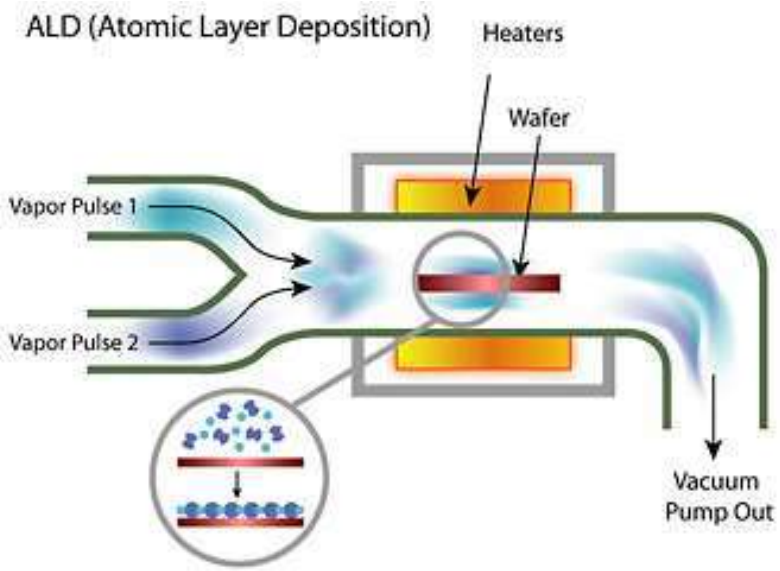
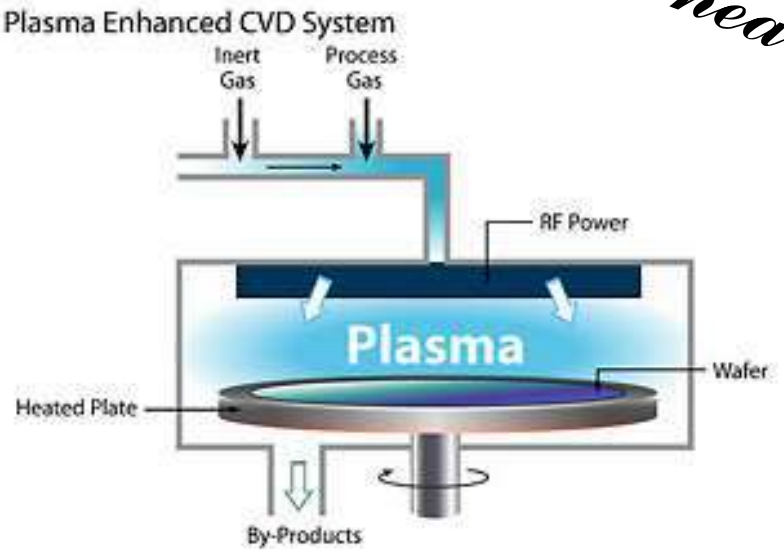
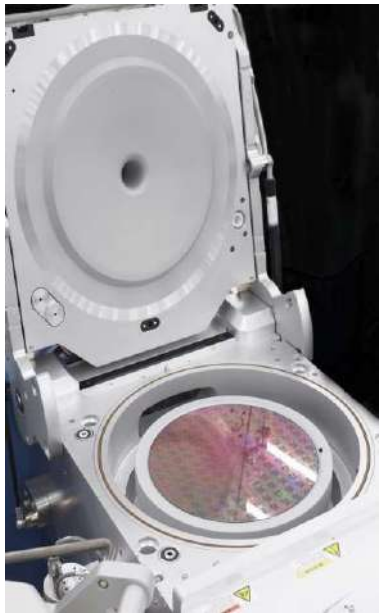




Source from：ITRI



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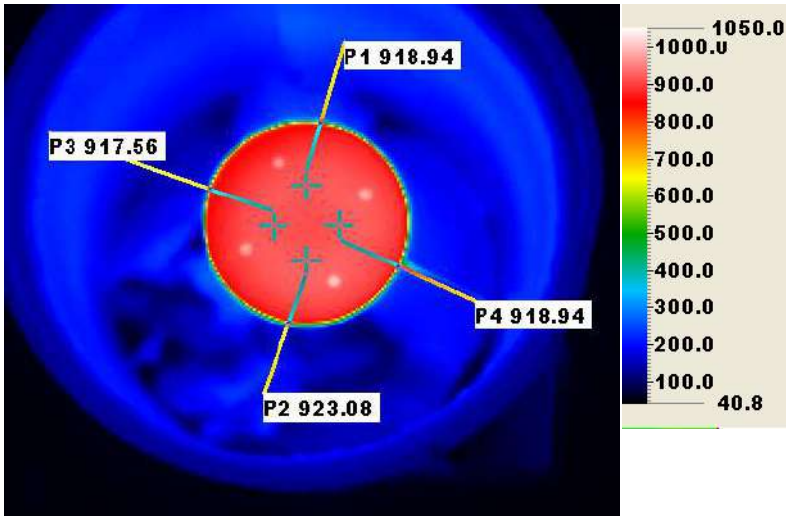
HEATING ELEMENT for VACUUM TECHNOLOGY



2” Chuck Heater 60V 720W at 900℃+ in ATM

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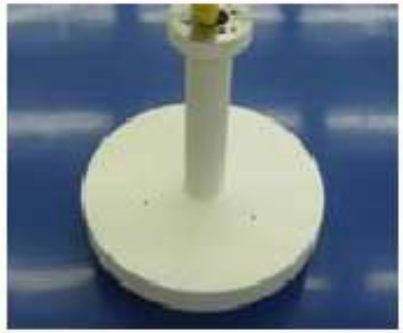
EXAMPLES of HEATER

Direct Contact (Conduction) Heaters

Hot Plate or Chuck Heater for Semiconductor & Optronic Industries

PBN Heater	SIC Heater	AIN Heater	APS Coated Heater
			
WxZ Heater	**DxZ Heater**	**TxZ Heater**	**Mattson Heater**
			

Source from：KoMiCo

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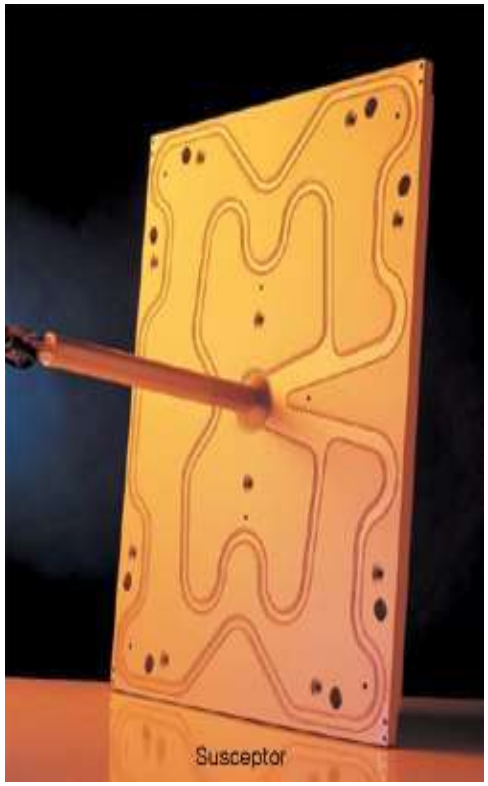
EXAMPLES of HEATER Con't

Direct Contact (Conduction) Heaters

Hot Plate for TFT & Photovoltaic Industries

AKT3900B/P susceptor



AKT4300 susceptor

AKT1600 susceptor

Source from：Wizit

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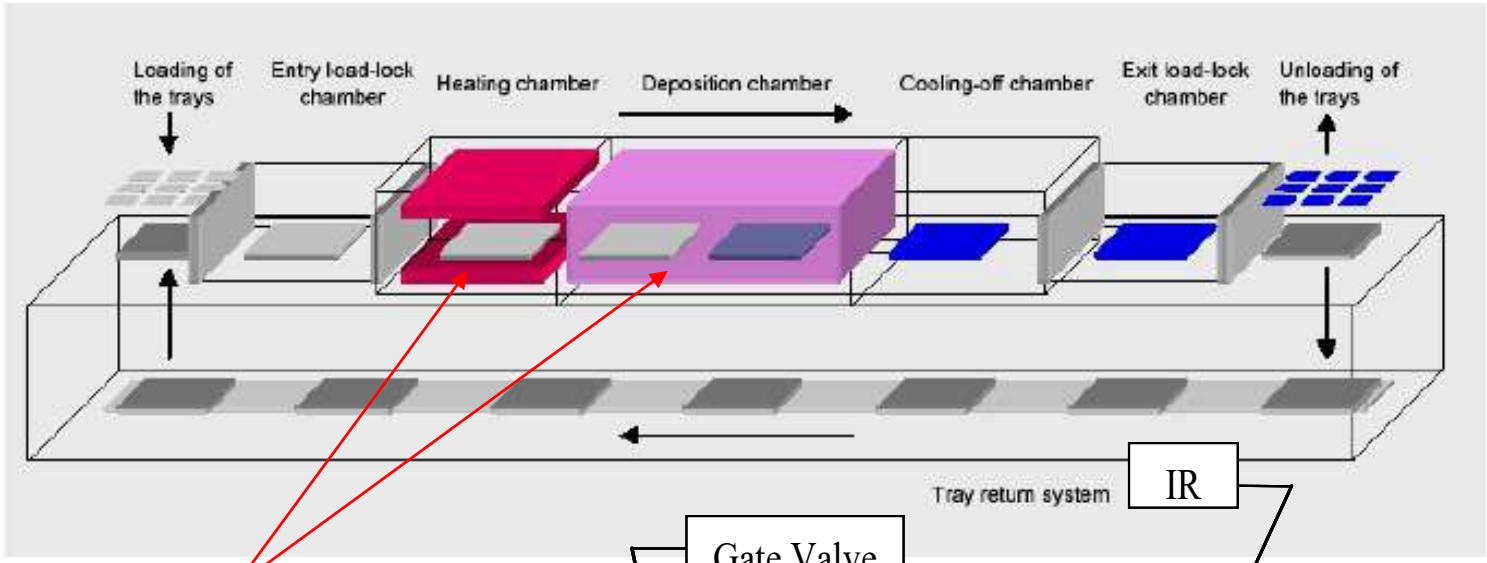
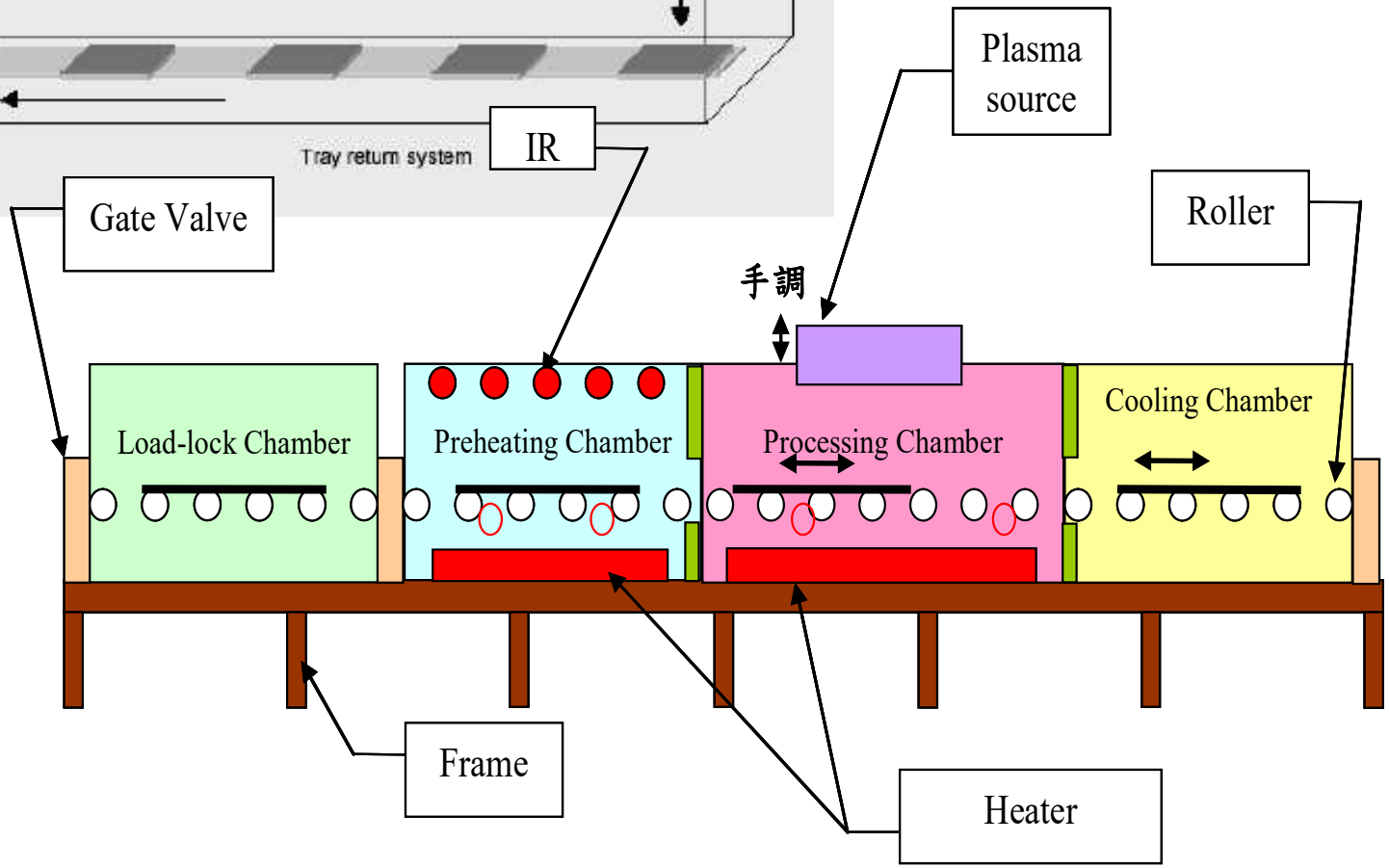
HEATERS APPLICATION Con't



HEATERS

Source from：ITRI



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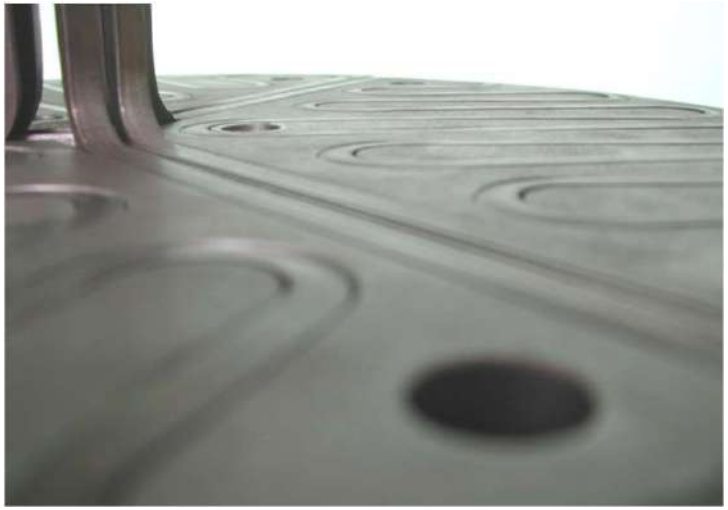
HEATING ELEMENT for DIFFUSION PUMP

Q7X7 Tubular Heater



The flatness of contact close-up.

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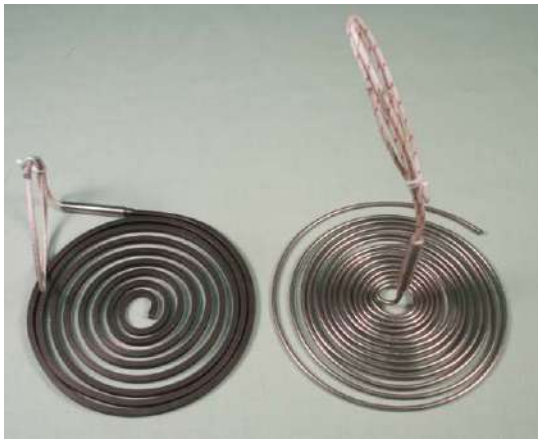
SQUARE TUBULAR HEATER
For Diffusion Pump

HEATING ELEMENT for DIFFUSION PUMP Con't



EXAMPLE OF VACUUM PUMP HEATING ELEMENTS

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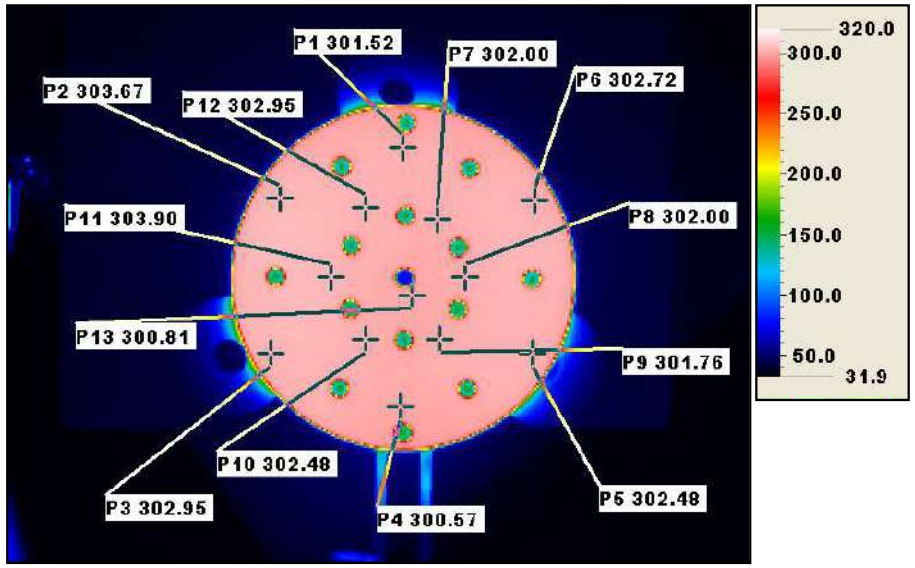
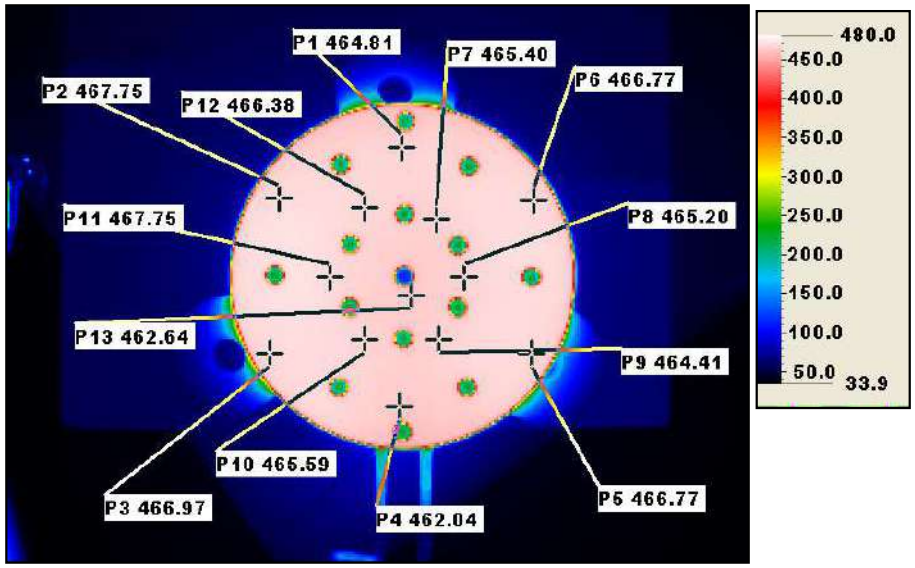
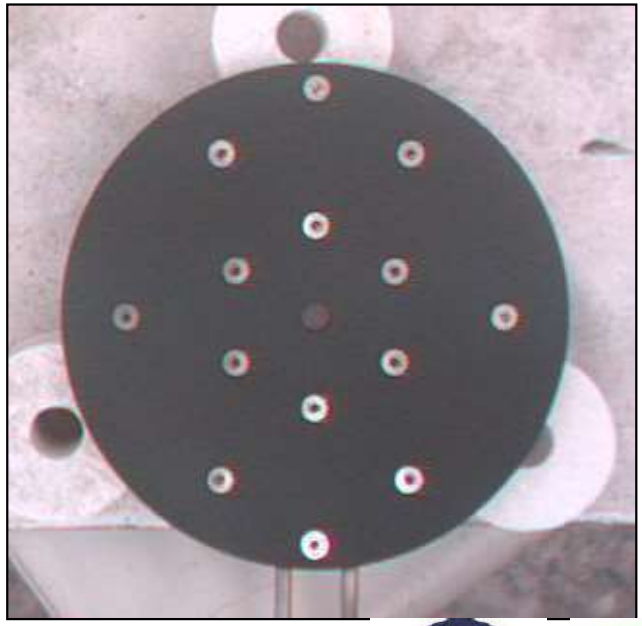
HEATING ELEMENT for DIFFUSION PUMP Con't





DIA. 150 mm 220V 750W

Fired up in ATM



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AREA HEATER

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EXAMPLES of AREA HEATER

Infrared Radiation-AREA HEATER

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EXAMPLES of AREA HEATER Con't

AREA SIZE: 1100X600 mm, 2 FLANGED

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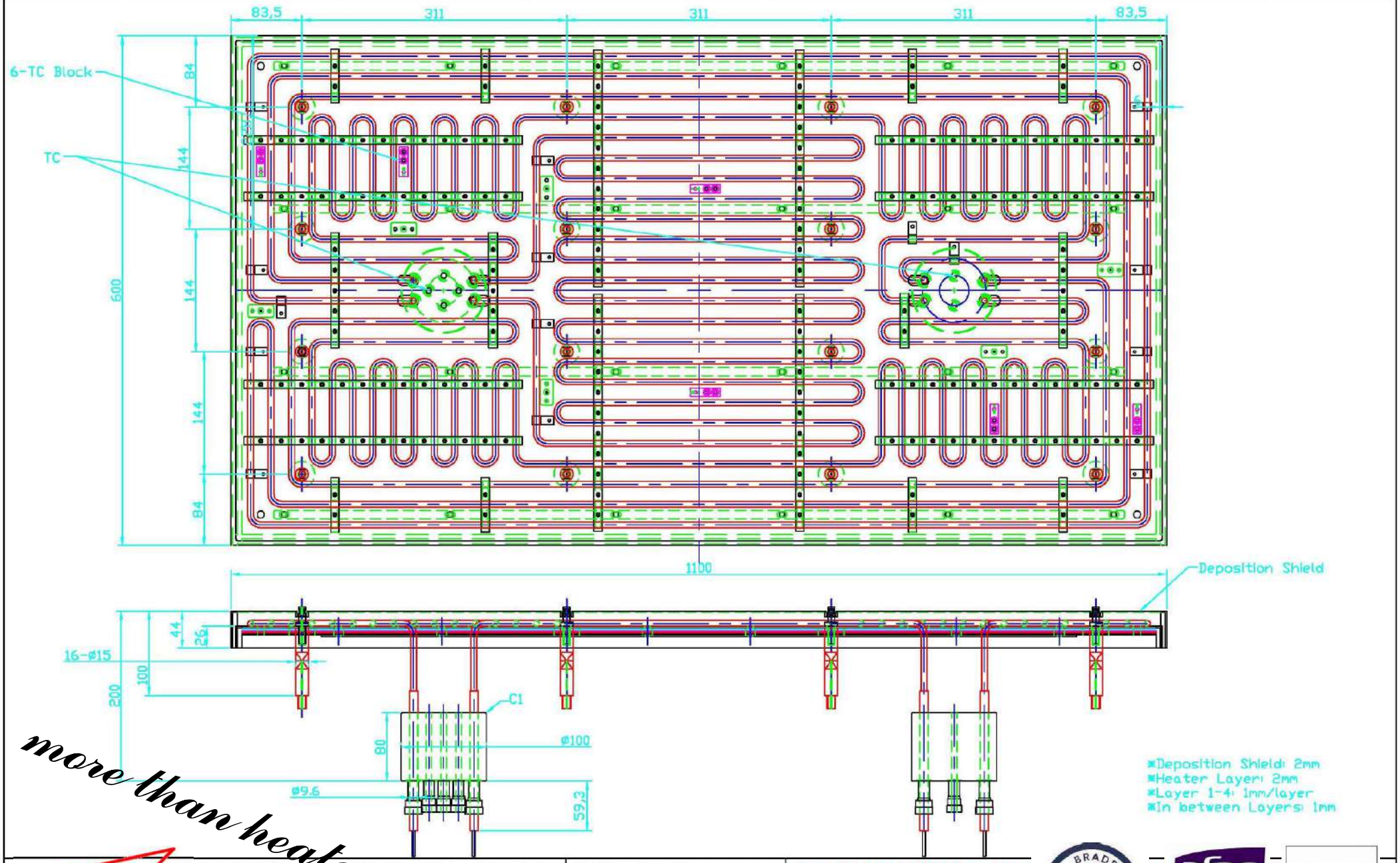
比例/SCALE		製圖/DRAWED BY	K. HUANG	審核/APPROVED BY		CT HEATERS
單位/UNIT	mm	日期/DATE	2008 MAY 29	備註/REMARK		



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正泰電熱股份有限公司 CT HEATERS CHENG TAY HEATER & INSTRUMENT CO., LTD.	圖名/NAME OF GRAPH	Area He Sheath
CT HEATERS	圖號/GRAPH NUMBER	Case 1

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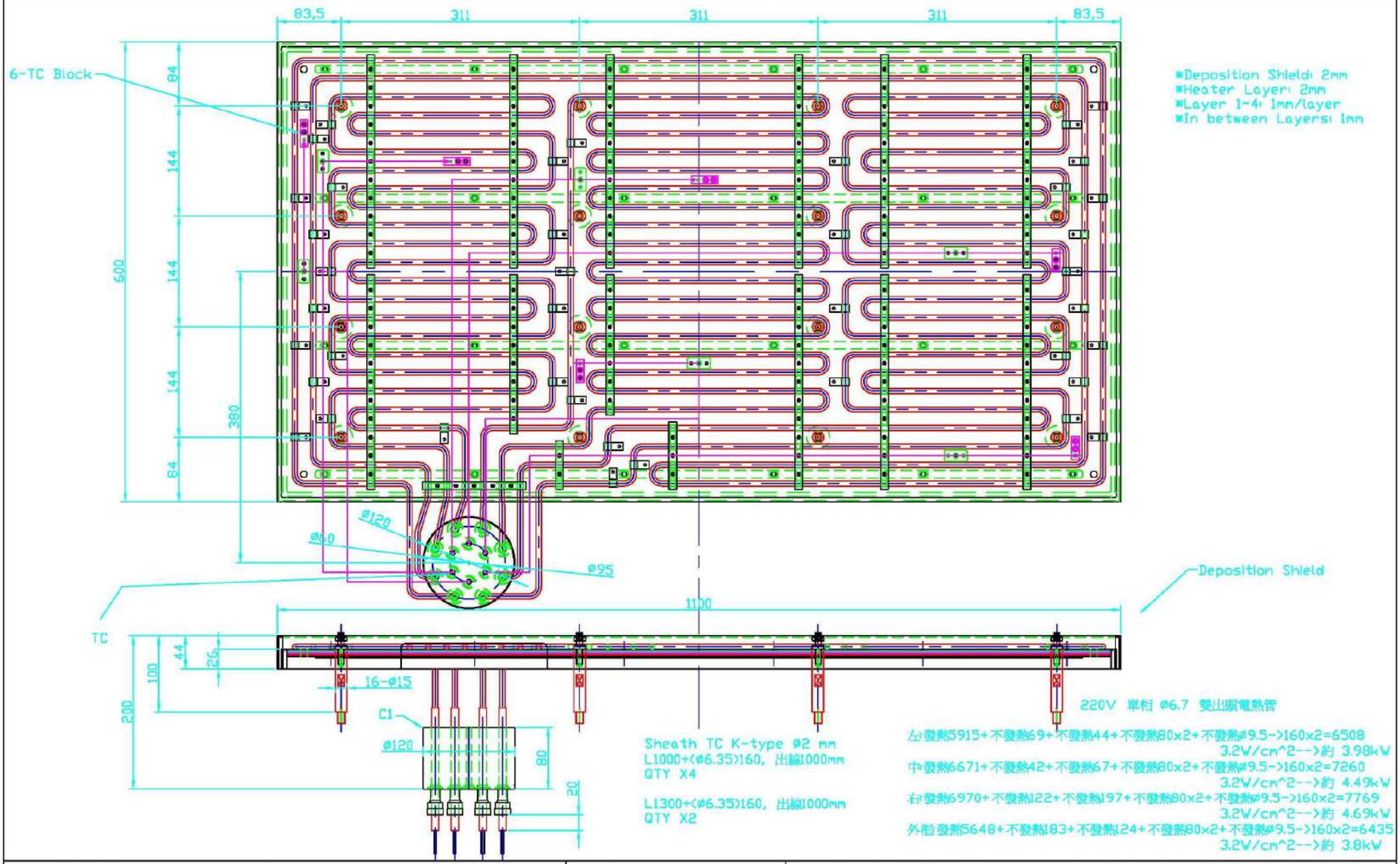
EXAMPLES of AREA HEATER Con’t

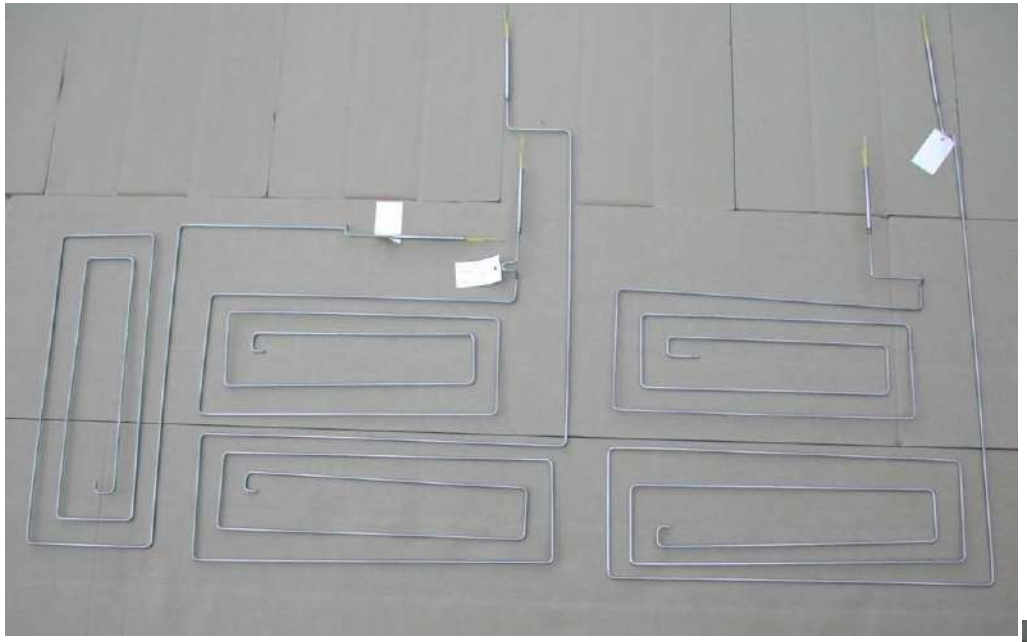
AREA SIZE: 1100X600 mm, SINGLE FLANGED

比例/SCALE		製圖/DRAWED BY	K. HUANG	審核/APPROVED BY		CT HEATERS
單位/UNIT	mm	日期/DATE	2008 MAY 29	備註/REMARK		



正泰電熱股份有限公司 CHENG TAY HEATER & INSTRUMENT CO., LTD.	圖名/NAME OF GRAPH	Area Heater 1100X600 mm for Carrier 1000X500 mm, 220V Approx. 16kW w/ Sheath Ø2.0 K-type TC X6
CT HEATERS	圖號/GRAPH NUMBER	Case 2: Processing

EXAMPLE of AREA HEATER ELEMENTS



Vacuum chamber heating elements

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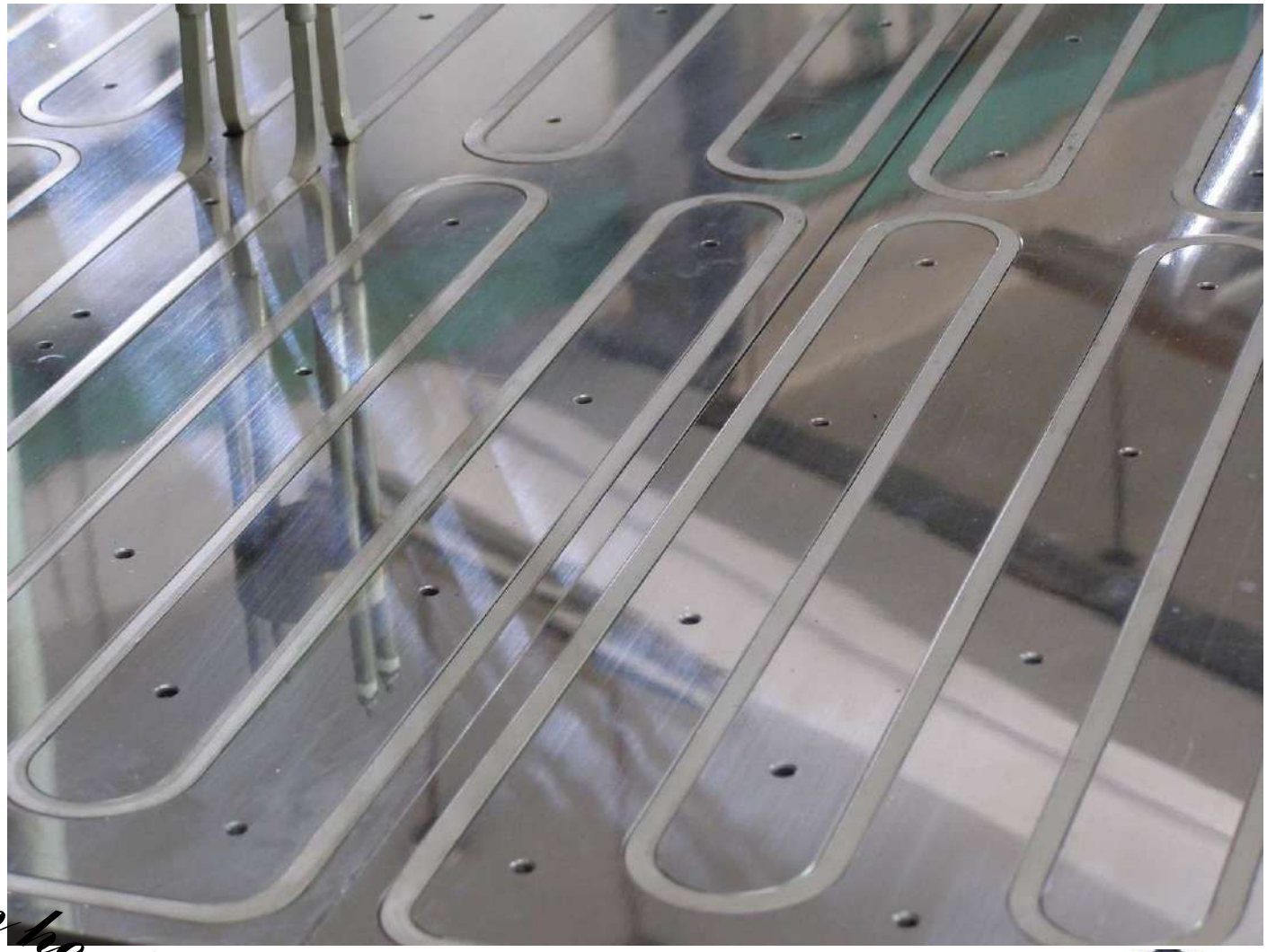
HOT PLATE



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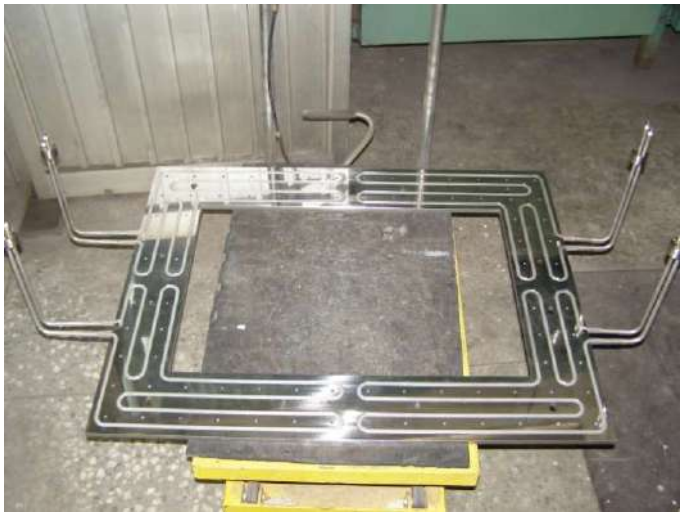
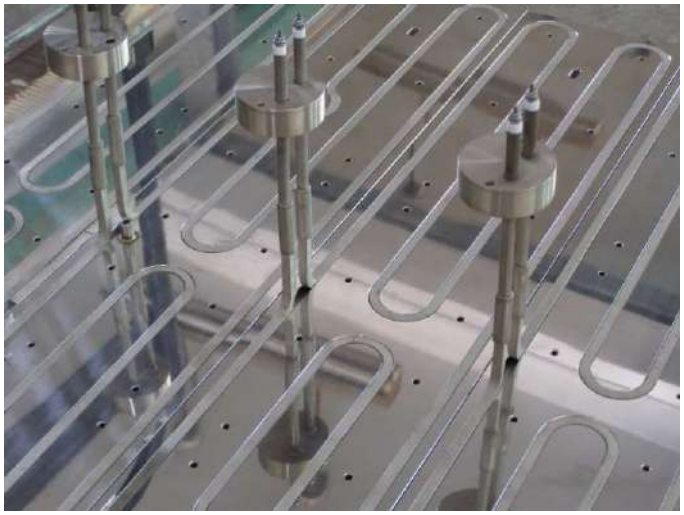
EXAMPLE of Hot Plates





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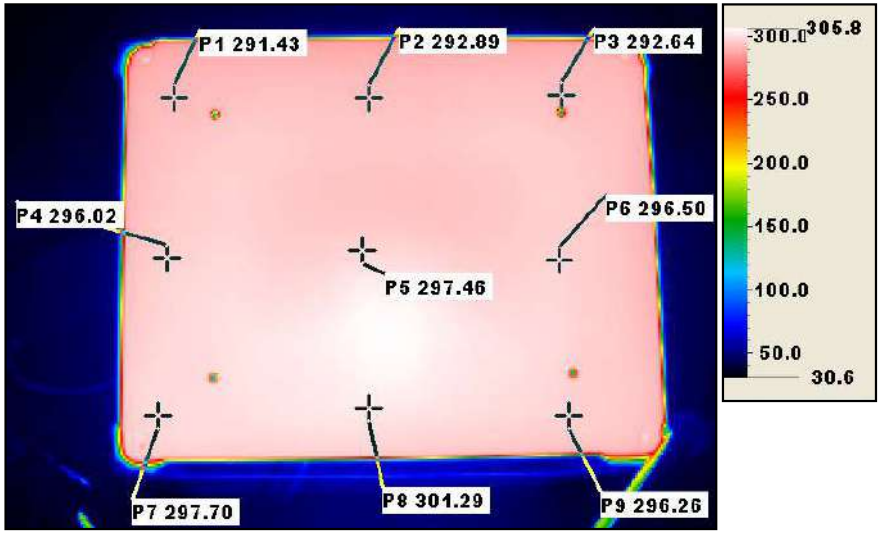
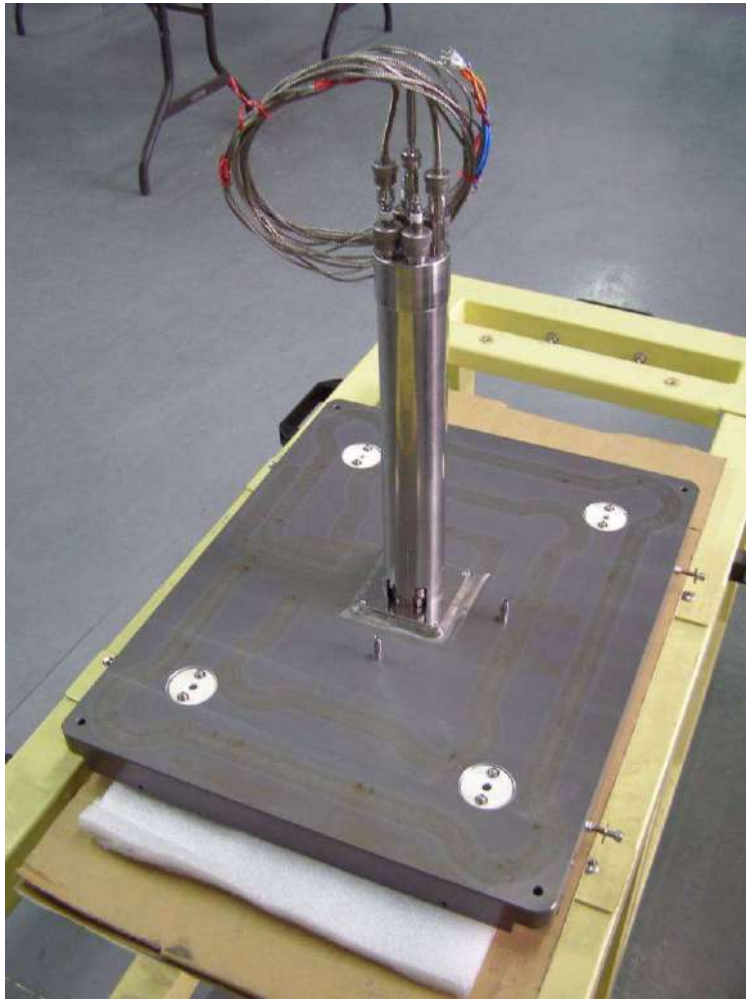
EXAMPLES of susceptor



Controller Temperature @ 300 deg. C in ATM tested



AL, hard anodized 2 heating zones, dim. 500X400X36T mm, 220V 6kW (outer zone), 220V 2kW (inner zone)

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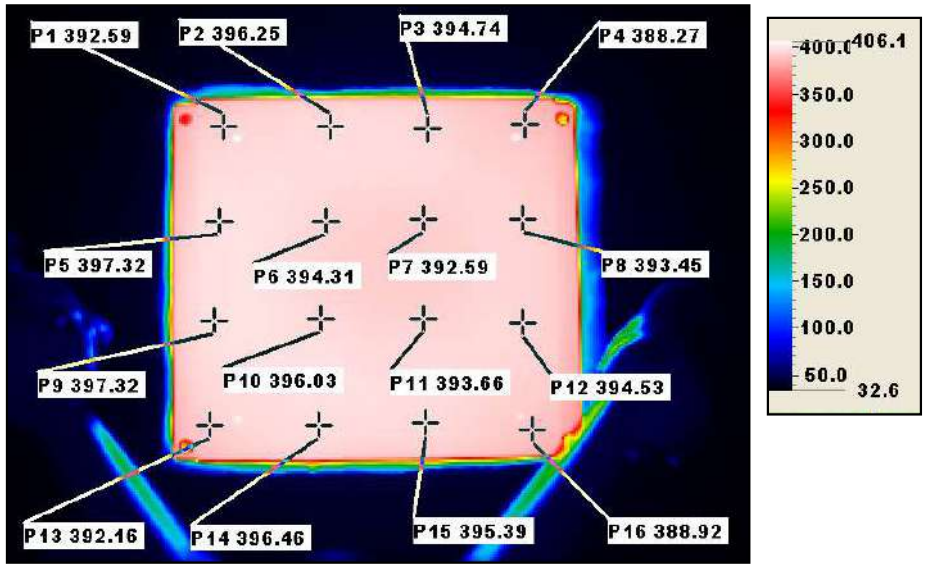
EXAMPLES of susceptor con't



Controller Temperature @ 400 deg. C in ATM tested

AL, hard anodized 2 heating zones, dim. 350X310X40T mm, 220V 1.8kW (outer zone), 220V 1.2kW (inner zone)

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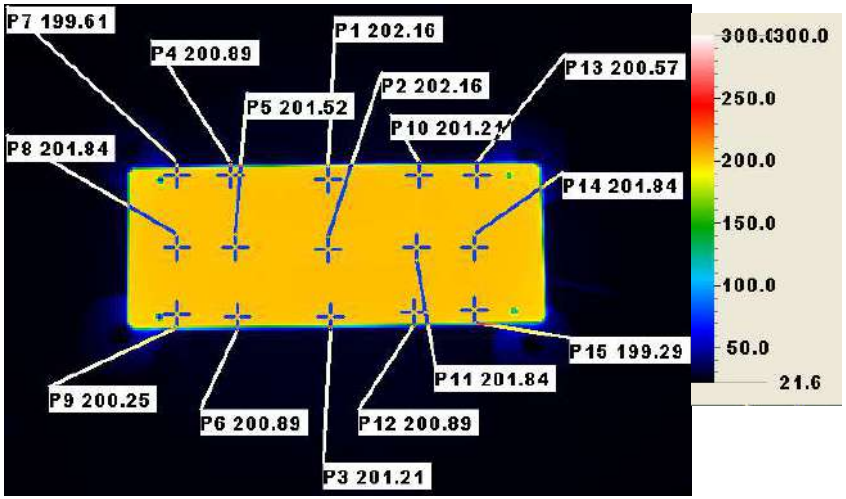
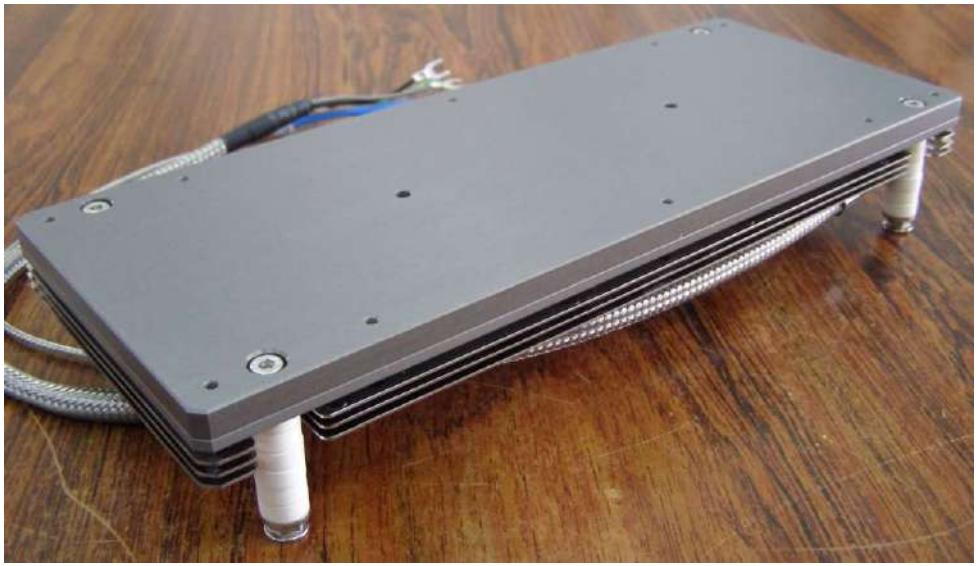
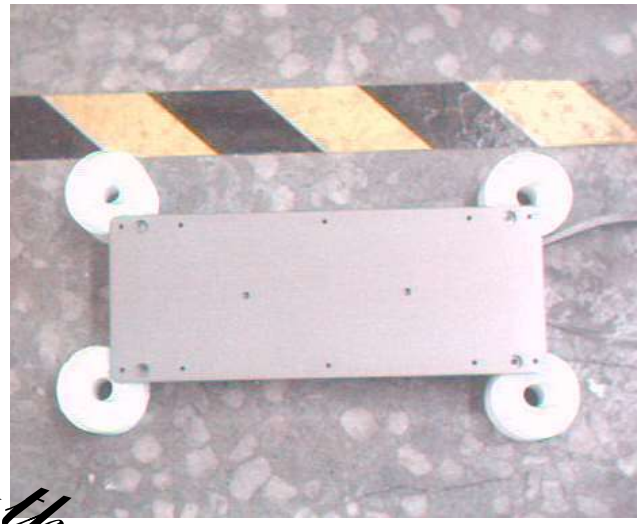
EXAMPLES of hot plate



Controller Temperature @200 deg. C. in ATM tested



AL. hard anodized 1 heating zone,
dim. 270X105X10T mm, 220V800W



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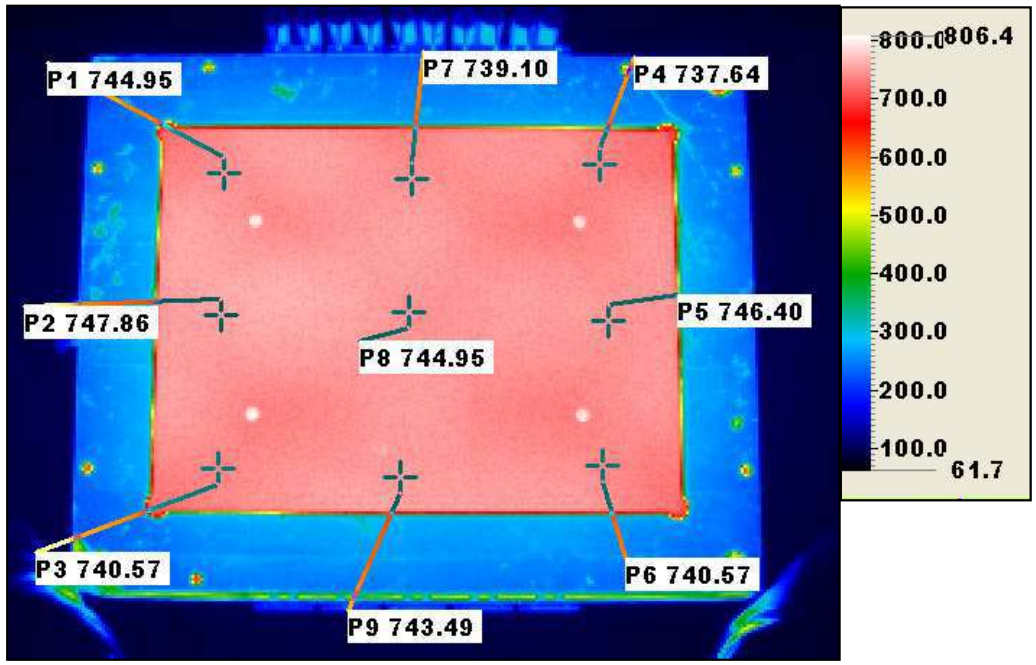
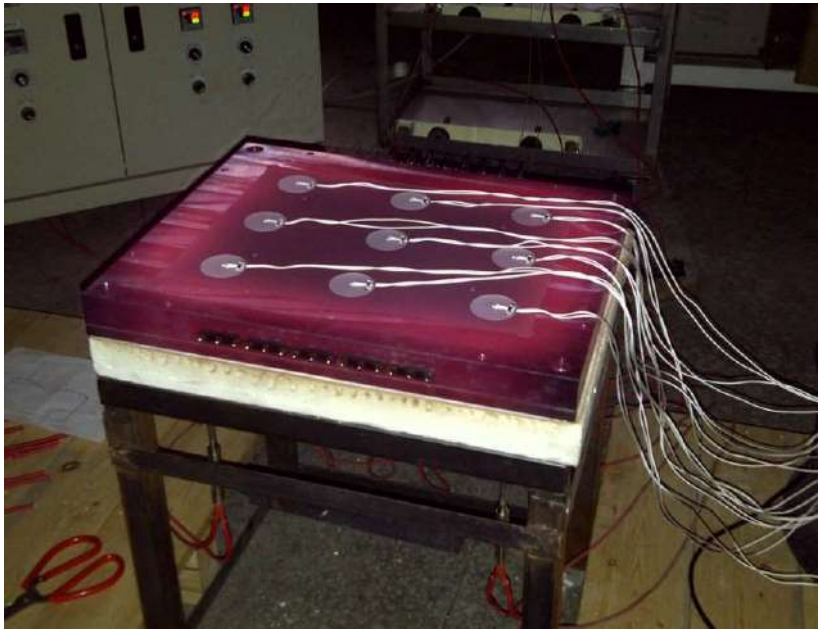
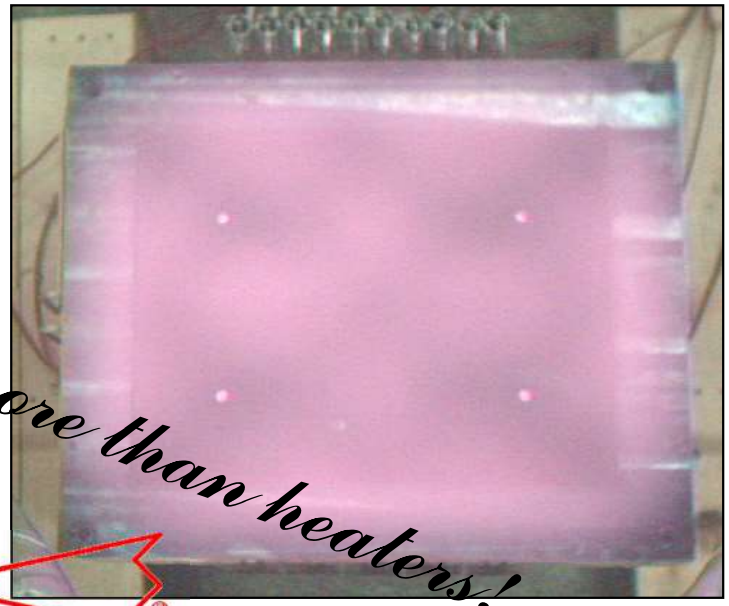
EXAMPLE of hot plate con't



Controller Temperature @750 deg. C in ATM





SUS316L, 5 heating zones

Dim: 520X420X50T

220V 10kW (outer zone), 220V 2.5kW X4 (inner zone)

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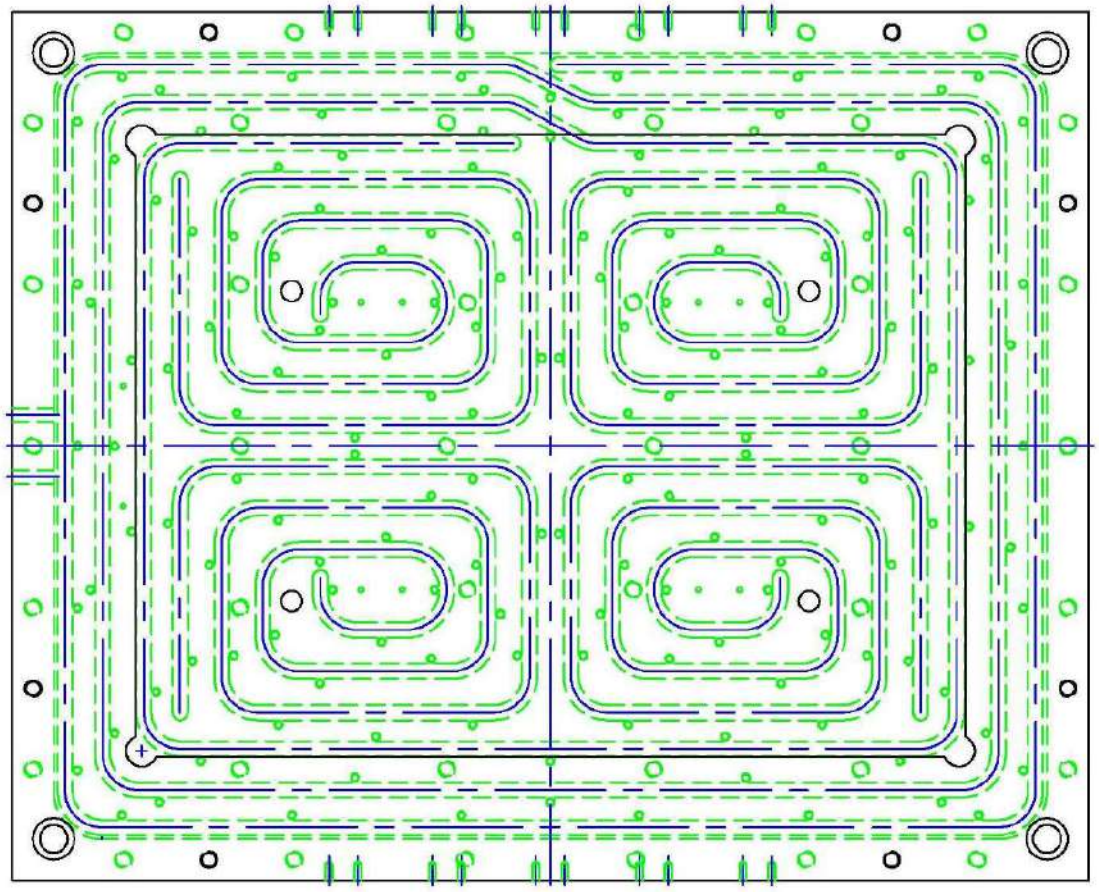
EXAMPLES of hot plate con't



SUS316L DIM: 520X420X50T mm

5 Hot Zones: 220V 10kW outer zone, 220V 2.5kW inner zone X4

10X Sheath Thermocouple

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EXAMPLE of working process

5.7G susceptor during the process

Heating elements bending formation

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INFRARED EMITTERS

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INFRARED HEATING

- An **Infrared Heater** is a body with a higher temperature which transfers energy to a body with a lower temperature through electromagnetic radiation. No contact or medium between the two bodies is needed for the energy transfer .

- Types and structures of **Infrared Heaters** are depending the applications. For example, for many plastics like PVC or polyethylene. Their peak absorption is around 3500 nm, therefore, the choice of Infrared Heater is medium-long wavelength.

DESIGN OF A QUARTZ GLASS TWIN TUBE IR EMITTER

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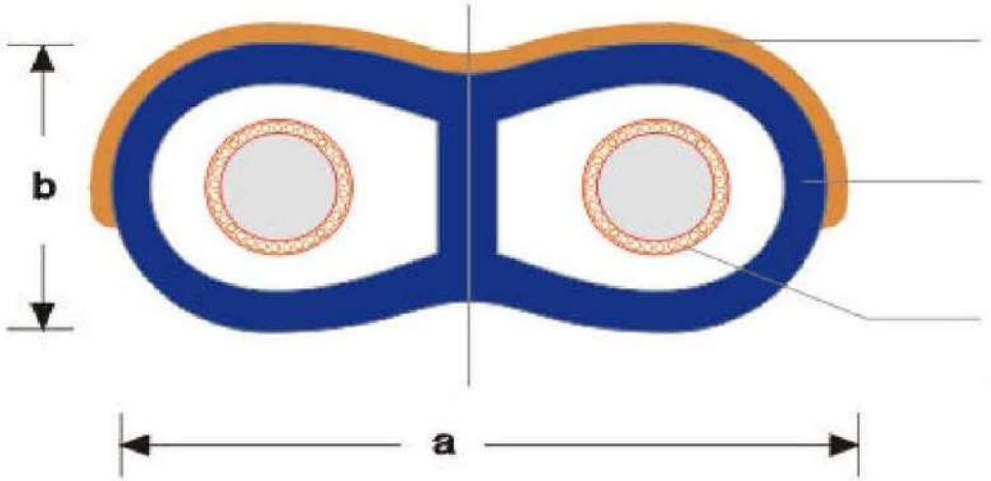

Gold Reflector

Quartz glass ~ 500 °C

Filament 600 - 2500 °C

Source from：Heraeus

Cross sections a x b (mm)	Lengths (mm)
18 x 8	1000
22 x 10	2000
33 x 15	6000
23 x 11	2200
34 x 14	4400

- Variety of wave ranges
- Gold reflector for high efficiency
- High stability for long emitters

These are most common dimension on the market.

INTENSITY DISTRIBUTION OF INFRARED TWIN TUBE EMITTERS

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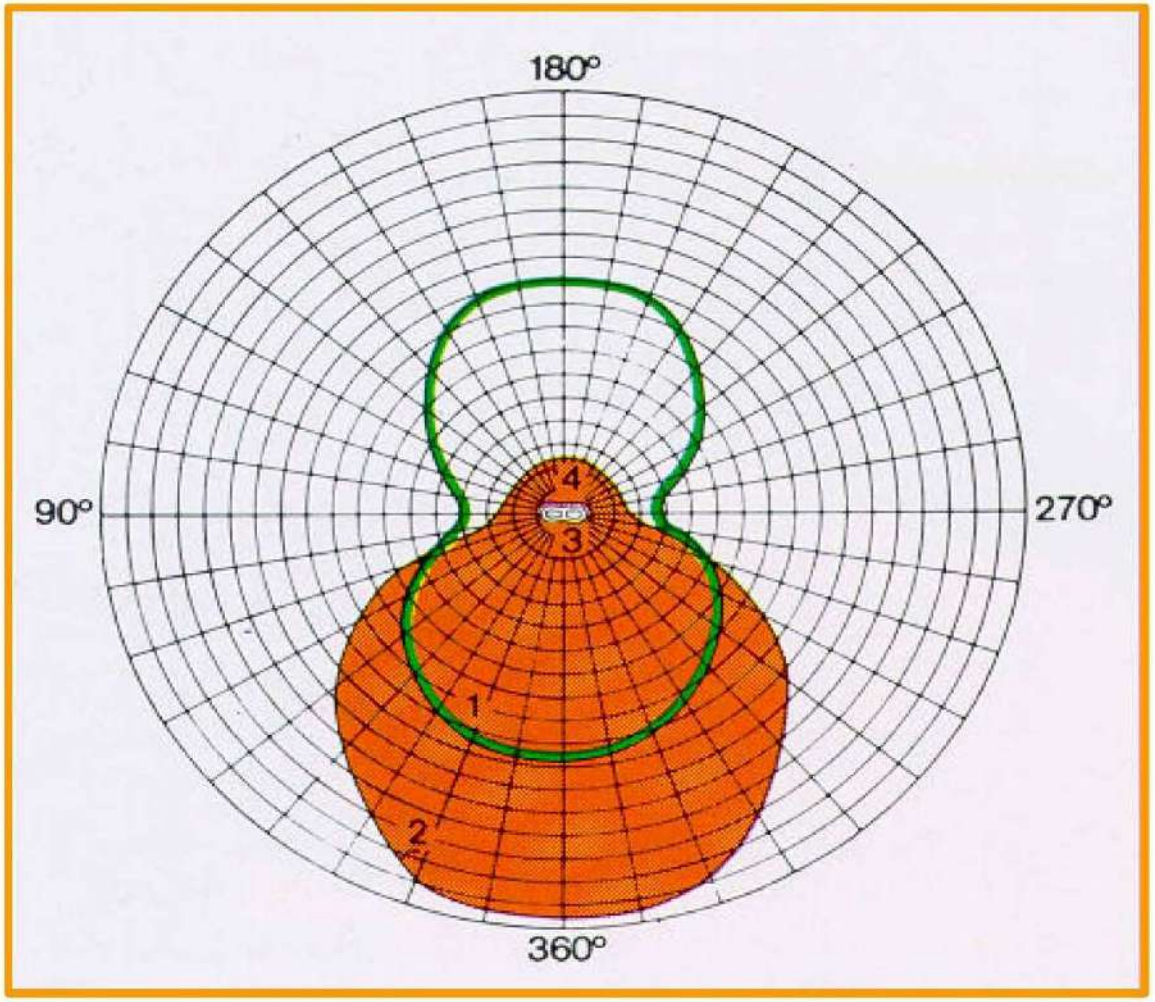


Emitter without Gold Reflector

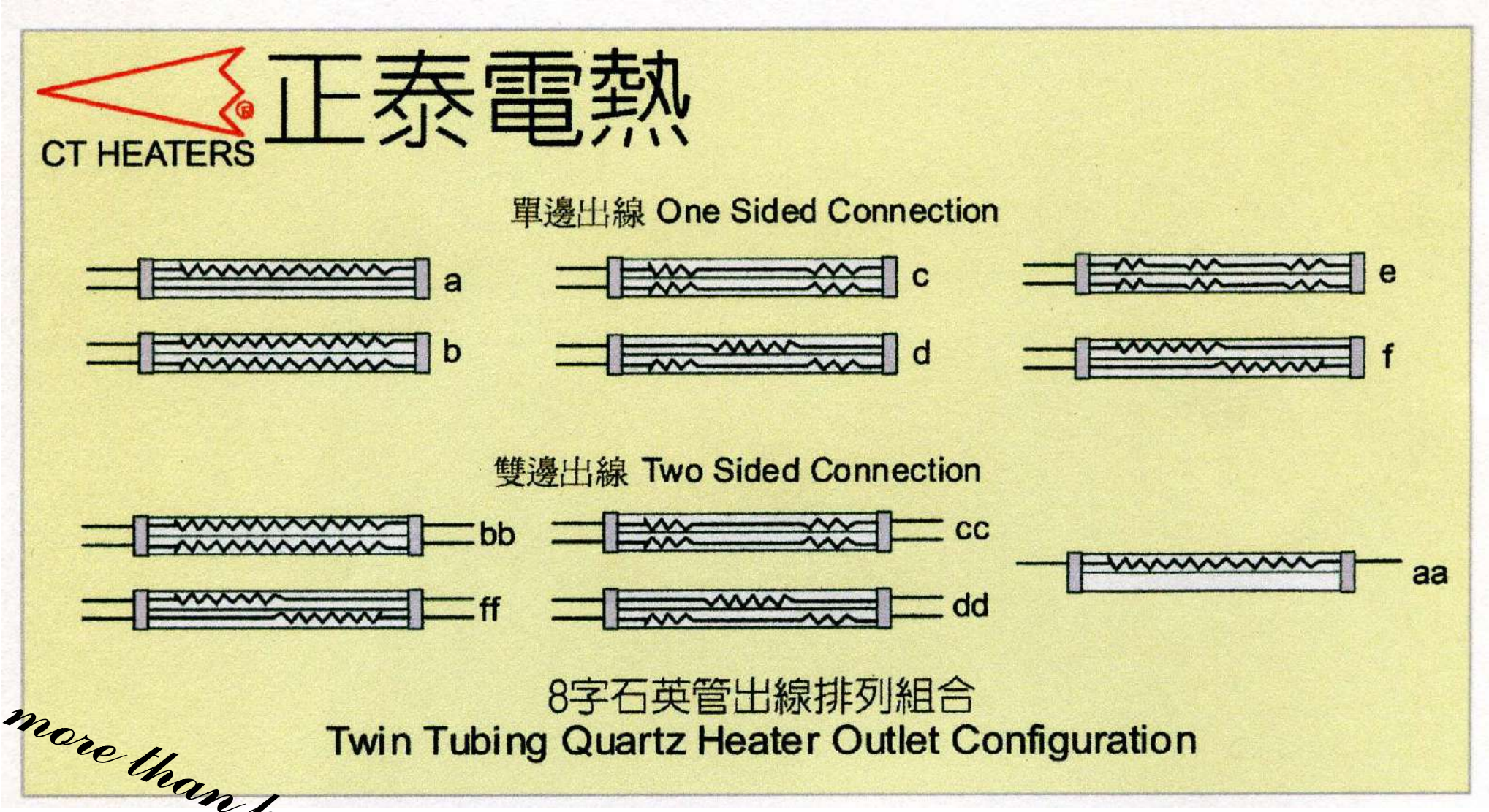
Emitter with Gold Reflector

Emitter Location

Location of Gold Reflector

Source from：Heraeus

TWIN TUBING QUARTZ EMITTER



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SPECTRAL RADIATION DISTRIBUTION

at the same electrical power ratings

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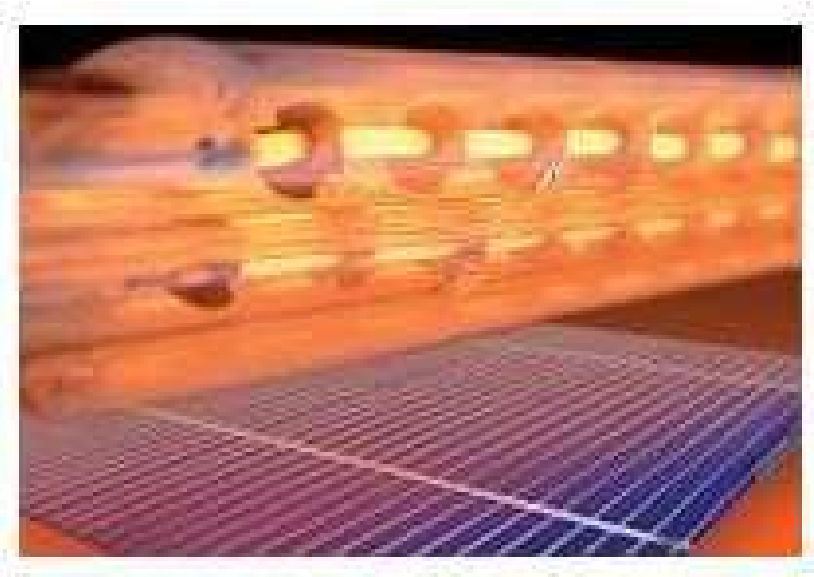

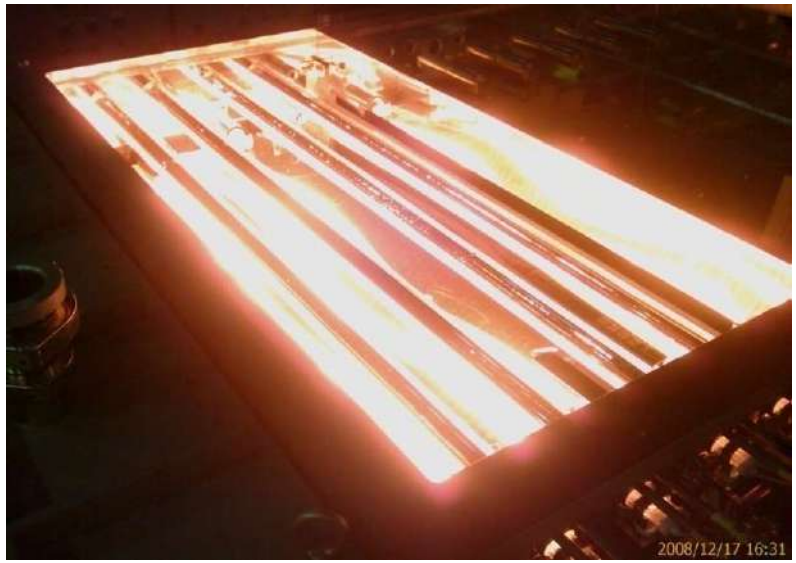

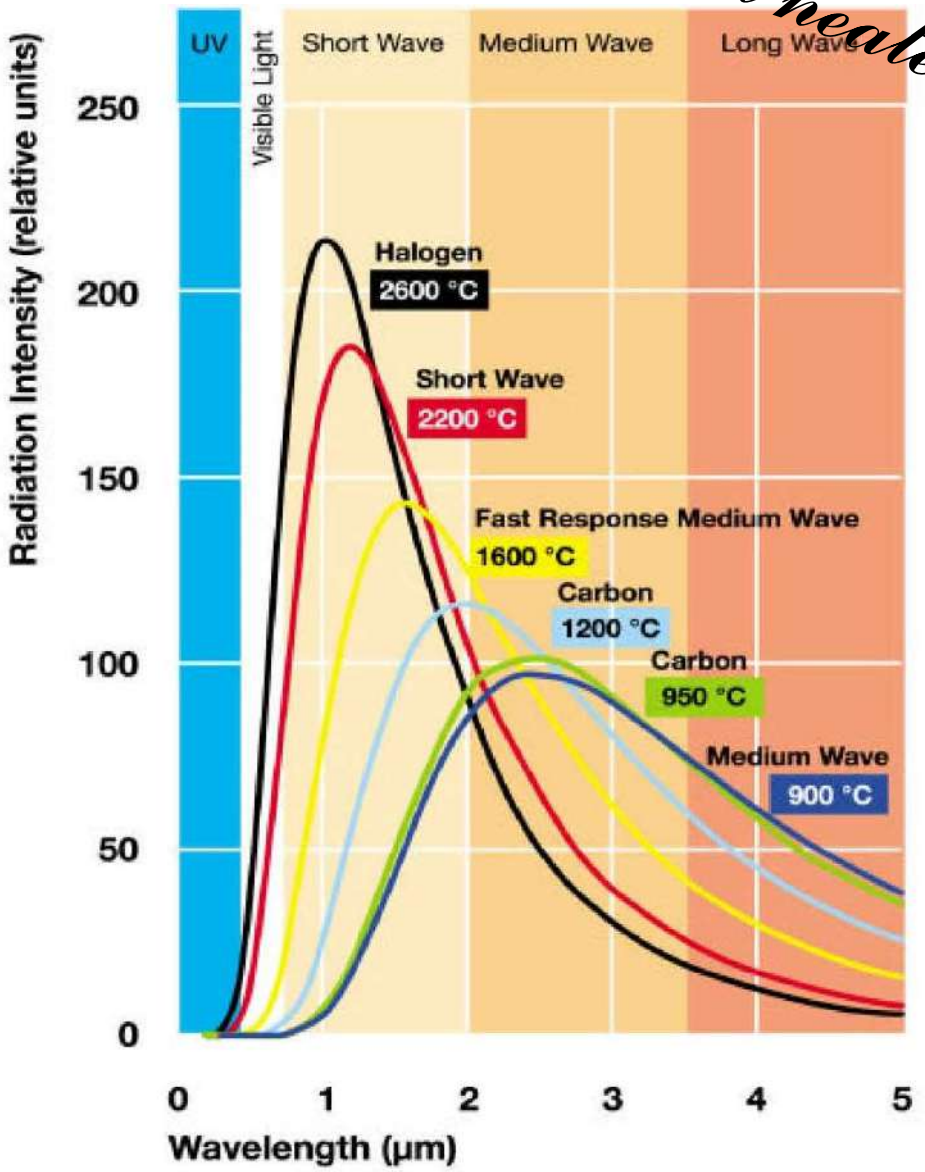

Source from：Heraeus, ITRI

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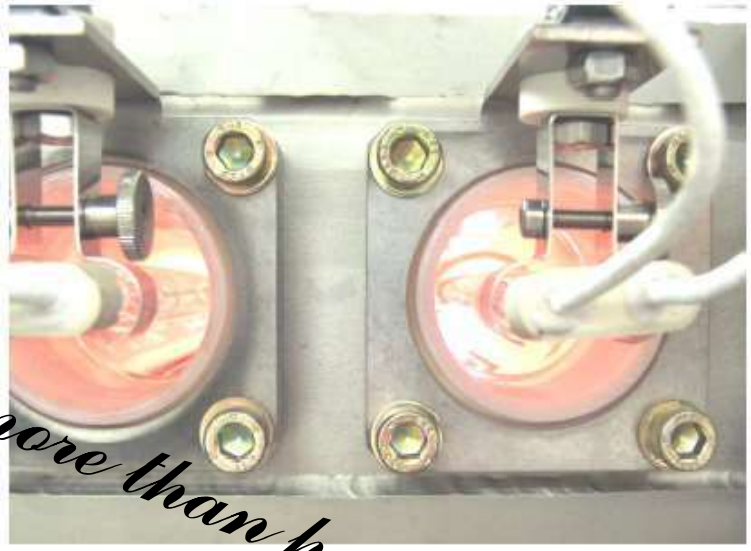
IR HEATING ELEMENT IN PECVD

APPLICATION



Source from：ITRI

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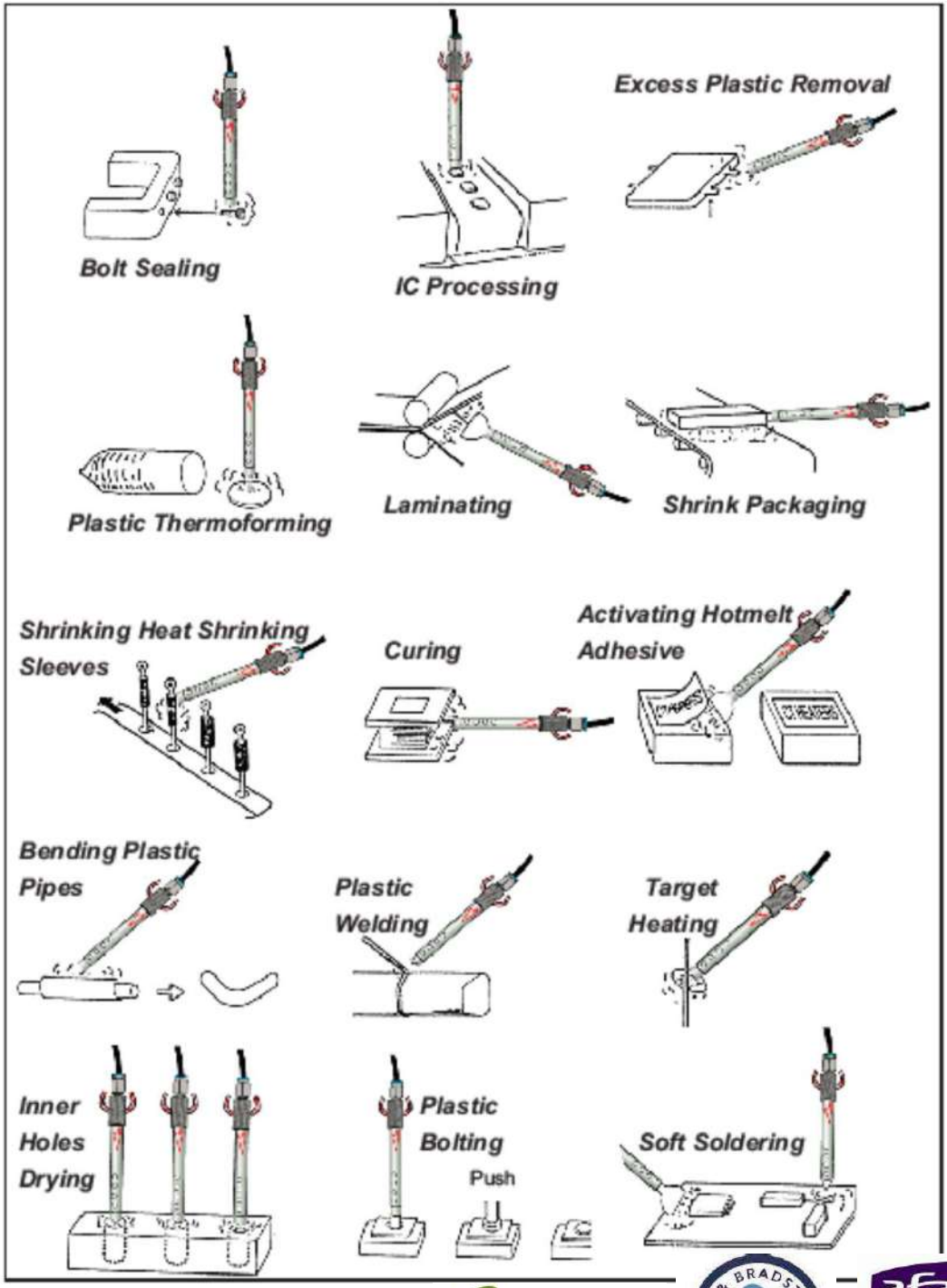
AIR HEATER
Applications of Air Heater



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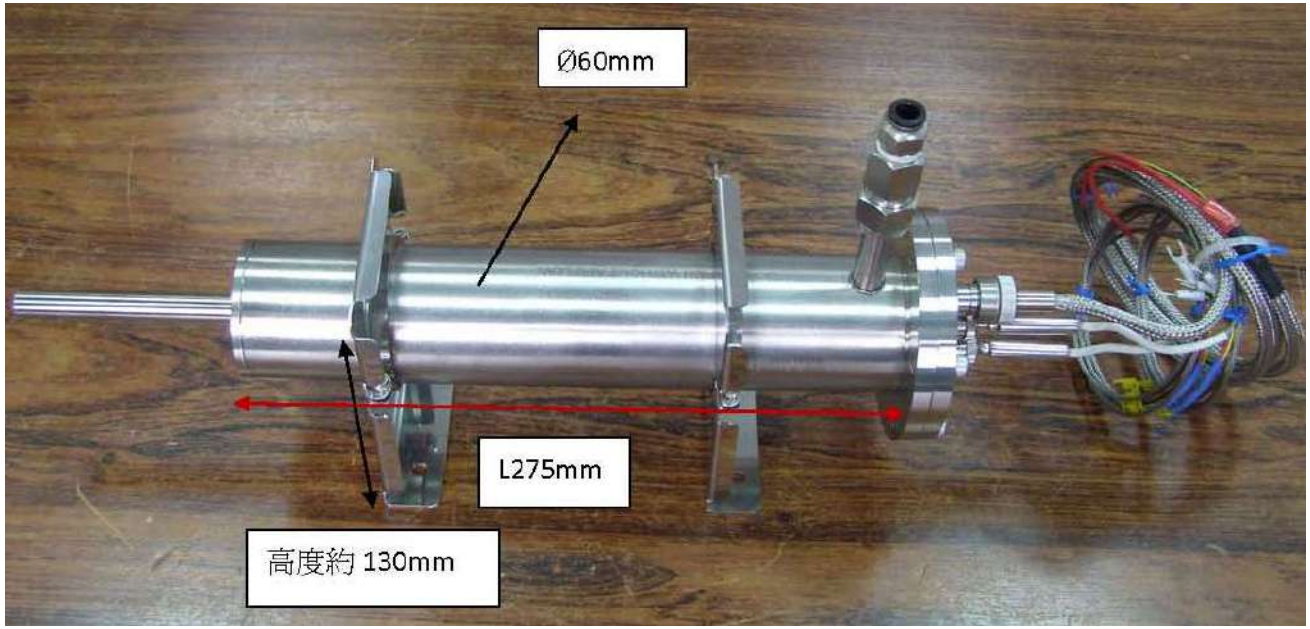
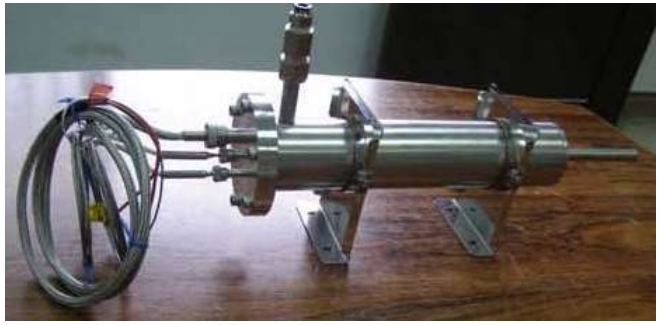
HOT N2 AIR HEATER





This device is designed for inert gas heating, for general application or for vacuum process application.

100 L/min=>500 deg C, 150L/min=>300 deg. C

The pressure of 6kg/cm^2 with maximum air flow 300L / min. Available for larger capacity as well.

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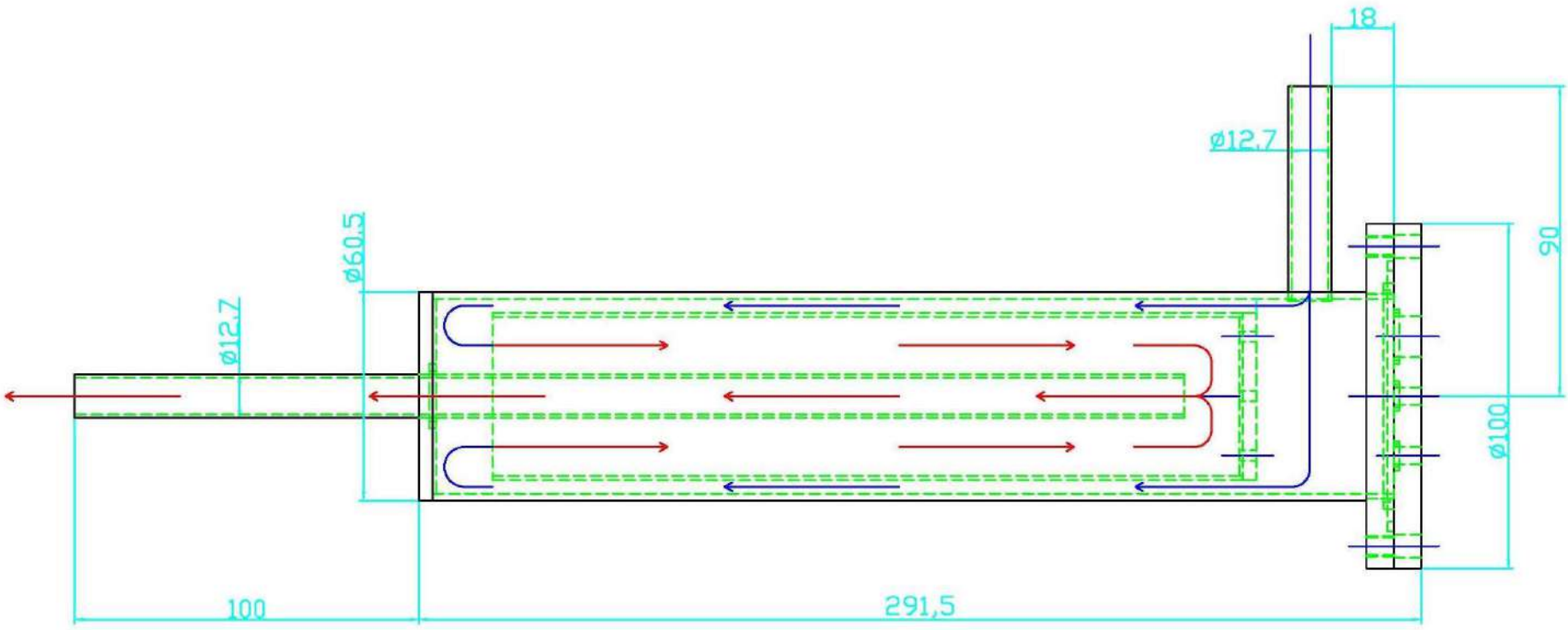
HOT N2 AIR HEATER

Green product



Energy efficiency up to 20% (in comparison of the same power and air flow)
No more uses of thermo jacket.

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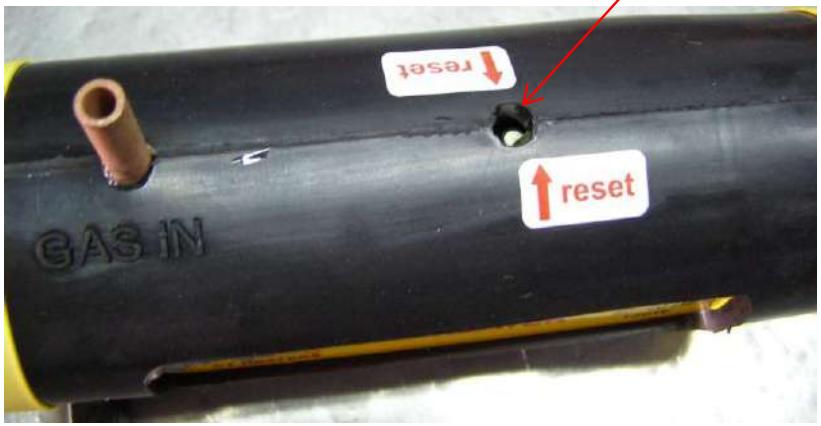
GAS HEATER

DIM:
DIA. 56X160 mm, gas in & out tubing DIA. 6.35 mm, electric outlet 2M

Choice of:
210~230V 120W (blue color code ends and blue label) or 90~120V 120W (yellow color code ends and yellow label) usage.



85℃ thermostat(primary), 100℃ thermostat (secondary-manual reset)
The GAS HEATER has built-in thermostat either 65℃ or 85℃ (primary-auto reset) and 100℃ (secondary-manual reset) thermostat button type.

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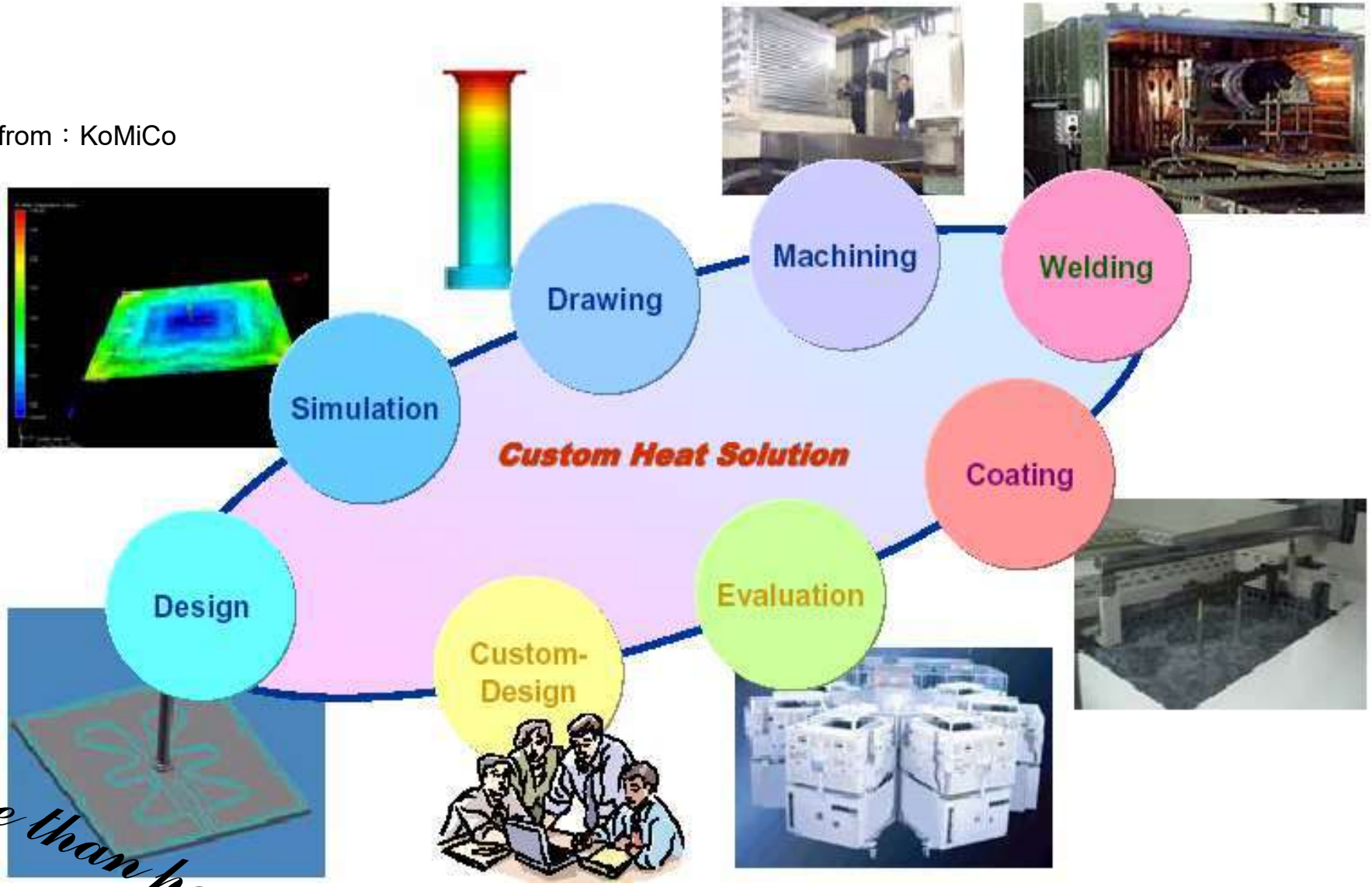
HEATER DEVELOPING PROCEDURE

Source from：KoMiCo



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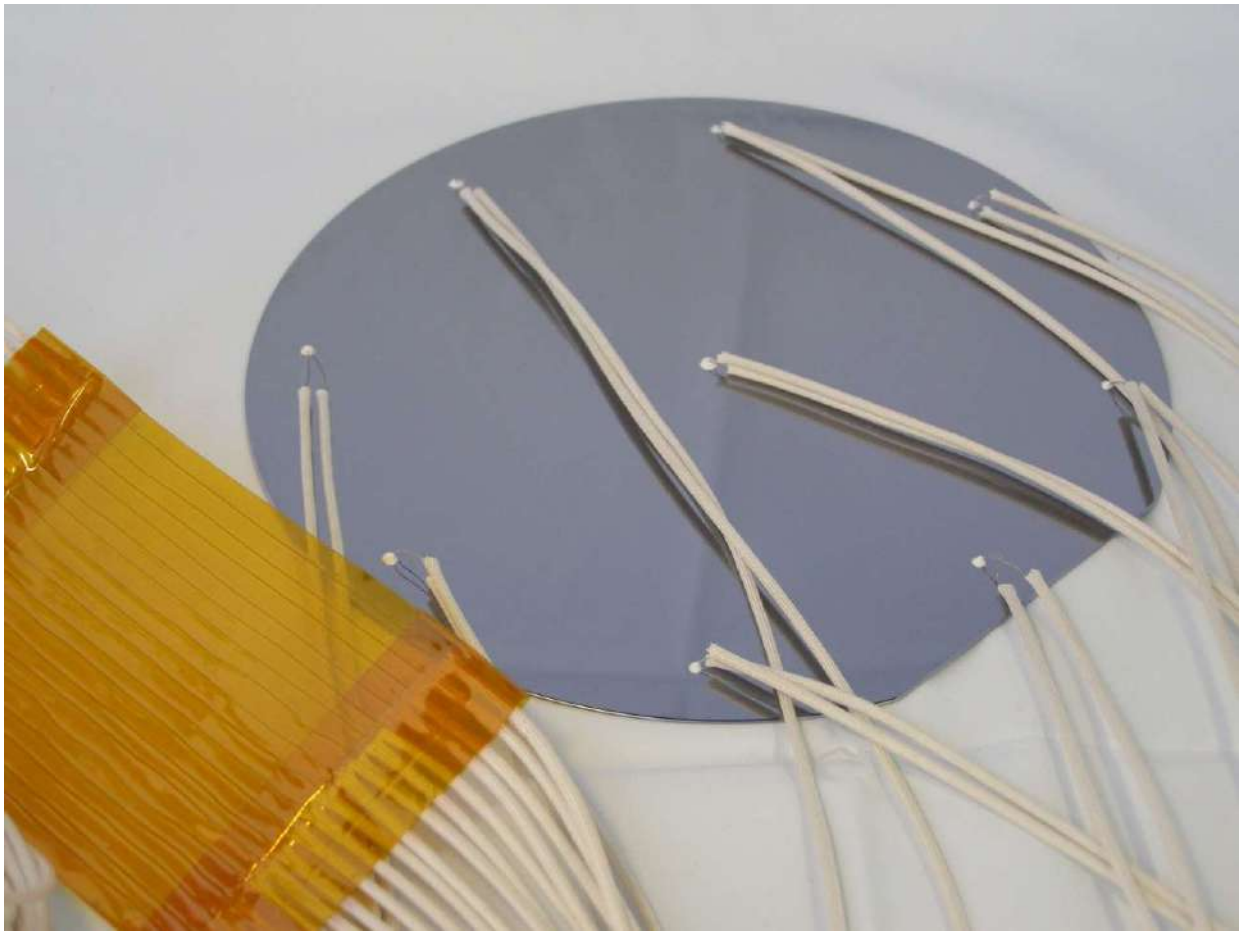
TEMPERATURE SENSORS



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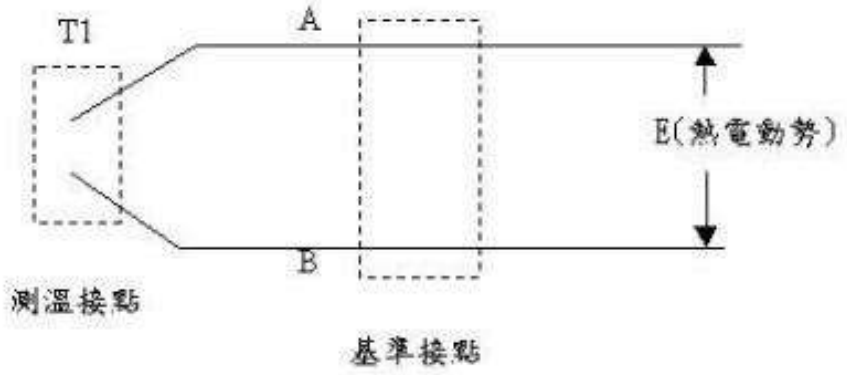
PRINCIPLE of OPERATIONS

In 1821, the German–Estonian physicist Thomas Johann Seebeck discovered that when any conductor is a small cuticle (such as a metal) is subjected to a thermal gradient, it will generate a voltage. This is now known as the thermoelectric effect or Seebeck effect. Any attempt to measure this voltage necessarily involves connecting another conductor to the "hot" end.

http://mmrl.cgu.edu.tw



型別 (Type)	原用記號	構成材料 正極--負極	素綫徑 mm	使用限度 常用溫度 ℃	使用限度 最高使用溫度 ℃	精密階級 級別	精密階級 測定溫度	精密階級 容許差	適用環境
S	PR10%	白金`銥 ㄌㄠˊ√10% / 白金	0.5	1,400	1,600	0.25級	0-600℃	±1.5℃	窯業、磁鐵、製鋼金屬工業、化學工業。氧化、不活性氣體中適用。但還元氣體、碳、金屬蒸氣中及核子環境則避之。
R	PR13%	白金`銥 ㄌㄠˊ√13% / 白金	0.5	1,400	1,600				
	PR20%	白金`銥 ㄌㄠˊ√20% / 白金`銥 ㄌㄠˊ√5%	0.5	1,600	1,800				
B	PR30%	白金`銥 ㄌㄠˊ√30%/白金`銥 ㄌㄠˊ√6%	0.5	1,700	1,800				
	PR40%	白金`銥 ㄌㄠˊ√40%/白金`銥 ㄌㄠˊ√20%	0.5	1,800	1,900		600-1800℃	±0.25%	
C	W5	鎢ㄨ``錸ㄌㄠˊ5%/鎢ㄨ``錸 ㄌㄠˊ26%	0.5	2,000	2,300				還原、不活性、真空核子環境。
	W3	鎢ㄨ``錸ㄌㄠˊ3%/鎢ㄨ``錸 ㄌㄠˊ25%	0.5	2,000	2,300				
K	C.A.	鉻ㄍㄜ`鎳ㄋㄧㄝ`合金/鋁鎳ㄋㄧㄝ`合金	0.65 1 1.6 2.3 3.2	650 750 850 900 1,000	850 950 1,050 1,100 1,200	0.4級 0.75級 0.4級 0.75級	0-400℃ 400-1000℃	±1.6℃ ±3℃ ±0.4% ±0.75%	容許測溫範圍內均適合。
J	I.C.	鐵ㄧ/鎳ㄋㄠˊ(銅鎳ㄋㄧㄝ`合金)	0.65 1 1.6 2.3 3.2	400 450 500 550 600	400 550 650 750 800	0.75級 0.75級	0-400℃ 400-600℃	±3℃ ±6℃ ±0.75% ±1.5%	比較不易受還元氣體之影響。
E	C.R.C.	鉻ㄍㄜ`鎳ㄋㄧㄝ`合金一/鎳ㄋㄠˊ(銅鎳ㄋㄧㄝ`合金)	0.65 1 1.6 2.3 3.2	450 500 550 600 700	500 550 650 750 800	0.75級 0.75級	0-400℃ 400-700℃	±3℃ ±0.75%	比I.C更具優越之耐蝕性，最適於800℃以下之溫域。
T	C.C.	銅一/鎳ㄋㄠˊ(銅鎳ㄋㄧㄝ`合金)	0.32 0.65 1 1.6	200 200 250 300	250 250 300 350	0.75級 0.75級	0-200℃ 200-	±1.5℃	適用於低溫域，尤適於弱酸性及還元氣

最常用的是 J 和 K TYPE

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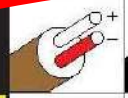
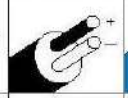
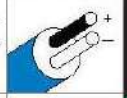
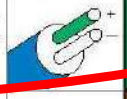
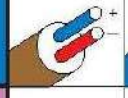
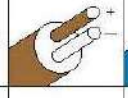
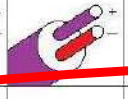
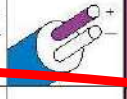
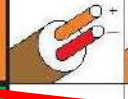
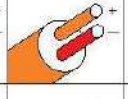
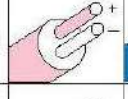
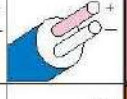
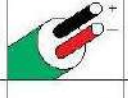
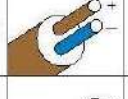
Source from: OMEGA

ANSI Code	ANSI MC 96.1 Color Coding: Thermocouple Grade	ANSI MC 96.1 Color Coding: Extension Grade	Alloy Combination: + Lead	Alloy Combination: – Lead	Comments Environment Bare Wire	Maximum T/C Grade Temp. Range	EMF (mV) Over Max. Temp. Range	IEC 584-3 Color Coding: Thermocouple Grade	IEC 584-3 Color Coding: Intrinsically Safe	IEC Code
J			IRON Fe (magnetic)	CONSTANTAN COPPER-NICKEL Cu-Ni	Reducing, Vacuum, Inert. Limited Use in Oxidizing at High Temperatures. Not Recommended for Low Temperatures.	-210 to 1200°C -346 to 2193°F	-8.095 to 69.553			J
K			CHROMEGA® NICKEL-CHROMIUM Ni-Cr	ALOMEGA® NICKEL-ALUMINUM Ni-Al (magnetic)	Clean Oxidizing and Inert. Limited Use in Vacuum or Reducing. Wide Temperature Range, Most Popular Calibration	-270 to 1372°C -454 to 2501°F	-6.458 to 54.886			K
T			COPPER Cu	CONSTANTAN COPPER-NICKEL Cu-Ni	Wind Oxidizing, Reducing Vacuum or Inert. Good Where Moisture Is Present. Low Temperature & Cryogenic Applications	-270 to 400°C -454 to 752°F	-6.258 to 20.872			T
E			CHROMEGA® NICKEL-CHROMIUM Ni-Cr	CONSTANTAN COPPER-NICKEL Cu-Ni	Oxidizing or Inert. Limited Use in Vacuum or Reducing. Highest EMF Change Per Degree	-270 to 1000°C -454 to 1832°F	-9.835 to 76.373			E
N			OMEGA-P® NICROSIL Ni-Cr-Si	OMEGA-N® NISIL N-Si-Mg	Alternative to Type K. More Stable at High Temps.	-270 to 1300°C -450 to 2372°F	-4.345 to 47.513			N
R	NONE ESTABLISHED		PLATINUM 13% RHODIUM Pt-13% Rh	PLATINUM Pt	Oxidizing or Inert. Do Not Insert in Metal Tubes. Beware of Contamination. High Temperature	-50 to 1768°C -58 to 3214°F	-0.226 to 21.101			R
S	NONE ESTABLISHED		PLATINUM-10% RHODIUM Pt-10% Rh	PLATINUM Pt	Oxidizing or Inert. Do Not Insert in Metal Tubes. Beware of Contamination. High Temperature	-50 to 1768°C -58 to 3214°F	-0.236 to 18.693			S
U	NONE ESTABLISHED		COPPER Cu	COPPER-LOW NICKEL Cu-Ni	Extension Grade Connecting Wire for R & S Thermocouples. Also Known as RX & SX Extension Wire.					U
B	NONE ESTABLISHED		PLATINUM-30% RHODIUM Pt-30% Rh	PLATINUM-6% RHODIUM Pt-6% Rh	Oxidizing or Inert. Do Not Insert in Metal Tubes. Beware of Contamination. High Temp. Common Use in Glass Industry	0 to 1820°C 32 to 3308°F	0 to 13.820			B
G* (W)	NONE ESTABLISHED		TUNGSTEN W	TUNGSTEN-26% RHENIUM W-26% Re	Vacuum, Inert, Hydrogen. Beware of Embrittlement. Not Practical Below 399°C (750°F). Not for Oxidizing Atmosphere	0 to 2320°C 32 to 4206°F	0 to 39.564	NO STANDARD USE ANSI COLOR CODE		G (W)
C* (W5)	NONE ESTABLISHED		TUNGSTEN-5% RHENIUM W-5% Re	TUNGSTEN-26% RHENIUM W-26% Re	Vacuum, Inert, Hydrogen. Beware of Embrittlement. Not Practical Below 399°C (750°F) Not for Oxidizing Atmosphere	0 to 2320°C 32 to 4206°F	0 to 37.066	NO STANDARD USE ANSI COLOR CODE		C (W5)
D* (W3)	NONE ESTABLISHED		TUNGSTEN-3% RHENIUM W-3% Re	TUNGSTEN-25% RHENIUM W-25% Re	Vacuum, Inert, Hydrogen. Beware of Embrittlement. Not Practical Below 399°C (750°F)–Not for Oxidizing Atmosphere	0 to 2320°C 32 to 4206°F	0 to 39.506	NO STANDARD USE ANSI COLOR CODE		D

Connectors

Connectors

* Not official symbol or standard designation

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MOST COMMON THERMOCOUPLE TYPES

ANSI CODE	CONDUCTOR CHARACTERISTICS		USEFUL TEMPERATURE RANGE	
	POSITIVE +	NEGATIVE -	℃	℉
J	IRON	CONSTANTAN	95 TO 760	200 TO 1400
	鐵	銅鎳合金		
	MAGNETIC	NON-MAGNETIC		
	WHITE	RED		
K	CHROMEL®	ALUMEL®	95 TO 1260	200 TO 2300
	鎳鉻合金	鎳鋁合金		
	NON-MAGNETIC	MAGNETIC		
	YELLOW	RED		
N	NICROSIL (NP)	NISIL (NN)	650 TO 1260	1200 TO 2300
	Ni-Cr-Si 鎳鉻矽合金	Ni-Si-Mg鎳矽合金		
	NON-MAGNETIC	MAGNETIC		
	ORANGE	RED		

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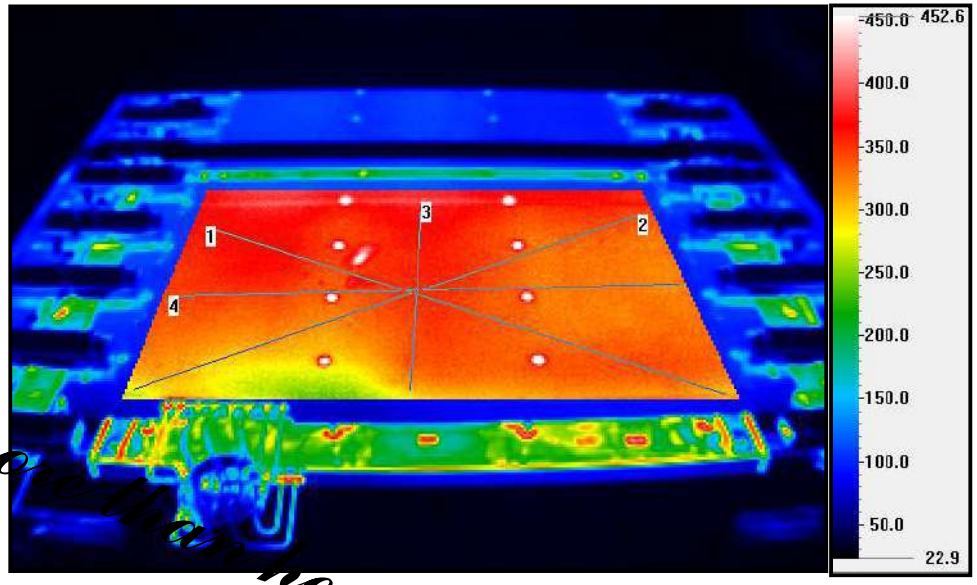
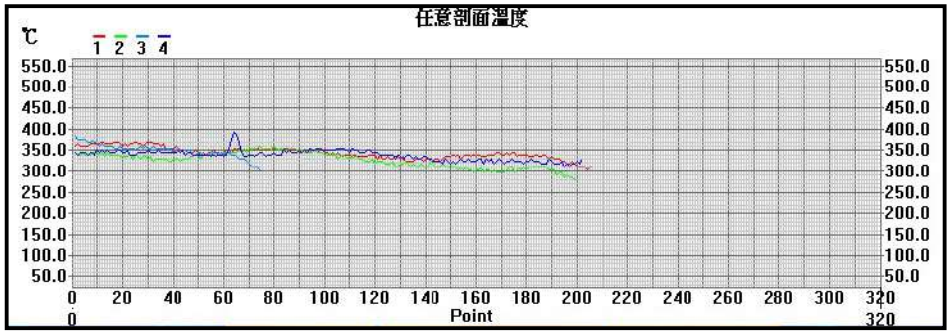
INFRARED THERMAL IMAGING

Source from: Ching Hsing Computer-Tech





Thermal Imaging Analysis Service available up to 2000 deg. C

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DATA LOGGER

Source from：DATAPAQ

Measuring the actual product temperature under normal furnace operating conditions the Data Logger system is used to optimize the contact firing furnace. Subsequent to this, the system can be used for routine monitoring thus warning the process engineer of any drift in the process.

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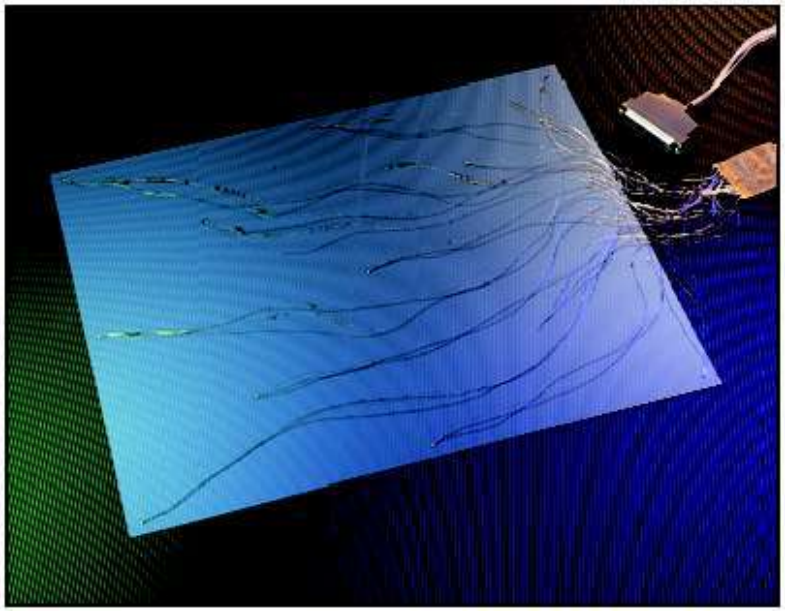
TC-WAFER/GLASS

Thermocouple Wafer



Thermocouple Glass

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TC-WAFER/GLASS Con't

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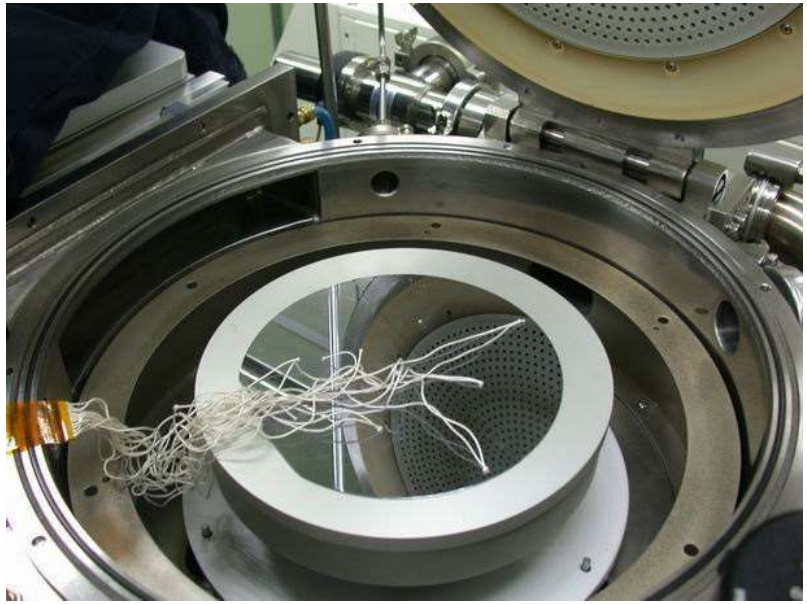
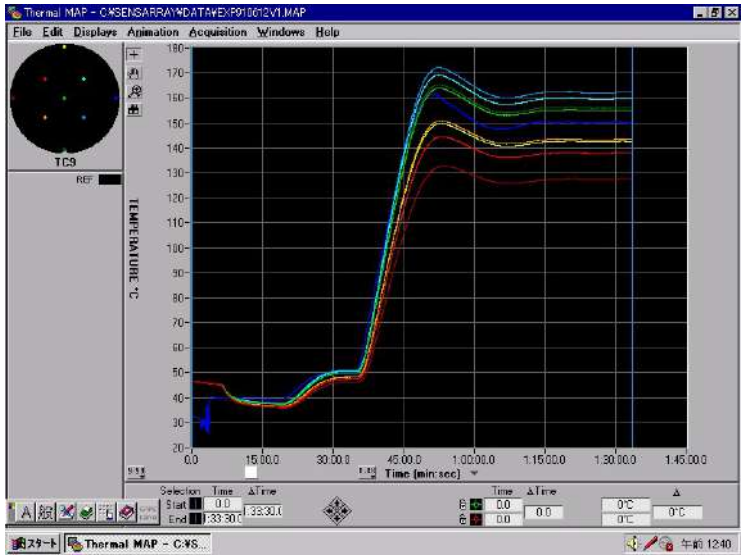
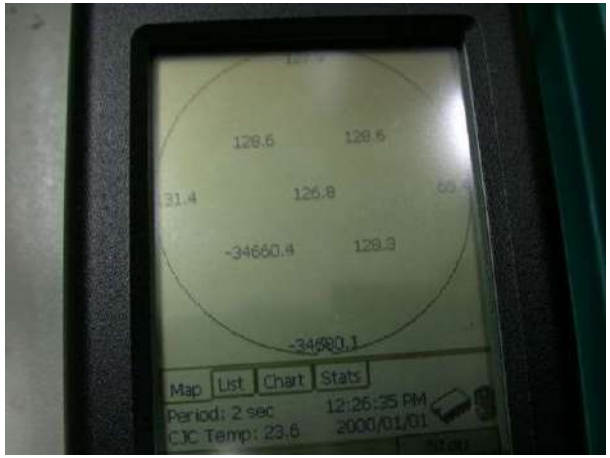


FeedThrough 採用Polyimide Kapton平板線
配合腔體的O型環來作真空密封





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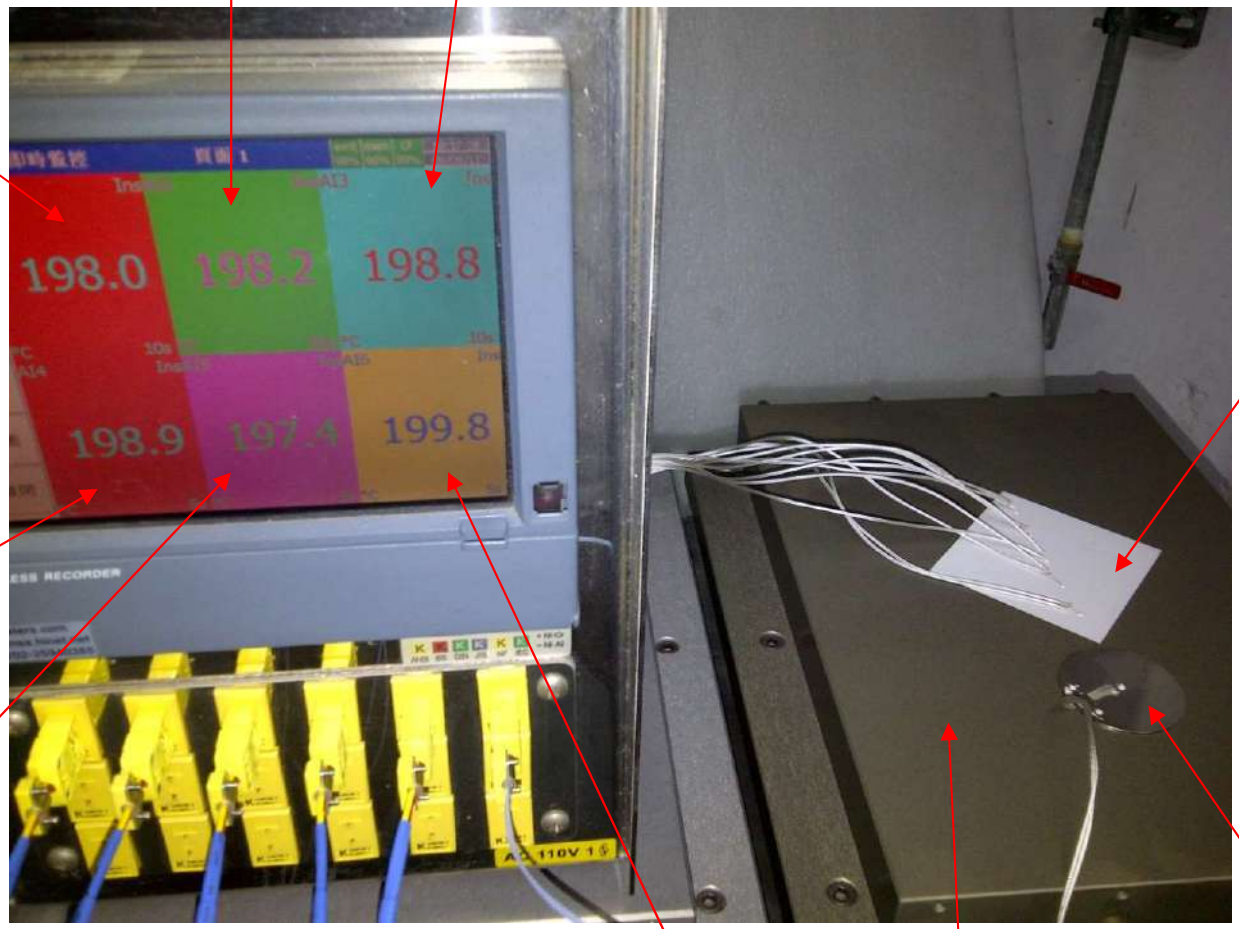
TC-WAFER/GLASS Con't

Controller Temperature @200 deg. C



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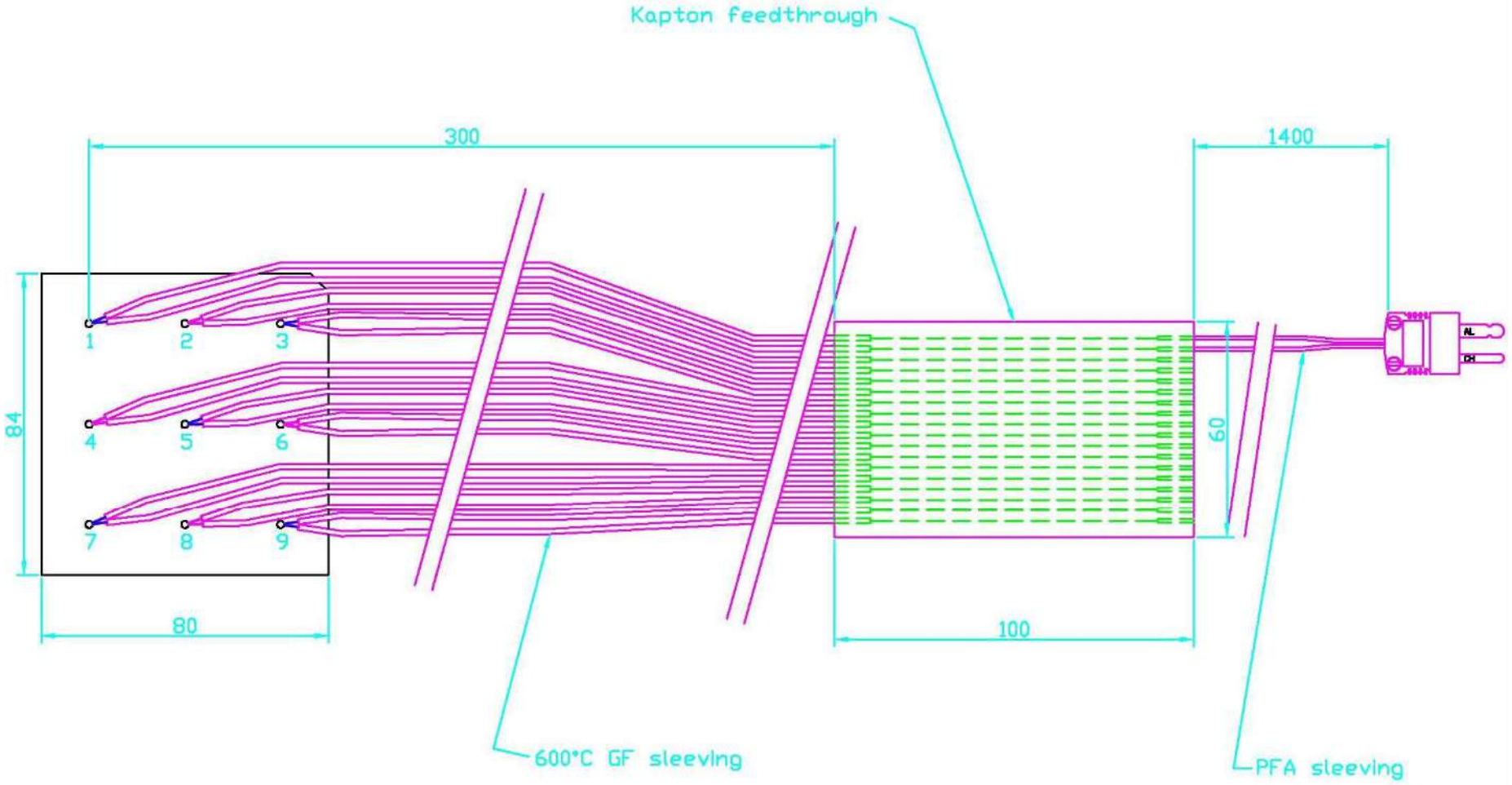
How to place an order of TC Wafer?

示意圖



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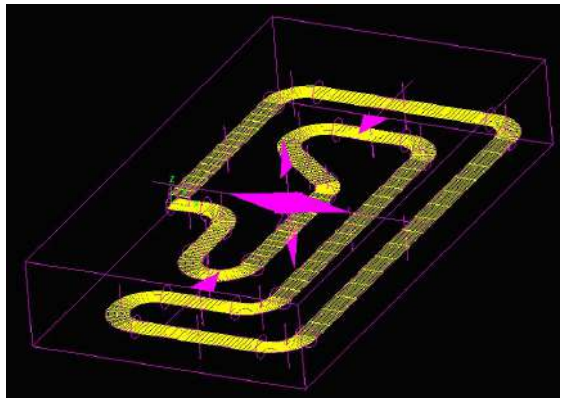
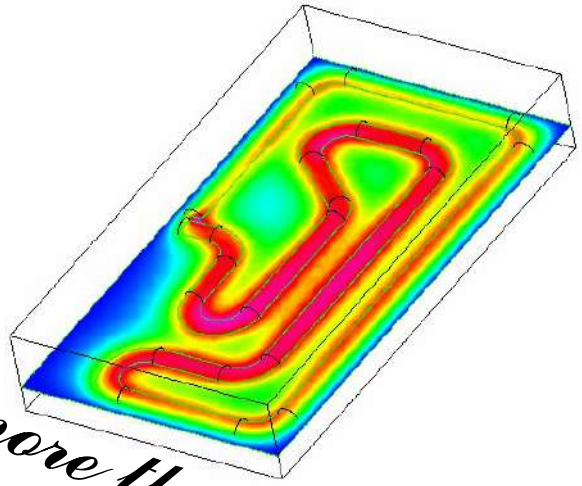
使用**CFD**軟體**--**熱傳分析

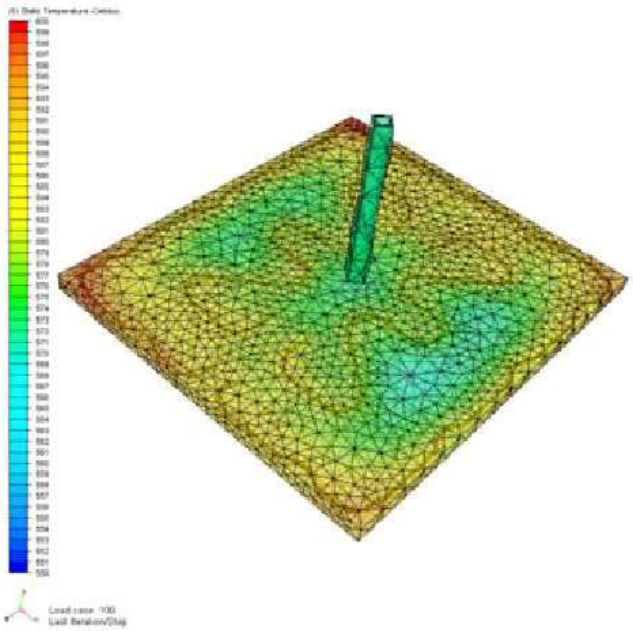
Source from：KoMiCo

分析真空熱傳有ANSYS、CFD-RC、COMET等專業軟體

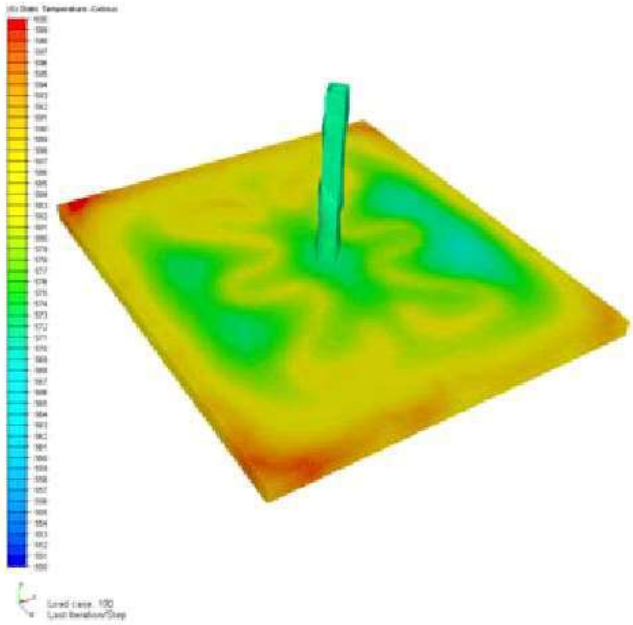




Mesh Model



Contour Plot (Surface Uniformity)



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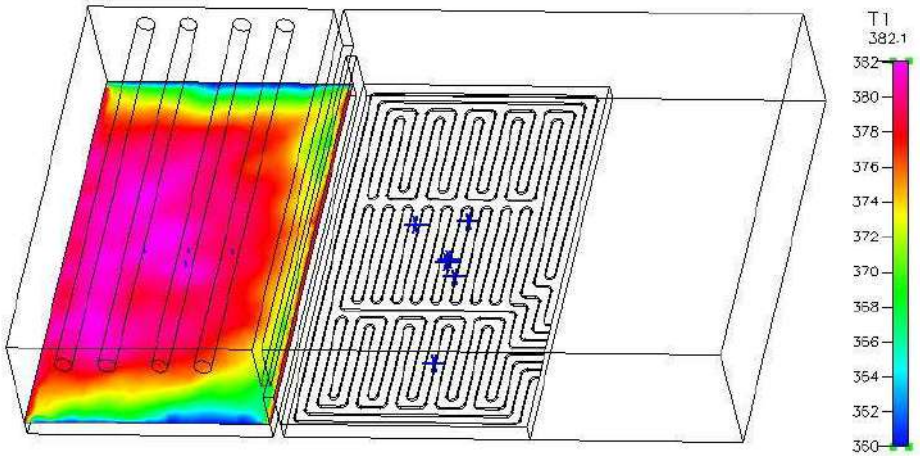
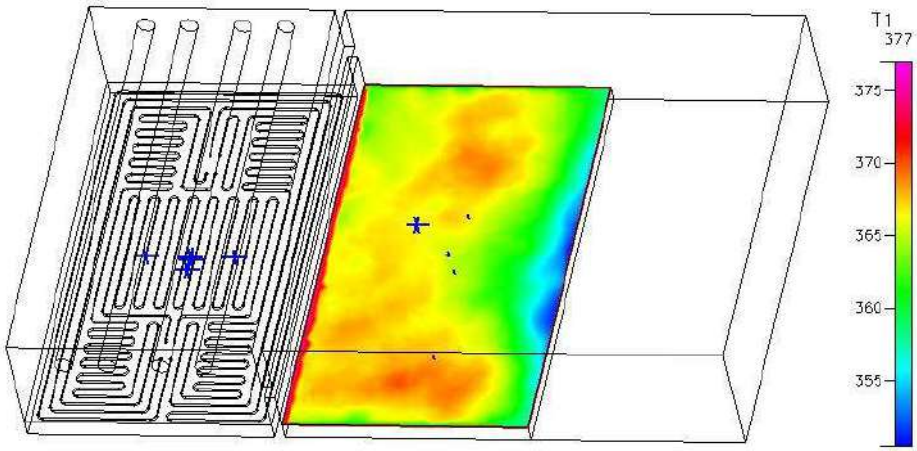
使用CFD軟體--熱傳分析 Con't

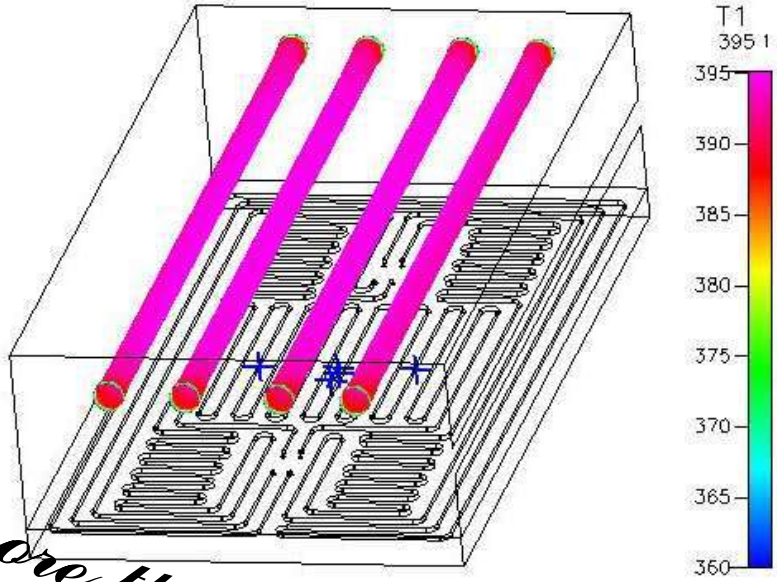
Source from：ITRI



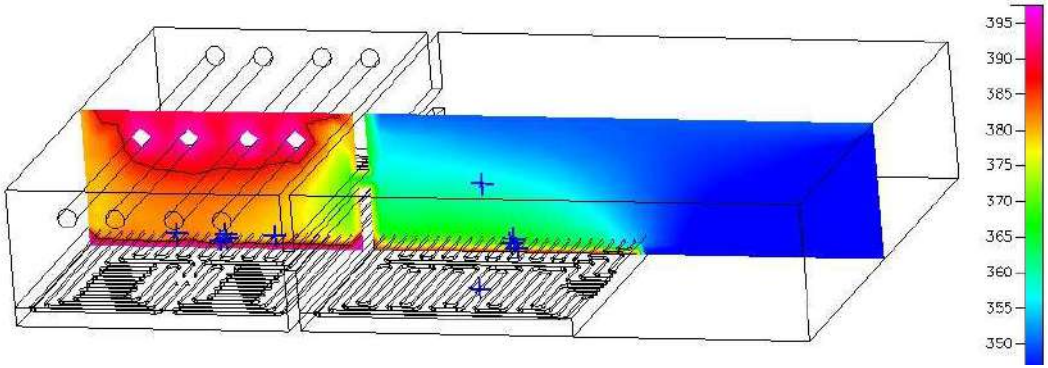
Pre-Heating: AREA HEATER 1



Process-Heating: AREA HEATER 2



Pre-Heating: IR LAMPS



In-Line Heating: X-AXIAL SECTION

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THANK YOU FOR YOUR ATTENTION!

QUESTIONS?

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