

## Thermal Engineering Solutions



# Pharmaceuticals

- Thermocouples & RTD's for
  - Auto Clave
  - Dry Heat Sterilizer (Tunnel)
  - Lypholizer
  - CIP/SIP
- Thermal Mapping
- Pyrometers
- Calibration Equipments
- Industrial Heaters
- Cables
- NABL Accredited Services
- Other Accessories



**TEMPSENS**  
INSTRUMENTS

[www.tempsens.com](http://www.tempsens.com)

# ABOUT THE COMPANY

## Pyrotech Group



TEMPSENS Instruments (I) Pvt. Ltd is a part of Pyrotech group which was established by four technocrats in 1976 at Udaipur, with its first product as Thermocouples and RTDs. Today Tempsens is one of the largest manufacturer of temperature sensors with world class manufacturing facilities in India, Germany and China. We are an ISO 9001:2008 certified company with NABL Accredited Laboratory. The Company is involved into manufacturing of Thermocouples, RTDs, Thermowells, Cables, Non Contact Pyrometers, Heaters and Calibration Equipments etc. we have covered area of more than 1,20,000 sq. feet.

Pharmaceutical industry requires the high integrity in production equipment in order to maintain the standards set by National and International regulatory bodies. We manufacture products that have rugged design and high reliability needed for accurate validation and control. We serves various pharmaceutical industries with our high accuracy, long-term stability and consistent temperature sensors and accessories.

## CAPABILITY

### WELDING AND BRANZING

- Laser Welding (YAG).
- Programmable Micro Plasma Welding Machines.
- TIG Welding machines with pulse modulation and rotary positioner.
- Induction brazing.
- Resistance Welding.
- Brazing sets (Oxy - Acetative)

### MACHINING

- CNC turning centers.
- VMC Machines.
- Deep Hole drilling machines upto 1500 mm drilling capacity.
- Milling centers.
- Manual Lathe machines.
- Cutting machines.
- Swaging Machines.
- Laser Marking Machines.
- Engraving Machines.
- Coil Making Machine
- High Frequency Annealing Machine
- MgO Filling Machine
- Rolling machine
- Skinning Machine

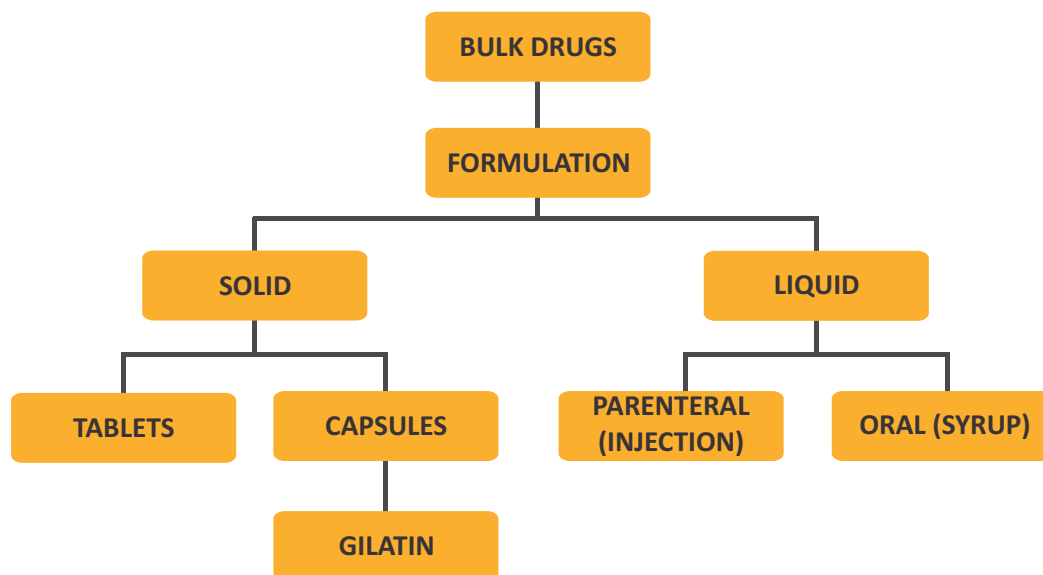
### CABLE PLANT MACHINERY

- FEP/PFA Extrusion Lines.
- PVC Extrusion Lines.
- Silicon Extrusion Line.
- Braiding Machines-High speed and regular.
- Rewinding Machines.
- Vertical Lapping Machines.
- Stranding Machines.
- Tape Wrapping Machines.
- PTFE Extrusion and Tape roll down plant



# PHARMACEUTICAL INDUSTRY

## PHARMACEUTICAL INDUSTRY



## APPLICATION OF TEMPERATURE SENSORS IN PHARMACEUTICAL INDUSTRY

### FOR VALIDATION

- AUTOCLAVE
- BUNG PROCESSOR
- DRY HEAT STERILIZER (TUNNEL)
- LYPHOLIZER (FD)
- SIP/CIP
- THERMAL MAPPING



### FOR PROCESS

- TANK
- VESSELS
- BOILER
- REACTOR
- DISTILLATION COLUMN
- SIP/CIP
- DRYER
- GRANULATION



## FEW CLIENTELE



# TEMPERATURE SENSOR FOR VALIDATION

## THERMOCOUPLES/RTD's FOR THERMAL VALIDATION AND QUALIFICATION

Tempsens manufacturing thermocouples, RTD's & their assemblies, which are optimally suited for validation tasks: -

- Solid and stranded thermocouple wires available in rolls.
- Thermocouples copper / constantan type T with narrow tolerances (special limits, and premium grade) with moisture Stopper solution for Auto calve
- Special Capsule type RTD's, Moisture Proof RTD's for Autoclave
- Thermocouples are normally used with different validation systems, such as Kaye Validator/Digistrip and Ellab E-Val Flex thermal validation system.

We offer NABL Calibration for Validation Thermocouple & RTD's

## MOIST HEAT STERILISATION (AUTOCLAVE)

### Thermocouples

With special Sleeves & Needle Type with Moisture Stopper.

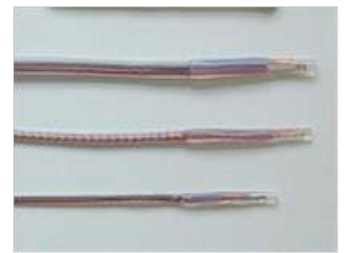
Type : "T" ( Cu-CuNi)  
Application Temperature : 121-134°C

#### Insulation Type

FEP : -70 to 200°C continuously, 316°C peak  
PFA : -70 to 260°C continuously, 285°C peak

#### Accuracy

At 40°C :  $\pm 0.5^{\circ}\text{C}$   
At 121°C :  $\pm 0.5^{\circ}\text{C}$



### RTD's

Avoid moisture inside probe, which is caused by Autoclave pressure cycling.

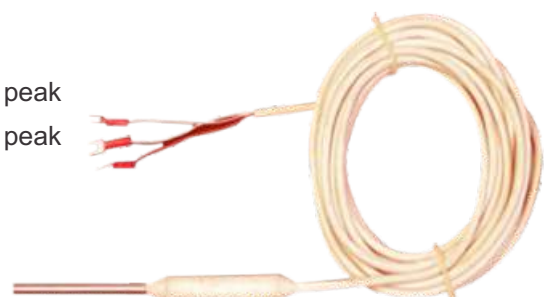
Type : Capsule Type RTD  
Application Temperature : 121-134°C

#### Insulation Type

FEP : -70 to 200°C continuously, 316°C peak  
PFA : -70 to 260°C continuously, 285°C peak

#### Accuracy

At 40°C :  $\pm 0.1^{\circ}\text{C}$   
At 121°C :  $\pm 0.3^{\circ}\text{C}$



# TEMPERATURE SENSOR FOR VALIDATION

## DRY HEAT STERILISATION (TUNNEL)

### Thermocouples

#### Special TIP Type & Needle Type

Type : "T" ( Cu-CuNi)  
Application Temperature : 160-300°C

#### Insulation Type

Kapton : 350°C continuously, 380°C peak

#### Accuracy

At 40°C :  $\pm 0.5^{\circ}\text{C}$   
At 121°C :  $\pm 0.5^{\circ}\text{C}$   
At 300°C :  $\pm 1.2^{\circ}\text{C}$



### RTD's

Type : Capsule Type RTD  
Application Temperature: 160-300° C

#### Insulation Type

Kapton : 350°C continuously, 380°C peak

#### Accuracy

At 40°C :  $\pm 0.1^{\circ}\text{C}$   
At 121°C :  $\pm 0.3^{\circ}\text{C}$   
At 300°C :  $\pm 0.5^{\circ}\text{C}$



## LYPHOLIZER (FREEZE DRYER)

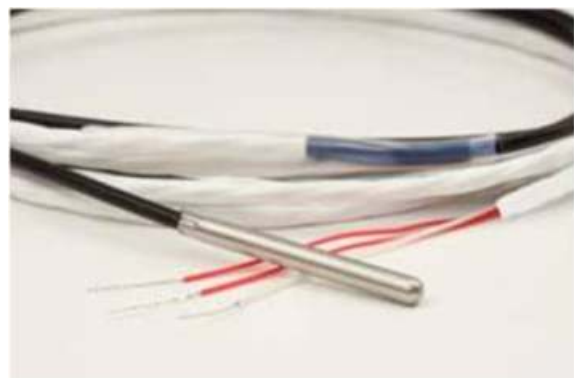
### Thermocouples /RTD's

#### For cooling plate temp. measurement

T/C Type : "T" (Cu-CuNi)  
RTD Type : Capsule Type  
Application Temperature: -40 TO 80°C

#### Insulation Type

PFA : -70 to 260°C  
continuously, 285°C  
peak





# TEMPERATURE SENSOR FOR PROCESS

**Tempsens manufacturing Thermocouples,RTD's & their assemblies, which are optimally suited for Process.**

- Simplex, duplex, and multi Element RTD's /Thermocouples for Storage Tanks, Vessels, Reactor s, Distillation Columns.
- Thermocouples with drilled bar stock Thermowells .
- RTD's / Thermocouples with Flame Proof Head & Indicators.
- Class A ,Class B, 1/3,1/5,1/10 DIN RTD's.
- Special Class thermocouples.
- RTD / Thermocouple Probes (Portable Temp. Measurement)



## STORAGE TANKS, VESSELS, REACTOR S, DISTILLATION COLUMNS

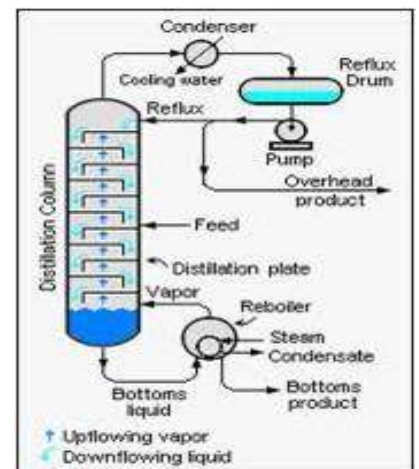
**Type :**

Thermocouples : Simplex, duplex, and multipoint.  
RTD's : Simplex, duplex & triplex.

**Head :** Ex-Proof, II A/II B.

**Thermowell :** Drilled bar stock

**Normally used RTD & “K” type Thermocouple with 6,8, or 10 mm OD, and 2, 3 Meter Long , with Drilled bar stock thermowell SS316 /HRS446**



## CIP (CLEANING IN PLACE) / SIP (STERILLISATION IN PLACE)

- Clean-In-Place (CIP) is an everyday practice in Pharma manufacturing and involves cleaning reactors, pumps, heat exchangers, distribution loops and process filling machines.
- Steam-In-Place (SIP) system is widely used for in-line sterilization of various processing equipment.
- Temperature Sensors Use in CIP/SIP : Sanitary RTD's

## Sanitary RTD's

Temp. Range : -20 to 250°C  
Type : Simplex, Duplex  
Class : A  
Head : Die Cast Aluminum, SS Head.  
Process Connection : Tri-clover Fitting, Fixed Fitting  
Fitting :  
Thermowell : with or without Tri-clover



# TEMPERATURE SENSOR FOR PROCESS

## TEMPERATURE CONTROL, INDICATOR, AND TRANSMITTER

- **Indicator** :- Flame proof for process and in all size for validation, mapping
- **Transmitter** :- Head mountd, field mounted
- **Hand Held Temperature indicator** :- For RTD PROBE



## THERMAL MAPPING

- Application** :- Refrigerators, Freezers, ULT Freezers, Autoclaves, Cold Stores, Warehouses & Storage Facilities (Dispensary area's), Transport Vehicles (Cold Chain)



### RTD's

- Type : Capsule Type RTD  
Application Temperature : 70-90° C  
Insulation type : PTFE / PTFE



### Thermal Imager

Tempsens offer AST Make affordable thermal imager for Instant infrared troubleshooting in Pharmaceutical

- Temp Range : (- 20....600°C)



# INDUSTRIAL HEATERS

## Silicon Rubber Heaters

- Temperature Range up to 250°C
- High Electric Strength , Flame retardant, Non Toxic.
- Easy to install on variety of surface including curved surfaces.
- Uniform heating, Adaptability, Long Life
- Good for heating drums, de-icing, vending machines, atms, aircraft, cars, and maintaining a comfortable temperature in medical equipment, such as CAT scanners.



## Tubular Heaters

- Used in various industrial processing such as liquid immersion (with threaded fittings), in free air, clamped on, wrapped around, cast into aluminum, bronze or cast iron.
- They may be installed into machines grooves or drilled holes in metal parts.



## High Watt Density Cartridge Heaters

- Temperature Range : upto 450°C
- Material : Ss304, SS316, Incoloy
- Configurations : Swaged in Leads, Crimped on Leads, Post terminals, Right Angle Leads, Teflon Seal, Silicon Rubber Seal, Epoxy Seal, Swaged in Braid, Right Angle Stainless Steel Braid, SS Flexible Conduit, Hex head pipe fittings, Flanges etc.



## Ceramic Band Heaters

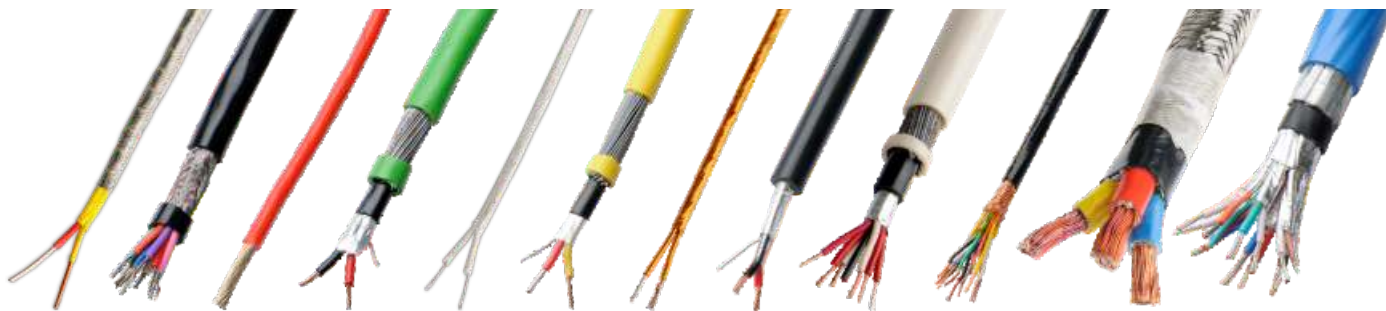
- Reduce power consumption
- Conserve heat
- High degree of flexibility
- Uniform heat distribution
- Various termination styles

Ceramic band heaters are medium-to-high temperature heaters that have 648°C as a maximum working temperature. These durable heaters can have optional in-built ceramic fiber jackets that make them energy efficient. Ceramic band heaters are available with different terminal styles, are fully flexible, and can accommodate holes and cut-outs.





# CABLE



Wide range of insulations and conductor configurations are manufactured in house by our cable manufacturing Facility. Compensating and Extension Cables for thermocouples J,K,T,E,N,R,S,B Types. RTD Cables in three wire & four wire configuration for simplex and six & eight wire for duplex are available.

Wire Gauge	:	14 to 36 gauge (AWG/SWG)
Conductor	:	Solid / Multi strand
Insulation	:	Single and Double Fibre Glass, PTFE, Ceramic Fibre, Silica Fibre, SS Braided, PVC etc.
Protection	:	Armored / Unarmored

Other Cables for Signal, Control and Instrumentation are available with variety of insulation and various configurations.

## WIRE INSULATION IDENTIFICATION AND APPLICATION GUIDE

INSULATION CODE	INSULATION	APPEARANCE OF CABLE	TEMP. RANGE INSULATION	ABRASION RESISTANCE	FLEXIBILITY	WATER SUBMERSION	RESISTANCE TO:	
							FLAME	HUMIDITY
<b>P</b>	Polyvinyl Chloride (PVC)		-40 to 105°C	GOOD	EXCELLENT	GOOD	GOOD	GOOD
<b>EF</b>	FEP		-200 to 200°C	EXCELLENT	GOOD	EXCELLENT	EXCELLENT	EXCELLENT
<b>S</b>	Silicon		-40 to 200°C	GOOD	GOOD	EXCELLENT	GOOD	EXCELLENT
<b>T</b>	PTFE		-267 to 260°C	EXCELLENT	GOOD	EXCELLENT	EXCELLENT	EXCELLENT
<b>PF</b>	PFA		-260 to 260°C	EXCELLENT	GOOD	EXCELLENT	EXCELLENT	EXCELLENT
<b>K</b>	Kapton		-267 to 316°C	EXCELLENT	GOOD	GOOD	EXCELLENT	EXCELLENT
<b>F</b>	Fiber Glass		-73 to 600°C	GOOD	GOOD	EXCELLENT	EXCELLENT	EXCELLENT
<b>CF/SF</b>	Ceramic Fiber/ Silica		-72 to 800°C	POOR	GOOD	POOR	EXCELLENT	EXCELLENT
<b>RF/NF</b>	Refrasil/Nextel Silica yarn		-73 to 1200°C	POOR	GOOD	POOR	EXCELLENT	FAIR

# PYROMETERS & THERMAL IMAGERS

## Radiation Pyrometers

- Wide range of non contact pyrometers are available for handheld and online applications for temperature range from - 100 . . . . . 3200°C
- Single Colour & Two Colour Pyrometers
- Special Molten Aluminum Pyrometers
- Fibre Optic Pyrometers
- Portable Pyrometers – TCT 750, TI 1500, TI 2400



# CALIBRATION EQUIPMENT

Model	Range	Stability
<b>BATH</b>		
CALsys -80/50	-80....+50°C	±0.05°C
CALsys -35/200	-40....+200°C	±0.01°C
CALsys 250	50....+250°C	±0.1°C
<b>DRY BLOCK</b>		
CALsys -15/110	-15....+110°C	±0.1°C
CALsys 650	50....+650°C	±0.1°C
CALsys 1200	250...+1200°C	±0.5°C
CALsys 1200L	300...+1200°C	±0.5°C
CALsys 1500L	500...+1500°C	±1.0°C
CALsys 1700L	500...+1700°C	±2.0°C
<b>BLACK BODY</b>		
CALsys 500 BB	50.....+500°C	±1.0°C
CALsys 1200 BB	300....+1200°C	±0.5°C
CALsys 1500 BB	500....+1500°C	±1.0°C
CALsys 1700 BB	500....+1700°C	±2.0°C



- Temperature Range : -80 to 1700°C
- Measuring instruments available with high accuracy
- Master Sensors - High Accuracy



# TESTING & CALIBRATION SERVICES

## NABL Accredited Calibration Services



Tempsens Calibration Center is an independent unit of Tempsens instruments (I) Pvt. Ltd. and we are Accredited for wide range of temperature calibration services. It is the only private sector Laboratory in the country with accredited Fixed Point Temperature calibration Facilities. The lab has highly stable calibration furnaces, measuring instruments and accurate master sensors traceable to National and international Standards. The calibration center functions as per ISO17025/NABL standards. Calibration of contact type sensors can be made in temperature range of -196°C to 1600°C. And Calibration of non contact type sensors can be made in temperature range 0°C to 1700°C. Further the laboratory is accredited for onsite temperature calibration.

### IN HOUSE CALIBRATION FACILITY :

Quality Measured/Instruments	Temperature Range	Calibration & Measurement Capability
Contact Type RTD, Thermocouples Thermometers	-196 °C	0.05 °C
	-80 to -38 °C	0.07 °C
	-38 °C to 0°C	0.03 °C
	>0°C to 140°C	0.03 °C
	>140°C to 250°C	0.04 °C
	>250°C to 650°C	0.12 °C
	>650°C to 1000°C	1.2 °C
	>1000°C to 1200°C	1.6 °C
Non Contact Type Pyrometer	>1200°C to 1600°C	3.4 °C
	0 °C to 250°C	1.5 °C
	>250°C to 400°C	2.4 °C
	>400°C to 500°C	1.0 °C
	>500°C to 1500°C	2.0 °C
	>1500°C to 1700°C	2.5 °C

### ON SITE CALIBRATION FACILITY :

Quality Measured/Instruments	Temperature Range	Calibration & Measurement Capability
Contact type RTD. Thermocouples Thermometers	-25°C to 0°C	0.07°C
	>0°C to 140°C	0.04 °C
	>140°C to 250°C	0.09 °C
	>250°C to 650°C	0.18 °C
	>650°C to 1000°C	1.20 °C
	>1000°C to 1200°C	2.10 °C
Non Contact Type Pyrometer	50°C to 250°C	1.50°C
	>250°C to 400°C	2.00°C
	>400°C to 500°C	1.00°C
	>500°C to 1200°C	2.00°C

### FIXED POINT CALIBRATION FACILITIES :

Quality Measured/Instruments	Temperature Range	Calibration & Measurement Capability
Calibration of SPRT/PRTS/ THERMOCOUPLES at	Triple Point of Water (0.01 °C)	0.0040 °C
	Melting Point of Gallium (29.7646 °C)	0.0085 °C
	Freezing Point of Tin (231.928 °C)	0.0085 °C
	Freezing Point of Zinc (419.527 °C)	0.0090 °C
	Freezing Point of Aluminum (660.323 °C)	0.0090 °C

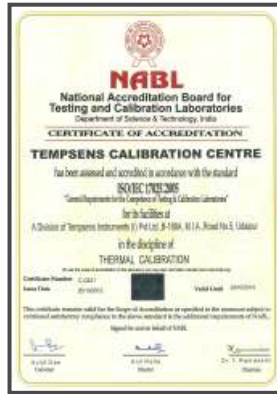


## Testing

- Digital Radiography setup for junction integrity
- PMI setup for chemical analysis
- Pressure test setup
- Nitrogen leak test
- Dye penetration test setup
- Microscopic junction check
- Response time test, least count 1 msec.
- Ultrasonic thickness test
- Giga Ohm Insulation resistance testers
- Mechanical checks - lengths, gauges, concentricity checks
- Conductor Resistance Test
- Test for thickness of Insulation and Sheath
- Physical test for Insulation and outer Sheath
- On line High Voltage test
- Flammability test & Tensile tester



## CERTIFICATES



## THERMAL ENGINEERING SOLUTIONS



Tempsens Instruments U# I



Tempsens Instruments U# II



Pyrometer & Industrial Heater Plant



Tempsens Instruments U# II - MI Cable Plant

[www.tempsens.com](http://www.tempsens.com)

[www.thermowellworld.com](http://www.thermowellworld.com) | [www.temperaturecalibration.in](http://www.temperaturecalibration.in) | [www.glassthermocouples.com](http://www.glassthermocouples.com) | [www.compensatingcables.net](http://www.compensatingcables.net) | [www.marathonheater.in](http://www.marathonheater.in)

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