HEAT MANAGEMENT SOLUTIONS

experience reliable Heating.

Heat Transfer, Temperature Maintenance,Heating & cooling

Celsun offer Customised Heat Management Solution from Design, Detail engg, Manufacture to installation & commissioning. Our Proven Expertise:

1. Electrical Heat Tracing system for Piping & tanks.
2. Steam Copper tube Heat Tracing system.
3. Flexible Heating Jackets & Pads for Hopper , Vessel & Drum heating
4. Hot water, steam generation plant & Hot air Heating Ovens
5. Under floor Heating & Cold Room Door Heating systems.

Flexible Heating Tapes freeze protection and process temperature, under floor Heating.

Pre-insulated Heating Jackets & Pads for Drum / Hopper Heating.

Silicone Heating Jackets & pads for customised heating.

Hot Air Heating Oven for Drum / Motor Heating.

Steam & Hot Water Boiler Plant.

Celsun Advantage:

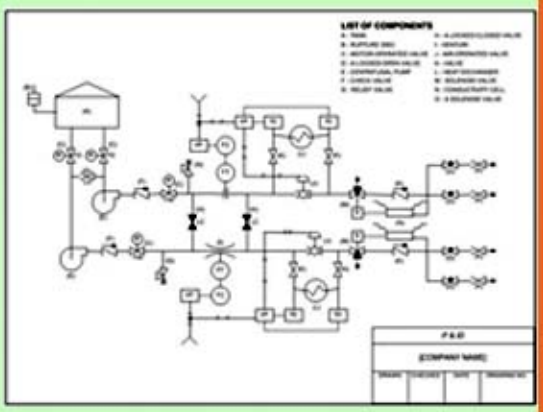
One stop solution from design to commissioning to Heat management.
In house Design & Engineering infrastructure.
In house Manufacturing under strict quality control.
On time delivery commitment.
Professional project management.
Decades of Heat Management experience.
Optimum solution using Steam, Hot water /air, Thermic fluid or Electrical Heating.

24 X 7 Technical support: +91 8652016361 Ph. 022-28746963 www.celsun.in info@celsun.in

CELSUN SERVICES FOR IBR & NIBR PROJECTS

Celsun & its promoter has over three decades of professional project experience in field of steam generator, steam distribution and steam application such as steam tracing. We are preferred vendors for THERMAX & FORBES MARSHALL.We offer following value added services:

1. Design to commissioning of Boiler Plant.
2. Design to commissioning of IBR Steam Piping & IBR PRS station.
3. Design to commissioning of Steam Tracing System.
4. Engineering , Drawings & IBR services.



Celsun Advantage:

Over 20 years of rich practical experience in Steam related projects.
One stop solution for all your steam related applications & projects.
Reputation of on-time delivery of projects & assignments.
Economic , at the same time quality driven operations.
Preferred Vendor for THERMAX & FORBES MARSHALL for last 20 years!
Executed over 100 challenging projects for quality & safety conscious clients.

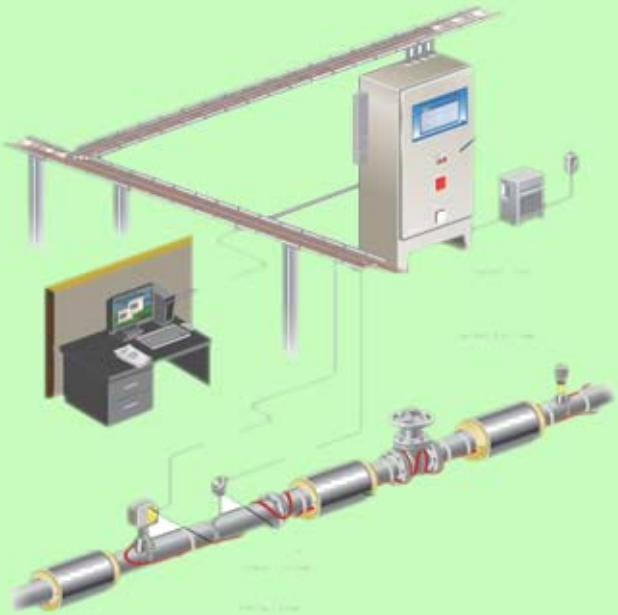
SELF REGULATING HEATING CABLE

experience reliable Heating.

Freeze Protection, Temperature Maintenance and Heating

Celsun offer Turnkey EHT Solution using World's Best Raychem Heat Tracing Systems for pipe Lines or vessels which consist of:

1. Flexible Self Regulating Heat Tracing cable
2. Temperature Monitoring & control System
3. EHT Power Distribution Panel
4. Insulation



Unique Raychem Self Regulating Advantages:

- Adjust Power output with surface temperature.
- Highly Safe and energy-efficient heating tape.
- Raychem is inventor of self regulating technology & world leader.

BTV for freeze protection and process temperature maintenance upto 65°C

QTV for pipe heat tracing and process temperature maintenance upto 110°C

XTV withstand up to 250°C & maintain temperature upto 121°C.

VPL withstand up to 260°C & maintain temperature upto 235°C.

Celsun Advantage:

One stop solution from design to commissioning to EHT management.
In house Design & Engineering infrastructure.
In house Manufacturing for EHT Panel under strict quality control.
On time delivery commitment.
Professional project management.

Technical support: +91 8652016361 **Ph. 022-28746963** **www.celsun.in** **info@celsun.in**

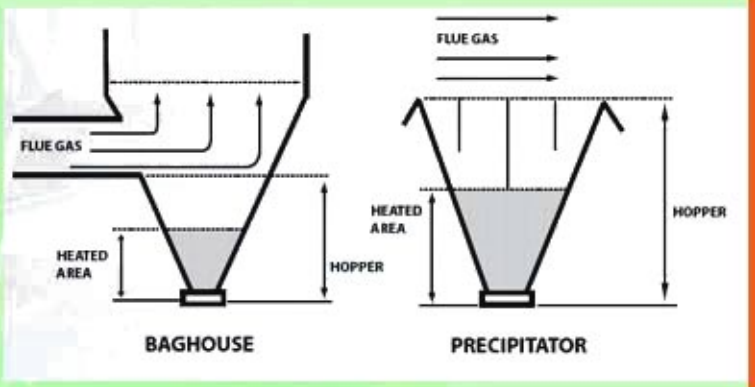
HOPPER HEATING

experience reliable Heating.

Eliminate Bridging, Pluggage, Condensation, and Corrosion

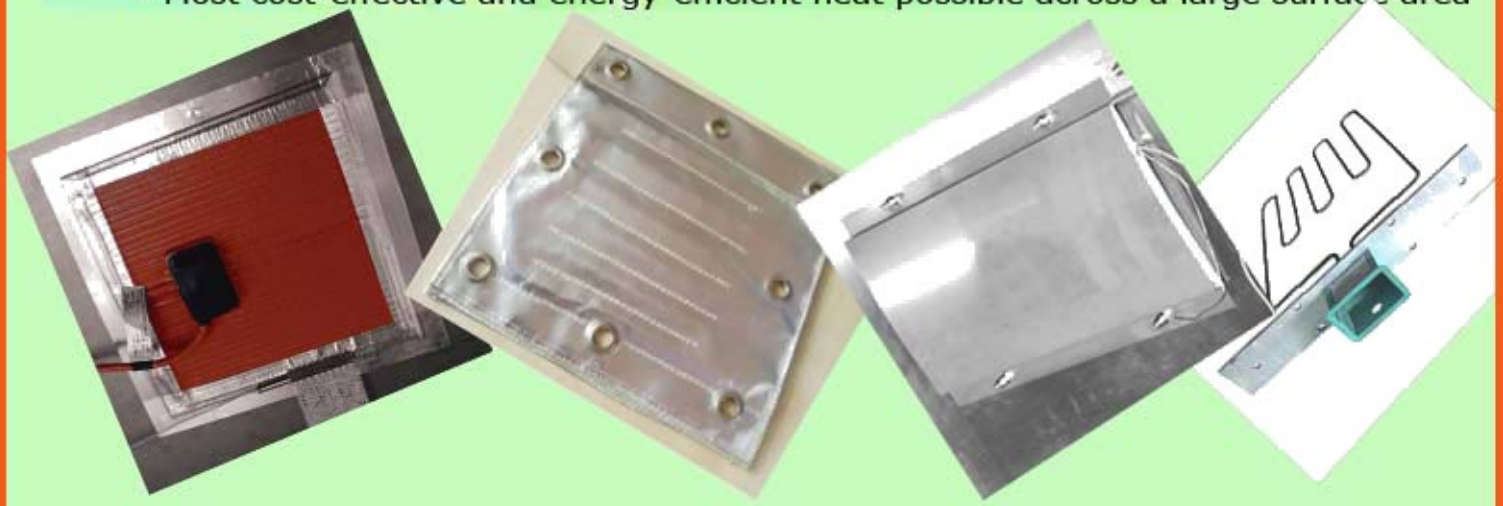
Celsun Hopper Surface Heating Systems maintain elevated temperatures above moisture and acid dew points using a proven combination of:

1. Modular hopper surface heaters
2. Flexible heating tapes for throats, poke tubes, and manways
3. Temperature control and installation hardware



Our modular design provides the:

- Easiest and lowest cost-of-installation
- Most cost-effective and energy-efficient heat possible across a large surface area



Silicone Rubber | Fibre Glass | Metal Clad | U Tube Heaters

Celsun Advantage:

Wide range upto 510 deg C exposure Temperature.
Customised Design.
In house Manufacturing under strict quality control.
In time delivery commitment.

Technical support: +91 8652016361 **Ph. 022-28746963** **www.celsun.in** **info@celsun.in**

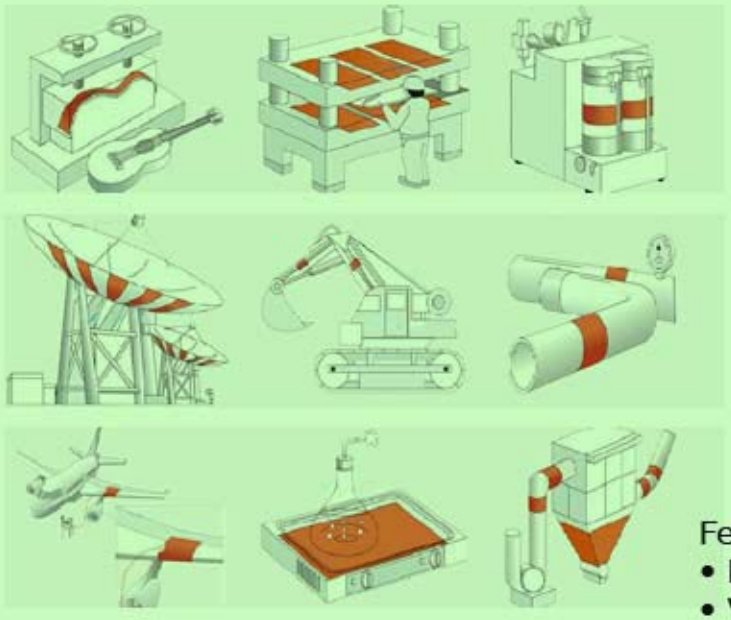
SILICONE RUBBER HEATING

experience reliable Heating.

Process Heating, Freeze / Condensation Protection and Composite Bonding

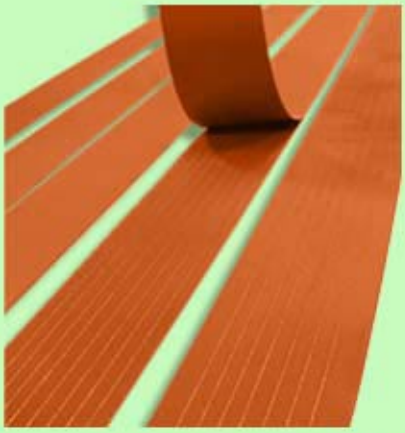
Celsun custom designs and manufactures flexible Silicone heaters for an almost endless list of different applications in different fields.Celsun design, manufacture & supplies two types of Flexible Silicon Heaters: :

1. Wire-Wound Flexible Silicone Rubber Heater
2. Etched Foil Flexible Silicone Rubber Heaters

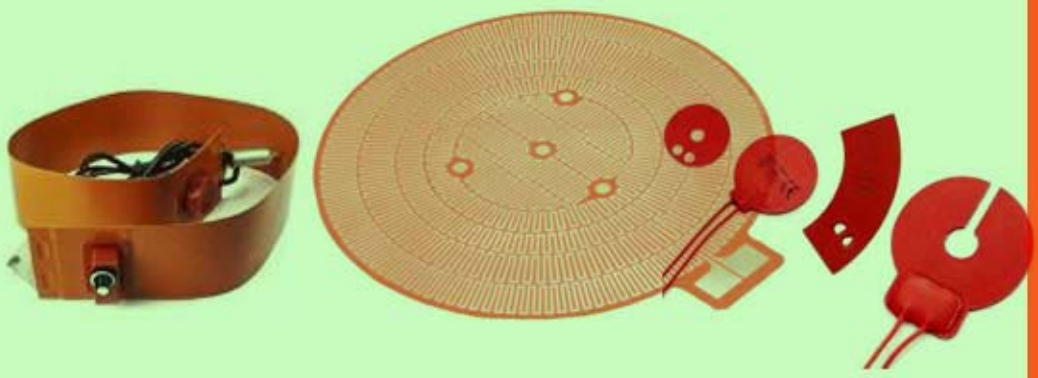


Features :

- Long life, high reliability
- Versatile configurations
- withstand extreme temperatures



Wire-Wound Silicone Heater



Etched Foil Silicone Heater

Wire-Wound Advantage:

Economic.
Customised Design.
No Minimum order quantity
Operating Temperatures: 200 °C

Etched Foil Advantage:

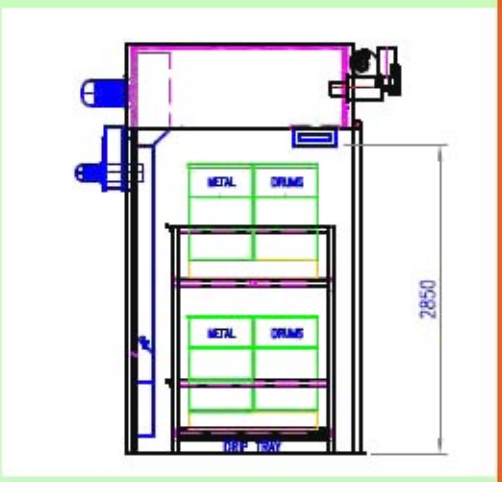
Higher watt densities
Reproduction of complex circuits
Elimination of edge loss compensation
Complex heat distribution with a rating of about 240°C
Very Thin, as thin as 0.5 mm

Technical support: +91 8652016361 **Ph. 022-28746963** **www.celsun.in** **info@celsun.in**

Viscosity Control, Temperature Maintenance and Heating

Celsun Drum Heating Systems for single drum or multiple drums heating consist of:

1. Flexible Jacket Type Drum heaters
2. Movable Metal encloser Type Drum heater
3. Multi-Drum Hot air Heating Oven



Our modular design provides the:

- Easiest and lowest cost-of-installation
- Most cost-effective and energy-efficient heat possible across a large surface area

Silicone Rubber

Fibre Glass Jacket

Metal Jacket

Multi Drum Heating Oven

Celsun Advantage:

Wide Product range upto 250 deg C heating application.
Customised Design using Electric, Thermic fluid & steam as heating medium.
In house Manufacturing under strict quality control.
In time delivery commitment.

REFERENCE CLIENTS

experience reliable Heating.

THERMAX

Forbes Marshall
Trusted Partners.
Innovative Solutions.

L&T

Godrej

PENTAIR

HUNTSMAN

vodafone

adani
POWER LIMITED

Jio

SPPL

Mylan

HYATT

AMMANN

Sudha

HEMPEL

gsk
GlaxoSmithKline

GPI
GODFREY PHILLIPS
INDIA LIMITED

AARTI INDUSTRIES LIMITED

Gulf Petrochem

citrus

Contact us:
Celsun EcoEnergy & InfraTech Holdings Pvt. Ltd.
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Goregaon (East), Mumbai - 400065, India.
Sales:+91 8652016361 | +91 022 28746963
yogendra@celsun.in | info@celsun.in | www.celsun.in

MULTIPLE DRUM HEATING OVEN

Designed & Manufactured by:

Celsun Ecoenergy & InfraTech Holdings Pvt. Ltd.

157 B Wing, ORM Road, Royal Palms, Aarey Colony, Goregaon (east), Mumbai – 400065. www.celsun.in

CELSUN Drum & Tote Heating Ovens

CELSUN design & manufactures a full line of drum & tote heating ovens (Hot Boxes) that use electric, steam or thermal fluid, to heat materials to a maximum temperature of 300°F. Standard models accommodate (1) to (32) drums, or (1) to (8) totes. The purpose of heating the drums or totes is typically to either maintain or alter the molecular properties of the materials within.

CELSUN drum & tote heaters are used to preserve the properties of materials initially above ambient temperature. Materials (like some oils) that have a tendency to thicken at cooler temperatures are stored at elevated temperatures to maintain their thinner viscosity so that they can be more easily mixed or pumped. Materials (like honey) that tend to crystallize at cooler temperatures are stored to maintain their fluidity. Products (like paint) that will freeze in cold outdoor environments are stored in heating ovens long term to prevent freeze damage.

Drum hot boxes are also used to change the properties of materials initially in an ambient or below ambient temperature state. Products that are solid at room temperature (like wax) are heated and melted to liquid form.

Volatiles (like solvents) that become more volatile at elevated temperatures are heated for more rapid evaporation. Perishable food items (like orange juice) that have been frozen are heated so that the contents can be poured or dumped from the drum.

The elevated temperatures achieved within CELSUN drum heating ovens either maintain the properties or change the properties of the materials being heated.

- Control viscosity
- Melting
- Freeze Protection
- Increase evaporation

Guide to select the best Model:

- Define your application
- Tell us required capacity of drums – 4 /8/12/16/20
- What is your Temperature requirement?
- Available Heating Medium. - Electric / Steam / Thermic Fluid / Other.
- Control options
- Area Classification

Please contact us for techno-commercial assistance:

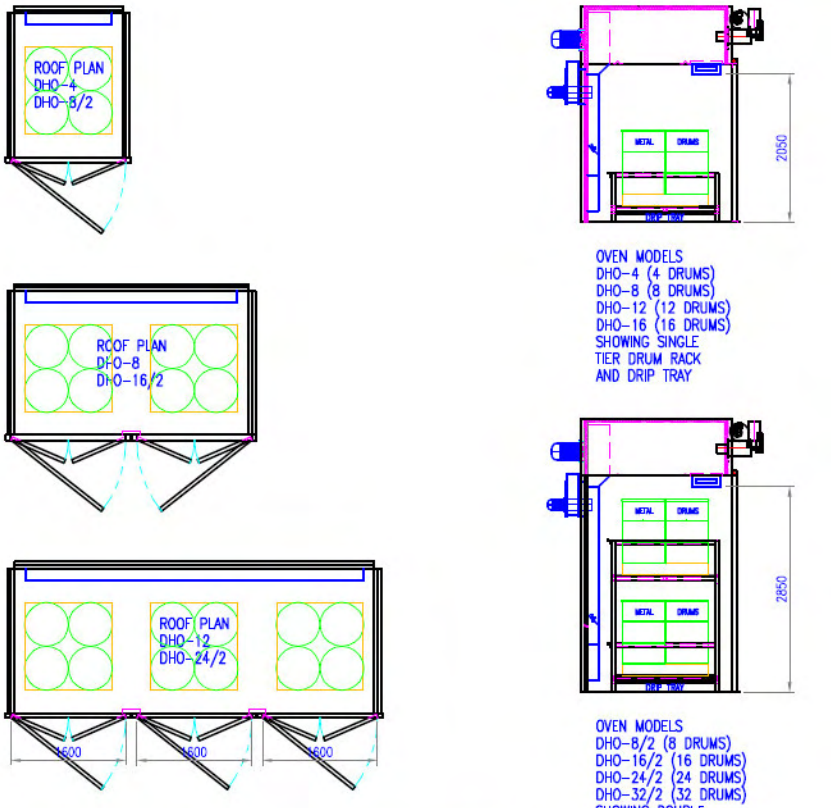
Celsun Ecoenergy & Infratech Holdings Private Ltd.

157B , Orchard Road, Royal Palms, Goregaon (east), Mumbai 4000 65, India.

www.celsun.in info@celsun.in 022- 2872 6963 / 2874 6963

Special features of CELSUN Drum Heating Ovens

- Result of over 30 years experience in Industrial Thermal Engineering.
- Unique high efficiency Thermal design minimizes energy usage.
- Increased production due to rapid warming and uniform temperature distribution.
- Unique High Volume Low Pressure hot air circulation system.
- Celsun is channel partner of Pentair thermal, world's largest heat tracing company.
- Galvanized steel, Alu-dip or stainless steel (optional) construction.
- Designed for rapid heating of a wide variety of Steel and Plastic drums.
- Assembled, Test Run, Data Logged and certified before handover.



Capacity: 2 /4/8/12/16/20/32 Drums
Insulation: 100mm thick LRB
Mode of heating: Force Convection
Heating Medium: Electrical Heater / Steam (L.P.) / Hot Oil
Temperature Range: Room temperature to 200 C(Electrical)/ Hot Oil. & up to 120Deg for Steam.
Finish: Exterior finished with acrylic enamel / Interior finished with heat resistant silver Stainless steel
Engineering: Custom engineered. Contact us for more structural information / drawing.

Please contact us for techno-commercial assistance:

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REFERENCE CLIENTS

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L&T

Godrej

PENTAIR

HUNTSMAN

vodafone

adani
POWER LIMITED

Jio

bppl

Mylan

HYATT

AMMANN

Sudha

HEMPEL

gsk
GlaxoSmithKline

GPI
GODFREY PHILLIPS
INDIA LIMITED

AARTI INDUSTRIES LIMITED

Gulf
Petrochem

citrus

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CELSUN FLEXIBLE JACKET TYPE DRUM HEATERS

Tried and tested across many industries, our range of Flexible Heating Jackets simply wrap around the vessel / drum , clip together and the thermostat can be set to the desired temperature.

- ✓ High-grade thermal insulation to reduce heat-loss and increase efficiency whilst providing protection for the operator.
- ✓ Fitted with adjustable retaining straps and quick release buckle clips.
- ✓ Integrated fully adjustable thermostats.
- ✓ 240volt or 430volt versions available from stock.
- ✓ Ideal for wide variety of plastic, fibre and metal containers – drums, tubs, buckets, kegs, carboys, totes and IBCs.
- ✓ Deliver an even heat over a large surface area, minimizing the possibilities of damaging the product.
- ✓ Fit and forget – no regular maintenance required.
- ✓ Safe to use 24 hours a day.
- ✓ Available in various capacity like 1KW, 1.5KW, 3KW, 4.5 KW for standard 200 / 50 / 20 liter poly / Metal drum or custom size.

Hopper Heating Pad

Celsun heating pads are designed to cover the maximum area of the vessel. Hence it gives uniform heat transfer throughout the surface, avoiding any hot-spot or carbonization of the content. Temperature is uniform and can easily be controlled. The elements are designed to work in black – heat region and closely follow the vessel surface temperature. Our modular design provides the:

• Easiest and lowest cost-of-installation

• Most cost-effective and energy-efficient heat possible across a large surface area

Construction details:

The electrical heating pad consists of nichrome wire heating elements insulated with two braids of glass-fiber yarn and impregnated with class f varnish. The element is spread over closely woven glass cloth carrier at a uniform pitch and again sandwiched between two layers of glass cloth.

The lead wires, comprising of fiberglass and Teflon insulated copper wire, are taken out from one side. Eyelets are provided for fixing the pads on vessel. Tying laces may also be provided for smaller size.

Technical specifications:

Maximum safe temperature	300°c
Maximum power density	3. 0 kw/sq. Mtr.
Working Voltage	230v single phase ac

Hopper Heating pads Ideal For:

- ESP (Electrostatic Precipitator) Hoppers
- Bag house Hoppers
- Material and Dust-Collector Hoppers
- Vessel / Drum heating
- Concrete Mould

Please contact us for techno-commercial assistance:

Celsun EcoEnergy & InfraTech Holdings Pvt. Ltd.

157B , Orchard Road, Royal Palms, Goregaon (East), Mumbai 4000 65, India.

www.celsun.in info@celsun.in 022- 2872 6963 / 2874 6963



Hopper Heaters

Hopper Surface Heating Systems maintain elevated temperatures above moisture and acid dew points. We design & Manufacture different types hopper heaters suitable for ESP Hoppers, Baghouse Hoppers, Material & dust collector Hoppers

1. **Metal Clad Heaters**: GI / SS body. Temperatures up to 350°C & Simple Stud-Welding Installation.

2. **Silicone Rubber Heaters:** Temperatures up to 232°C & Easy Adhesive Installation.

3. **Fibre Glass Heating Pads:** Temperatures up to 300°C & Easy eyelet Installation.

In-house team of heating experts assigned to each application to provide:
• Thermal calculations
• Wiring diagrams and installation drawings
• Maintenance manuals and support

Our modular design provides the:
• Easiest and lowest cost-of-installation
• Most cost-effective and energy-efficient heat possible across a large surface area.

Temperature Control and Power distribution Panel for Hopper heating system:

Choose from a wide range of temperature control options to meet your application and precision needs. All control systems are configured-to-order to meet your unique environmental requirements. Temperature monitoring & Control accessories such as Thermostats, RTD, Thermocouple, junction box & Panels is available under one roof.

Other application of Hoppers Heating Pads:

- ✓ Storage Tanks Viscosity control and freeze protection
- ✓ Process Vats and Dip Tanks Heat raising and maintenance
- ✓ Low Temperature Ovens
- ✓ Concrete Chute Curing

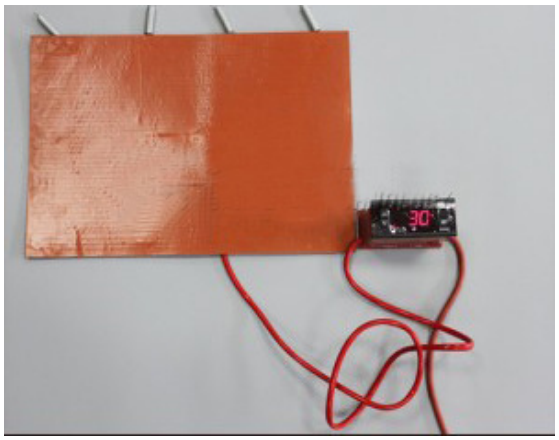
TECHNICAL SPECIFICATIONS FOR CELSUN "FACTORY TERMINATED CONSTANT WATTAGE HEAT TRACING CABLE"

1	**Type :**	**CELSUN** Brand, Constant Wattage, Series Resistance Tracer Tape
2	**CONSTRUCTION :**	
	Primary Insulation:	P.T.F.E. (Teflon)
	Secondary Insulation:	GLASS - FIBRE
	Sheathing:	SS 304
3	**Nominal Voltage** :	230 V
4	**Nominal Loading** :	25 & 45 Watts/Mtr.
5	**Design Standard** :	BS 6351 and IEEE 515
6	**Approval Agencies** :	Central Mining Research Station (CMRS), Dhanbad. Department of Explosives, Nagpur
7	**Area Classification** :	Approved for use in **Zone II Area**, with gases having classification T1 to T5 as per **IS 5571 - 1979**
8	**Dimensions**:	12 mm X 4 mm Maximum (Cross Section)
9	**Termination :**	Supplied in Ready to use form with 1m long cold-end
10	**Maximum Safe Temperature**: :	170 ^{o}C - For 25 Watts/Mtr. Tracer 160 ^{o}C - For 45 Watts/Mtr. Tracer
11	**Maximum circuit Length:**	25 meter

Salient Features and Advantages:

- These tapes are supplied in ready to use form with factory terminated cold ends.
- No cutting, splicing or making joints at site is required. Hence installation is easy, safe and fast. No skilled person is required.
- Output does not fall with temperature, giving a faster rate of heating.
- There is no heavy inrush current while starting from cold. Hence lower rating of switchgears and lower capital investment is required.
- Working temperature can be varied easily by changing the set point of the thermostat or temperature controller.

Silicone Rubber Pad Heater



Silicone rubber heater is made of silicone rubber and glass fiber cloth are compounded sheet, Silicone rubber heater has good flexibility, can be associated with an object to be heated is close contact; the heating elements of nickel alloy foil processing form, more uniform heating. In this way, we can let the heat transfer to any desired place.

Technical Data of Silicone Rubber Heater:

1.Maximum temperature resistant of insulate: 250℃
2.Maximum Operating Temperatures: 200 ℃
3.Power deviation: 8%
4.insulating resistance: ≥ 5 MΩ
5.Compressive strength: 1500V/5S
6.Width: 20mm-1000mm;Length: 25mm-1000mm
7. Voltage: 12V-480V,or customized
8. Heating element: nickel chrome wire

Application:

Silicone rubber heater has good waterproof performance. It can be used in wet environment, explosive gas industrial equipment, laboratory pipe, tanks and hopper, heating and insulation equipment and so on. It is easy to operate, safe and reliable. Widely used for hopper heating, motors, submersible pumps and other equipments.

Please contact us for techno-commercial assistance:
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157B , Orchard Road, Royal Palms, Goregaon (east), Mumbai 4000 65, India.
www.celsun.in info@celsun.in 022- 2872 6963 / 2874 6963

CELSUN FLEXIBLE SILICONE RUBBER DRUM HEATERS

Drum Heaters are available in a variety of sizes to fit 5, 15, 30, and 55 gallon plastic and metal drum heaters. They are chemical and moisture resistant and extremely rugged. Installation onto standard drum heaters is quick and easy. They are available with or without integral temperature control.

- ✓ For 20, 50, 150, and 200 lit metal and non-metal drums.
- ✓ Rugged and flexible.
- ✓ Integrated fully adjustable thermostats.
- ✓ 240volt or customized volt versions available from stock.

Product Technique Data：
1.The highest heat resistance for insulation materials：180℃
2.Compressive strength:≥AC1500v/5s
3.Insulation resistance:≥50 MΩ
4.Power Tolerance：±5%

Specification:

Drum Capacity	200L	20L	150L
Size	250*1740mm	200*860mm	125*1740mm
Voltage and Power	220v 2000w	220v 800w	220v 1000w
Weight	≈0.5kgs	≈0.3kgs	≈0.4kgs
Diameter of Oil Drum	≈580mm	≈300mm	≈580mm
Working Temperature:30-150℃ EGO			

CELSUN METALLIC JACKET TYPE DRUM HEATERS

The Electric Drum Heaters are uniquely designed and rigorously tested product of the company and it has evolved due to lot of research over time scale for decades.
Tried and tested across many industries, our range of Flexible Heating Jackets simply wrap around the vessel / drum , clip together and the thermostat can be set to the desired temperature.

- ✓ High-grade thermal insulation to reduce heat-loss and increase efficiency whilst providing protection for the operator.

- ✓ Designed & suitable for 1 drum (200ltr)
- ✓ MOC. M.S./ S.S. or G.I.
- ✓ Supplied with Power panel, Temperature indicator & controller.

- ✓ 240volt or 430volt versions available from stock.

- ✓ Dimensions: 610mm x 1100mm (internal)

- ✓ Temperature Range : Up-to 200 Deg C.

- ✓ Weight : 150 Kg. supplied with Wheels for easy portabiility.

- ✓ Safe to use 24 hours a day.

- ✓ Available in various capacity like 4.5KW, 6KW, 9KW, 3 KW for standard liter poly / Metal drum or custom size.



Hopper Heaters

Hopper Surface Heating Systems maintain elevated temperatures above moisture and acid dew points. We design & Manufacture different types hopper heaters suitable for ESP Hoppers, Baghouse Hoppers, Material & dust collector Hoppers

1. **Metal Clad Heaters**: GI / SS body. Temperatures up to 350°C & Simple Stud-Welding Installation.

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3. **Fibre Glass Heating Pads:** Temperatures up to 300°C & Easy eyelet Installation.

In-house team of heating experts assigned to each application to provide:
• Thermal calculations
• Wiring diagrams and installation drawings
• Maintenance manuals and support

Our modular design provides the:
• Easiest and lowest cost-of-installation
• Most cost-effective and energy-efficient heat possible across a large surface area.

Temperature Control and Power distribution Panel for Hopper heating system:

Choose from a wide range of temperature control options to meet your application and precision needs. All control systems are configured-to-order to meet your unique environmental requirements. Temperature monitoring & Control accessories such as Thermostats, RTD, Thermocouple, junction box & Panels is available under one roof.

Other application of Hoppers Heating Pads:

- ✓ Storage Tanks Viscosity control and freeze protection
- ✓ Process Vats and Dip Tanks Heat raising and maintenance
- ✓ Low Temperature Ovens
- ✓ Concrete Chute Curing

CELSUN SPONGE BALLS FOR CONDENSER & HEAT EXCHANGERS CLEANING

The sponge rubber balls are necessary to maintain the inner side of condenser and heat exchanger tubes clean in power plants and process industries. Any kind of deposition inside the tube reduces the heat-exchange coefficient drastically. The sponge rubber balls can clean all the deposits on the inner side of the tube, and ensure that the equipment runs efficiently.

Our Sponge Balls are sold to Power Plants, Various types of industries and for HVAC condenser tube cleaning applications.

The Standard Sponge Balls (SSB) also called

as non-abrasive balls have porous structure, they are softer and more elastic. They have tendency to absorb water, their surface is coarser, so it can remove dirty stuff easily.

Standard balls are used in most condition that has no special requirements. We recommend continuing use these balls for fresh water, water with high TDS and sea water application. For most customers, the standard sponge ball is their first choice.

The standard balls offered by us have 5 kinds of different firmness. They are soft, mid-soft, medium, mid-firm, and firm.

Symbol	Firmness	Density
S	Soft	160 kg/m^3
MS	Medium Soft	200 kg/m^3
M	Medium	250 kg/m^3
MH	Medium Hard	300 kg/m^3
H	Hard	350 kg/m^3

The choice of the firmness of the balls is dictated by the type of the system design, application, operation of the system continuous/batch type, the pressure drop across the heat exchanger etc. The most commonly used sponge balls for cleaning application are 'Medium' firmness.

Ring Carborundum Sponge Balls also called as abrasive balls are the sponge balls coated with the ring of hard carborundum material. The carborundum is very hard; it can abrade hard deposits on the inner side of the tubes. So if on your condenser tube there is something stuck on the inner surface and very difficult to remove, the carborundum coated ball is the best choice.

But these balls can be harmful for soft tube.

They should ONLY be used in extremely difficult conditions, and they cannot be used continuously or very often. It is recommended not to use these kinds of balls for new equipment, and never use them for brass tube and other soft material tubes. These types of balls should be selected as per the recommendations of online tube cleaning system equipment supplier.

These balls are available for the various firmness mentioned above. For ring coated balls coating of 1-2 mm shall be additional to the ball diameter.

The cleaning sponge rubber balls are available in various sizes mentioned below:

Ball Size (Nominal Diameter in mm)									
Ø 12	Ø 13	Ø 14	Ø 15	Ø 16	Ø 17	Ø 18	Ø 19	Ø 10	Ø 21
Ø 22	Ø 23	Ø 24	Ø 25	Ø 26	Ø 27	Ø 28	Ø 29	Ø 30	Ø 31
Ø 32	Ø 33	Ø 34	Ø 35	Ø 36	Ø 37	Ø 38	Ø 39	Ø 40	-

For the sizes not mentioned above, please contact us. The balls supplied have a tolerance of (-0) to (+1) mm.

Please contact us for techno-commercial assistance:

Celsun Ecoenergy & Infratech Holdings Private Ltd.

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Electric Heat Tracing Applications

Industrial Applications

Four major areas of technology, services and products

1. Electric Heat Tracing + Control & Monitoring
   (Raychem and all kinds of electric heating solutions)

2. Standing Seam Tank thermal insulation (TracLoc)

3. Leak Detection System
   (TraceTek, either for Water or liquid hydrocarbons)

4. Fire Survival Mineral Insulated Cable
   (for power as well as control / signaling)

Industrial Applications

Pipe freeze protection
Process temperature maintain
Pipeline heating
Tank & vessel heating

Industrial Heating Solutions

nVent RAYCHEM

nVent TRACER

Heat Tracing for Plant Piping & Vessels

Heating System Components

Control, Monitoring & Sensing

Turnkey Services

Snow melting & de-Icing
Radiant floor warming
Liquid leak detection
Life safety power cables

Building & Infrastructure Solutions

nVent RAYCHEM

Heat Tracing for Pipes & Surfaces

Fire Rated Wiring Cables

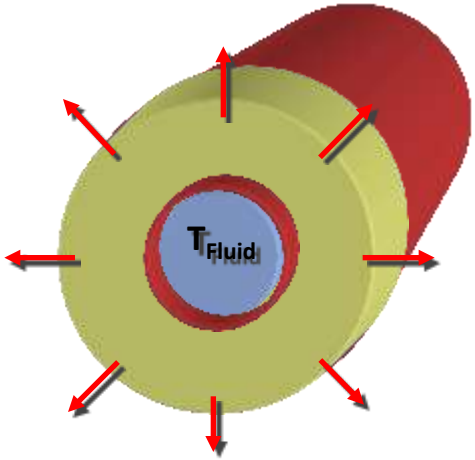
Floor Heating Cables & Mats

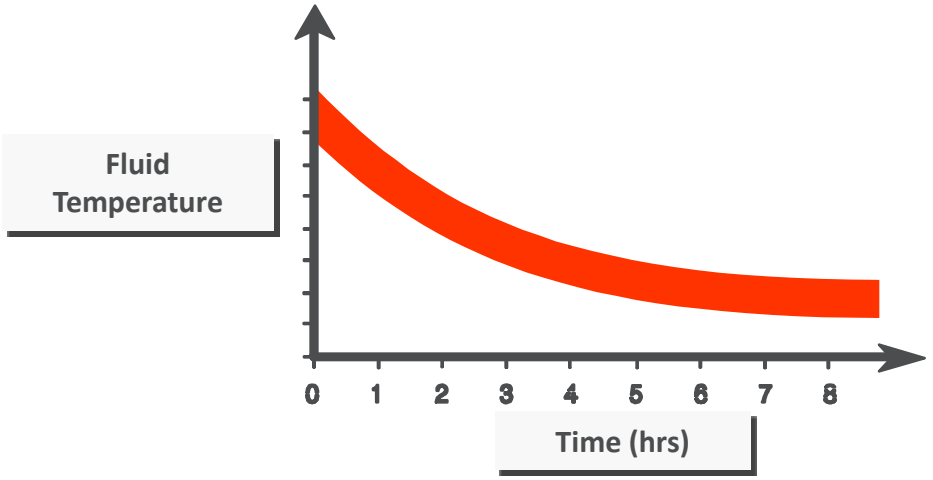
Thermostats, Controls

Basic Fundamentals of Heat Tracing

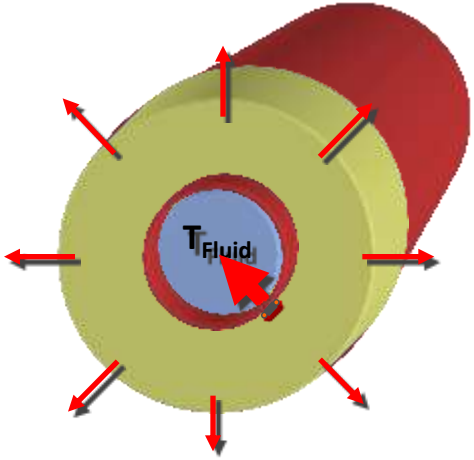
Maintains Temperature Over Time

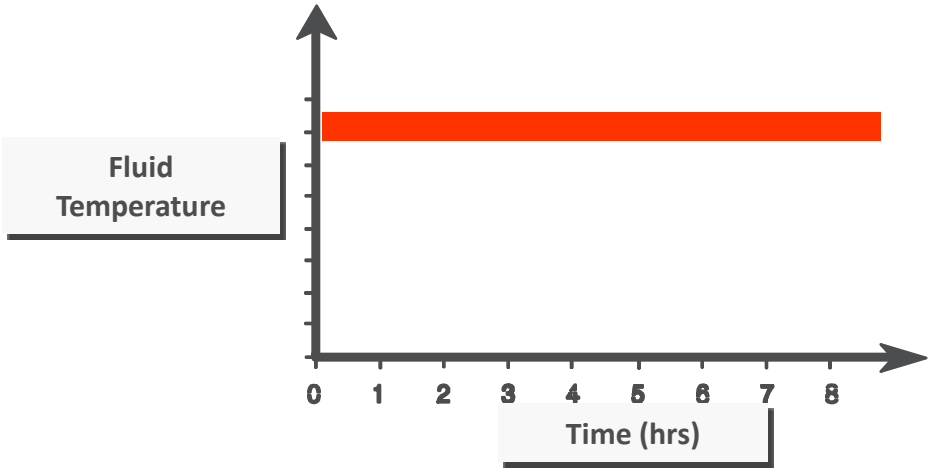
Not Traced





Traced





Factors that Influence Product Selection

- Customer's Specification
- Standards
- Application
- Length, Size, material and Type of Piping
- Area Classification & T-Rating
- Maintain Temp
- Max operating Temp
- Max Exposure Temp
- Allowable Temp
- Heat Loss
- Supply Voltage
- Chemical Exposure
- Mechanical Resistance
- Cost/Selling Price

Heat Tracing Application Areas

Freeze Protection	Reduce Viscosity
Prevent Condensation	Prevent Bacteria Growth
Prevent Crystallization	Temperature Sensitive Fluids
Prevent Solidification	Special Applications

Freeze Protection

FLUID	MAINTAIN TEMP. OC	APPLICATION	INDUSTRIES
Water	4 - 10	Winterization Freezer Rooms: Drain lines, Trays Coils	Petro Chemicals, Hotel, Cold Storage, OEM's
Moisture	4 - 10	Freezer Room - Door frame; Coils Ammonia - Insulated Lines Refrigerated Vans – Control Panel	
Gas	4 - 10	Safety Valve - Freeze up.	Refineries, Oil & Gas, Petro Chemicals

Prevent Condensation

FLUID	MAINTAIN TEMP. OC	APPLICATION	INDUSTRIES
Gas	30 - 40	Hydrogen Sulphide, LPG / LNG Pipes	Oil & Gas, Petro-Chem, Refineries; Industries; OEMs
Emissions	160 -180	To Prevent Corrosion due to SOX, NOX HCI - Pollution Monitoring	Stacks Of Boiler, Furnace
Solvents	60 - 80	Solvent Extraction	Edible Oil Plant, Chemical Ind; Glycerine Recovery

Prevent Condensation

FLUID	MAINTAIN TEMP. OC	APPLICATION	INDUSTRIES
Hygroscopic Materials	40- 50	Chute Conveyors, Bagging, Storage Silo for Powder, Fertilizer, Grain	Various
Ash	145	Ash handling Hopper System	Power Plant Boiler, Steel Furnace
Chlorine	50- 60		To prevent Corrosive Condensate formation

Prevent Crystallization

FLUID	MAINTAIN TEMP. ^{O}C	APPLICATION	INDUSTRIES
Inorganic Chemicals / Salts	60- 80	To prevent crystallization by under or over heating.	Intermediates, Dyes & Chemicals
Glucose / Sugar Syrup	50- 60	To prevent crystallization by under or over heating	Pharmaceutical, Food
Starch	50- 60	To prevent crystallization	Yarn & Textile

Bacteria Control

FLUID	MAINTAIN TEMP. OC	APPLICATION	INDUSTRIES
Distilled Water	60- 80	Distilled Water Storage Vessel by EHT during weekly plant holiday.	Pharmaceuticals, Hospitals
Water	45	Domestic Hot Water supply to prevent 'Legionella' forming bacteria	Hospitals, Hotels, Health Spa, Old aged peoples homes

Prevent Solidification

FLUID	MAINTAIN TEMP. OC	APPLICATION	INDUSTRIES
Low Sulfur Fuel Oils	65 - 90	Prevent Solid forming	Refineries, Boiler & Furnace Plants
Wax	50- 60	Prevent Solid forming	Refineries, Match Stick, Packaging paper
Petroleum Jelly	50 - 60	Prevent Solid forming	Pharmaceuticals & Cosmetics
PUF Chemicals	60	Prevent Solid forming	Foam Sheets, Shoe soles, Construction

Temperature Sensitive

FLUID	MAINTAIN TEMP. OC	INDUSTRIES
Phenol	40- 50	Petrochemicals, Chemicals
Sulfur	138 -145	Refineries, Polyester Yarn, Acid
Chocolates	50- 60	Chocolate - Cadbury, Amul
Hydrogenated Oils	50 - 60	Vanaspati
Soap	60 - 70	Soap - HLL, Godrej, Nirma

Reduce Viscosity

FLUID	MAINTAIN TEMP. OC	Application
Fuel Oil	40 – 50 135	For Handling & Transfer For Combustion
Bitumen Coal Tar	135 170	For Storage, Handling & Transfer. Drum Heating
Lube Oil / Grease	50 - 60	For Storage, Handling & Transfer. Drum Heating

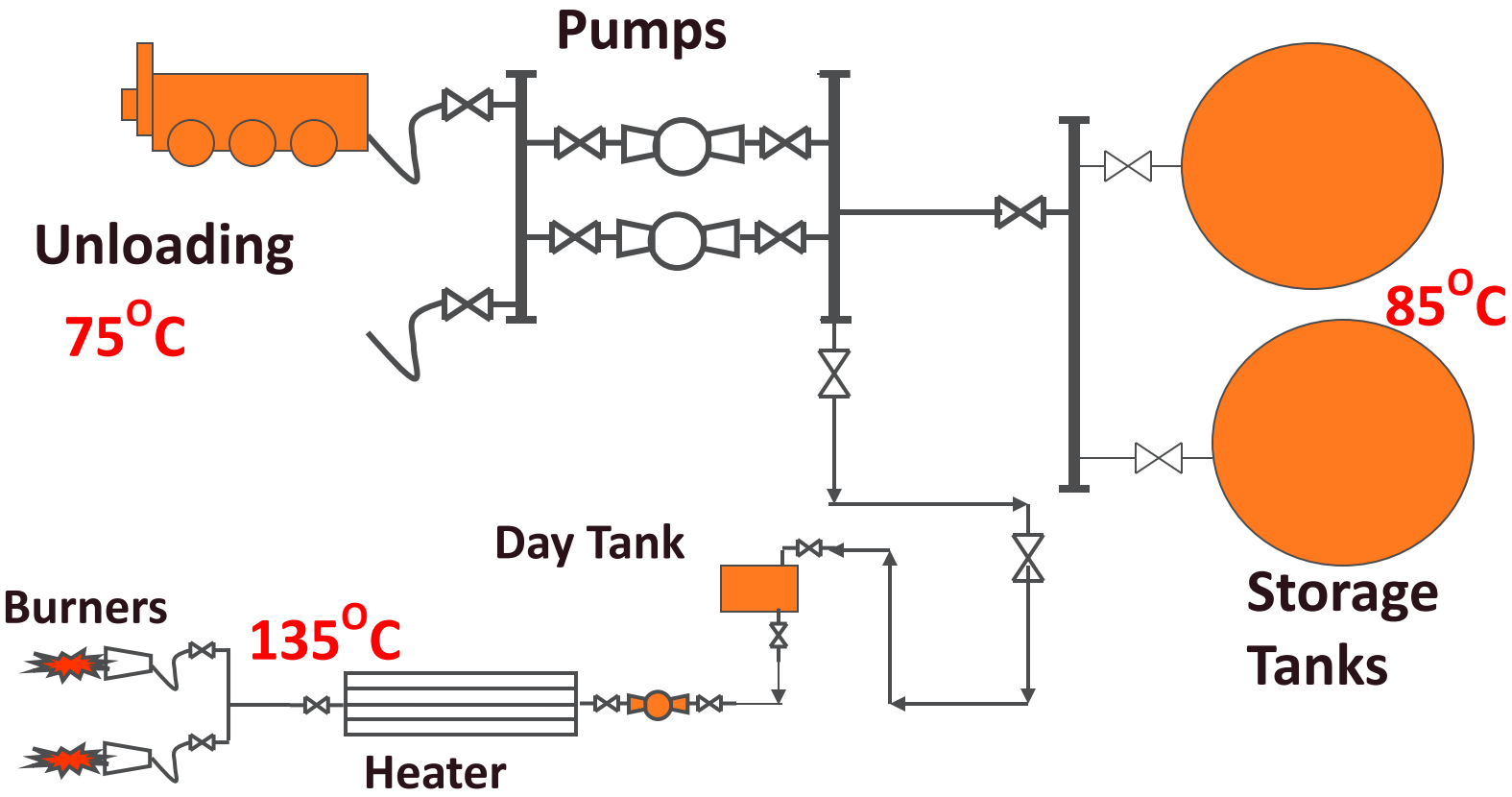
Special Areas

Nuclear	Off-shore
Cryogenic	Buried
Very High Temp.	Un-insulated Barriers

Other Applications

Where Steam is not available (Glass, Steel, Cement, etc,)	Long Transfer Lines, >2 Km
Maintenance Temp. >210^{0}C	Buried Pipes, Tanks
Maintenance Temp. <90 ^{0}C	Short length, Complex Piping and Flexible hose
Remote Location (Jetty, Pumping Station, etc,)	

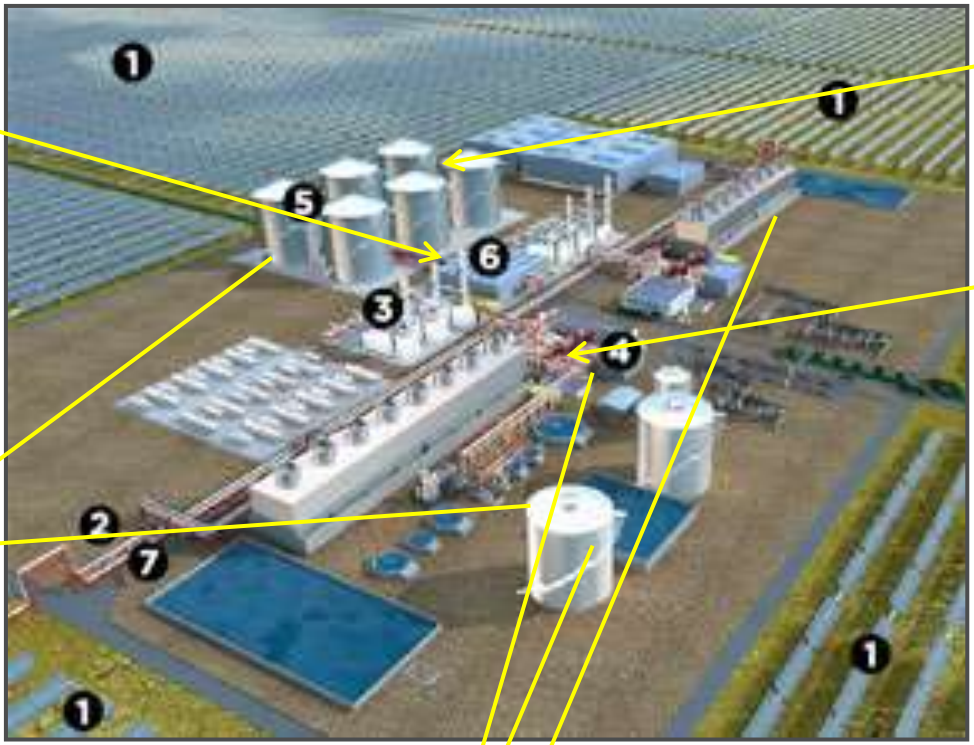
LSHS/ FO/ HFO Handling - EHT



Solar Power - Parabolic Trough System – Typical Layout

Process Temperature Maintenance for:
- Molten salt pipelines carrying salts/ HTF

Tank Insulation:
- Molten Salt Tanks
- Water Tanks



Process Temperature Maintenance for:
- Molten salt tanks

Heat-Tracing Control & Monitoring Systems:
- Distributed Control System

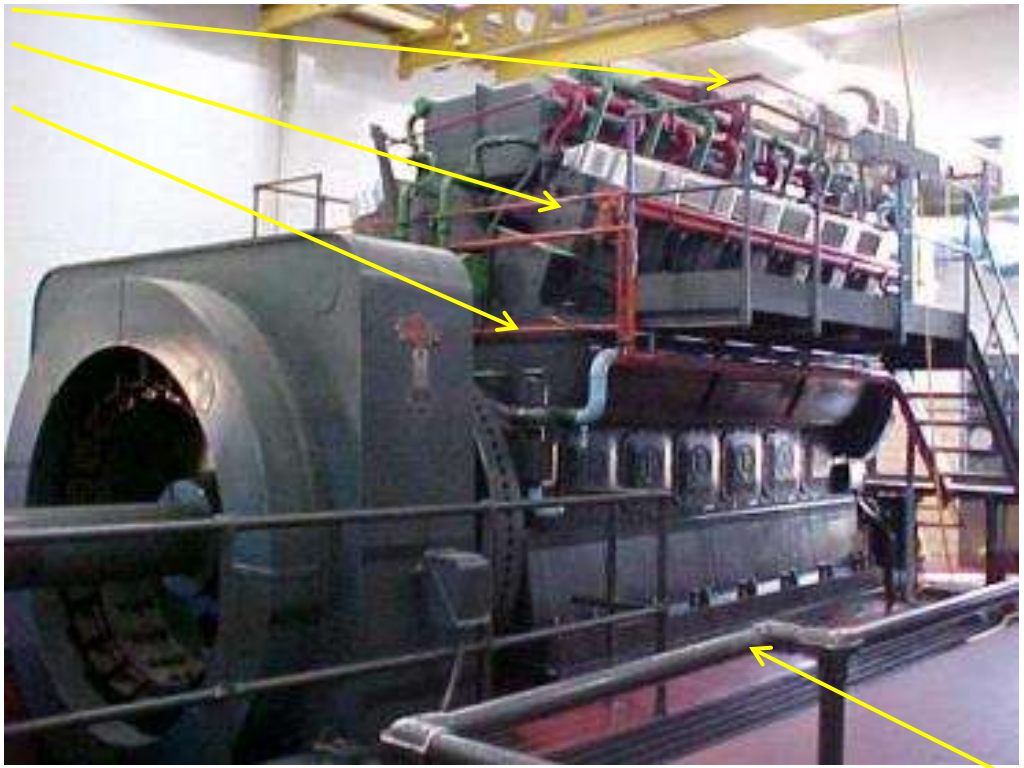
Freeze Protection:
- Drain, chemical injection, water treatment, other water lines throughout the plant

EHT & Tank Insulations for the Heat Transfer fluid & Molten Salt

Diesel Power Plants

Pipe Freeze Protection and Diesel Oil Temperature Maintenance Requirements

Process Temperature Maintenance for:
- LDO Lines



Source: Melrose Diesel Power Generation Plant

Tank Heat-Tracing & Insulations Systems for:
- LDO Tanks
- Unloading Pipelines

Heat-Tracing Control & Monitoring Systems:
- Distributed Control System

Pipe Freeze Protection:
- LDO Lines

Typical Applications

INDUSTRY	PLANT	FLUID OR EQUIPMENT
REFINERY	Topper	Crude Oil
		Atmos Residue
		Heavy Gas Oil
	Vacuum	Vacuum Bottom
		Vacuum gas oil
	FCC	Slurry Oil
		Light Cycle Oil
	Viscocity breaker	Heavy Oil
	Sulfur	Sulfur
	SWS	H2S
	Caustic Treating	Sulfulic Acid
		NaOH aq
	Asphalt	Asphalt / Bitumen
	Lube Oil	Paraffin

Typical Applications

INDUSTRY	PLANT	FLUID OR EQUIPMENT
PETROCHEMICAL	1,4 BG	
	2 - EH	2 - Ethyl Hexanol
	AA	Acetic Acid
	ABS	ABS
		Acrvionitni
		Butadiene
		Styrene
	Acetone	Acetone
	AE	Air Entraining Agent
		(Diazo Amino Benzene)
	AN	Acylonitni
	Parek	Paraxylene
	Sulfolane	Banzene
		Sulfolane
	Morphylane	Banzene
		Morphylane
	BPA	
	Butanol	t- Buthylalcohol
	CPL	
	DMF	Dimethyle Formanide
		Dimethyle amine
	DOP	Diotyl Pathalate
		Phthafic anhydride
		2 Ethyle Hexanol
	ECH	
	EDC	Ethylene Dichloride
	EG	Ethylene Glycol
	EVA	Ethylene Vinilacetate Copolymer
		Vinyl Acetate
	HDPE	High Density PE
	IEM	Chlorine Gas
	LDPE	Linear Low Density PE
	MMA	Methyl Methacylene
	MTBE	Methyl Butyl ether
	PA	Polyamide
		Caproractam
		Ethylene Diamine

Typical Applications

INDUSTRY	PLANT	FLUID OR EQUIPMENT
PETROCHEMICAL		
	PC	Chlorine Gas
		Polycarbonate
		Bisphenol A
	PHENOL	Phenol
		NH3
	PP	Polypropylene
	PVC	Chlorine Gas
		Vinyl Chloride resin
	SAN	Acryinitrile Stylen resin
		Acrylnitile
		Stylen
	SM	Stylen
	TDI	Chlorine Gas
		Tolylene Disocyanate
		Tolylene Diamaine
	VAM	Vinyl acetate
	VCM	Chlorine Gas
	EO	Ethylene Oxide
	TPA	Terephthalic acid
		Paraxylene

Typical Applications

INDUSTRY	PLANT	FLUID OR EQUIPMENT
OIL STORAGE		Crude Oil
		Fuel Oil
		Diesel
		Heavy Fuel Oil

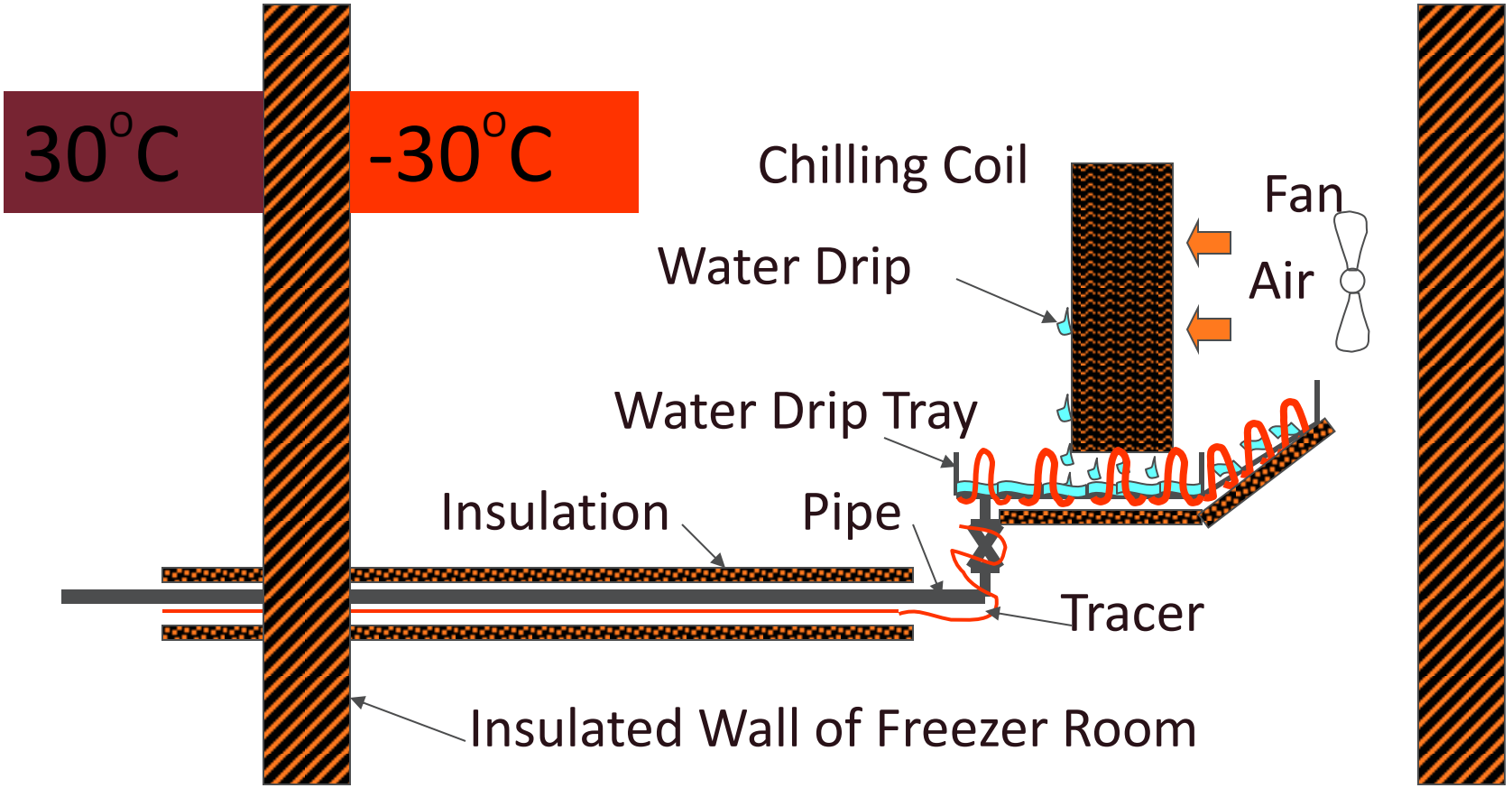
INDUSTRY	PLANT	FLUID OR EQUIPMENT
CHEMICAL	Fertilizer	NaoH aq
		Sulfuric Acid
	Synthetic Resin	Monomer
		Polymer
	Dye Stuff	Monomer
		Polymer
	Paint	Monomer
		Polymer
		Sulfuric Acid
	Pigment	Monomer
		Polymer
	Bonding	Monomer
		Polymer
	Detergent	NaoH aq
		Sulfuric Acid
		Fatty Acid
		Fatty Alcohol
	Soap	NaoH aq
		Fatty Acid
	Soda	NaoH aq
	Acrylic	Acrylic Acid
	Ethyl Alcohol	Hydrate
		Fermentation

Typical Applications

INDUSTRY	PLANT	FLUID OR EQUIPMENT
FOOD / BEVERAGE	Chocolate	Chocolate
	Syrup	Syrup
	Milk	Oil
	Edible Oil	Oil
	Soy Sauce	
PHARMACEUTICAL	Cosmetics	Higher Glycol
	Fuel Oil	Fuel Oil (For DG Set)
POWER PLANT	Co Generation	Fuel Gas
	Thermal Fire	Fuel Oil
		Water
	Solar	Molten Salt

INDUSTRY	PLANT	FLUID OR EQUIPMENT
UTILITY & OTHER	Steam Generation	Hydrazine
	Fuel Oil	Heavy Oil
	Acid Flare	Due to containing H2S
	Suction Line of Compressor	Avoid Condensation

Freezer Room Applications



Applications By Type

Process Temperature Maintenance

- Crude oil,
- Petrochemicals,
- Chocolate
- Soap Industry
- Transfer lines
- Bitumen lines

Pipe Freeze Protection

- Water pipeline,
- crude lines,
- or any chemical lines in cold locations

Longline Heating

- Material transfer lines
- Snow and ice melting
- Tank foundation heating
- Subsea transfer lines
- Sulphur Pipelines
- Longline pipe heating

.

Applications By Type

Flow Assurance

- Solutions can combat production issues associated with paraffin, heavy or hydrate-laden production fluids
- DownHole Heating,
- Enhanced Oil Recovery (EOR)

Tank Heating

- Freeze protection(e.g. water, ammonia)
- Temperature maintenance (e.g. oils, resins)
- Crystallization prevention (e.g. caustic soda)
- Condensation prevention (e.g. fly ash in conical bases of silos)

Frost Heave Prevention

- System prevents frost heave by applying thermal insulation around cryogenic tanks and by applying electric heat trace cables to the concrete layers underneath the tank
- LNG Storage Tanks

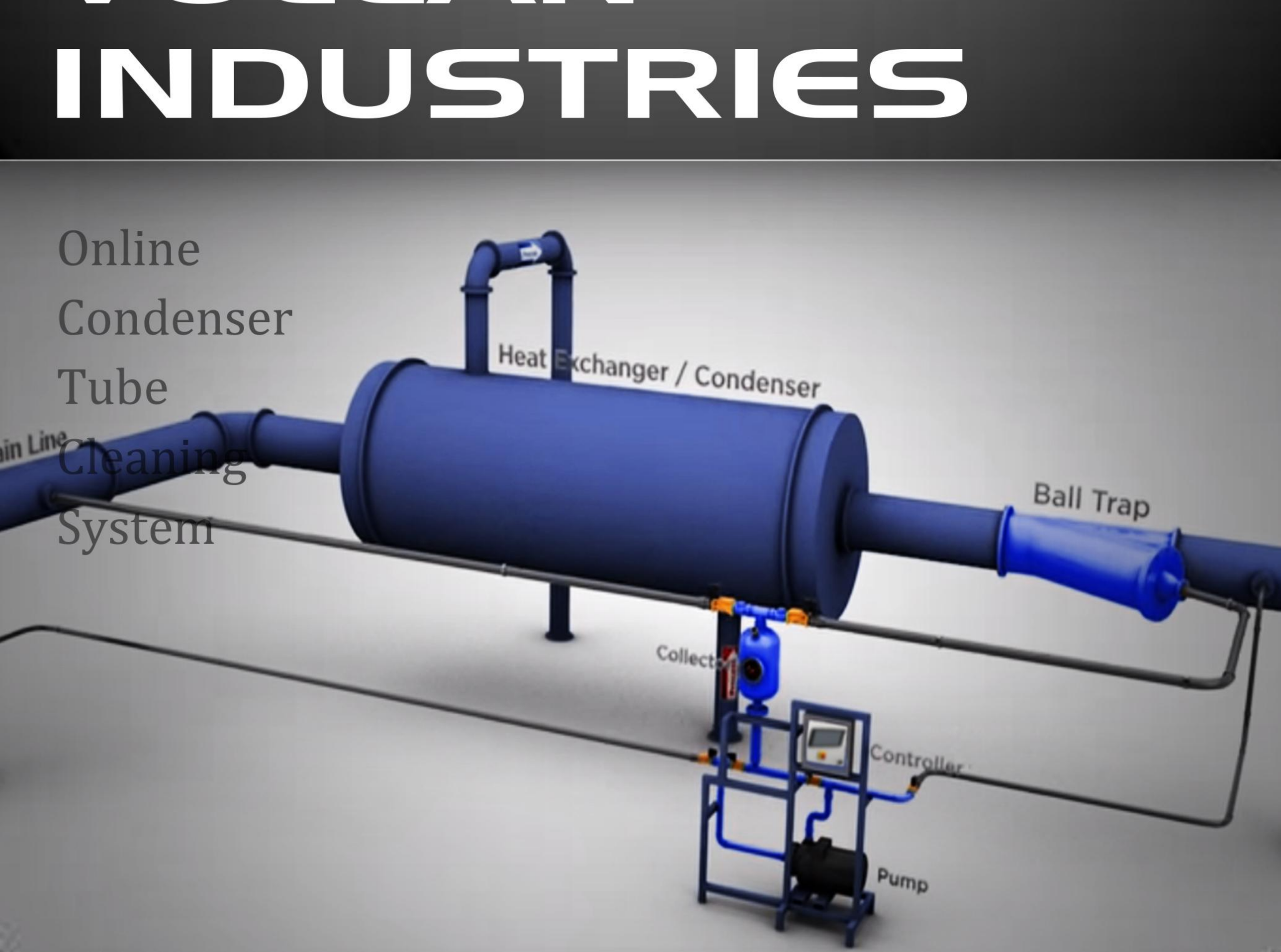
Summary of EHT Applications : Industry A-Z

A-F	F-M	M-Z
• Acetic Acid • Black Liquor • Carbon Black Feed Stock (CBFS) • Caustic Soda • Chocolate • Coal Tar • Coconut Oil • Cold Storage (doors/ drain) • Dairy Products • Fatty Acids	• Fertilizer Slurries • Furnace Oil • Glucose • Glue • Hotels – hot water circulation • Hydrogen Sulfide (H2S) • Latex • Low Sulphur Heavy Stock (LSHS) • Lubricants • Menthol	• Molasses • Oil & Gas • Palm Oils • Rosin • Solar (CSP) • Steel • Thermal Power • Tyre • Vegetable oil/ Dalda • Wax

Thank you

VULCAN INDUSTRIES

Online Condenser Tube Cleaning System



Introduction

The rising trend as witnessed and predicted the world over shows us that there has been a Global increase in energy consumption. This rising demand causes the Industry & the Commercial Market to indulge in excessive expenditure to fulfil their basic necessities.

We, Vulcan Industries, through our Online Condenser Tube Cleaning System, endeavor to help in reducing these expenditures. These overheads are not attributed only to energy loss, but also towards improving technical infrastructure and preventing further damage to the environment!

Major factors contributing towards Expenditures & Environmental Damage:

1. Loss of Energy
2. Loss of Water
3. Technical problems
4. Use of chemicals & softeners

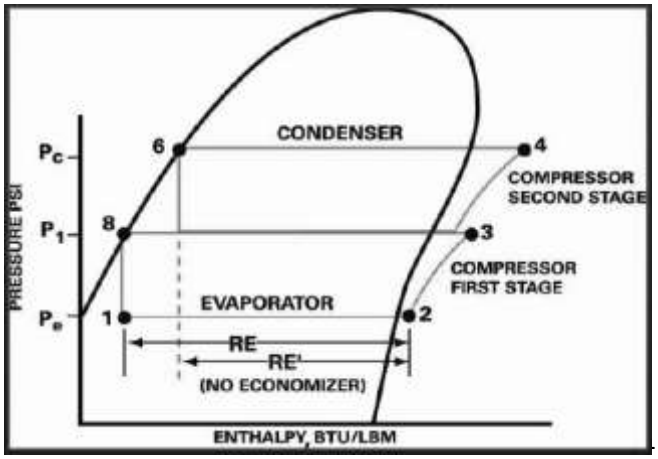
Loss of energy

We can find loss of energy in two places of the heat transfer process:

1. **In the Heat Exchanger/Condenser/Chiller:**
   During the process of heat transfer the constant evaporation leads to the formation of scaling on the inner walls of the heat exchanger tubes. This phenomenon is exacerbated by the sediments present in the water. This leads to significant loss in heat exchanging capacity. Depending on the industry, the heat exchanger can have water, chemicals, or any other liquid running through the tubes. This problem of accumulated sedimentation in each case drastically reduces any heat transfer.

2. **In the cooling tower/ cooling circle:**
   Here we can find the same problems as in the heat exchanger, together with other elements such as bacteria & algae. In the cooling tower the efficiency of the energy release to the atmosphere damaged, because process difficulty due to the scale & sediment. The efficiency of the water spreading on the “Lamellas” and the air flow is reduced. In a closed cooling circle we can find again the difficulty of heat transfer due to dirt problems and others, affecting the fen-coils, side.

In this diagram we can see the effect of reduced heat transfer efficiency from the compressor side. The compressor needs to work harder to produce more energy for the heat transfer process. (Compressor Second Stage)



Online Condenser Tube Cleaning System Applications

Power Stations

Online Condenser Tube Cleaning Systems have been widely used in this application for many years. Biggest advantages of our system are the technology, the competitive costs and the fact that the balls inject & return to the collector without additional loss in heat exchanger pressure.

Refineries & Chemical Industries

Here a large number of heat exchanger processes require a regular cleaning. This is done at present by means of manual pressurized and chemical cleaning. This unfortunately requires shutting down of the heat exchanger and unnecessary costs in maintaining the system.

Pharmaceutical Industry

In this industry the production process requires a constant temperature. Due to the sedimentation and scaling in the Heat Exchangers, there is reduction in output due to changes in temperature. The temperature differential over the walls becomes higher & the media can be locally overheated. This results in a drop in product quality.

Textile Industry

These plants are highly affected due to the dirt in water towers caused by the production process. This blocks the heat exchangers.

Plastic Industry

Their problem lies in small heat exchangers and smaller diameter inner piping which prevent mechanical cleaning. This often involves rinsing with acid, whereby heat exchangers are often damaged.

Air Conditioning

Applications of central air-conditioning units lie mostly with commercial buildings, like hospitals, banks, hotels, office buildings, shopping centers etc. A specific advantage of this market is that all air-conditioners and coolers work identically. Therefore power-saving calculations appear throughout each and every manufacturer's literature and one can calculate the pay-back time very accurately. Energy savings of 15% - 30% are very common in this industry.

Cooling Systems

These systems are used in plants for the production of dairy products, ice cream, meat processing plants, and cold storage plants. These systems work around the clock, therefore they are susceptible to problems involving downtime for purposes of prolonged treatment & cleaning of heat exchangers, leading to losses via interruption in the production process.

Ships

Given the presence of algae & microorganisms in the sea water, which is often used for cooling, these are liable to cause problems so that the heat exchangers lose their excellence of operation. New ships carry only small crews, thus there is no available personnel to deal with the high frequency treatment required by heat exchangers. Furthermore a ship's downtime costs may amount to thousands of dollars per day.

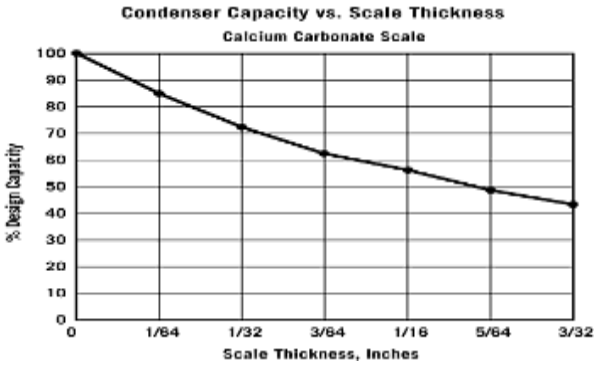
Savings Calculation

Our Online Condenser Tube Cleaning System saves our clients a lot of money from the daily/monthly/yearly expenses by reducing energy cost, technical cost and other cost which most of us don't notice during the routine everyday processing.

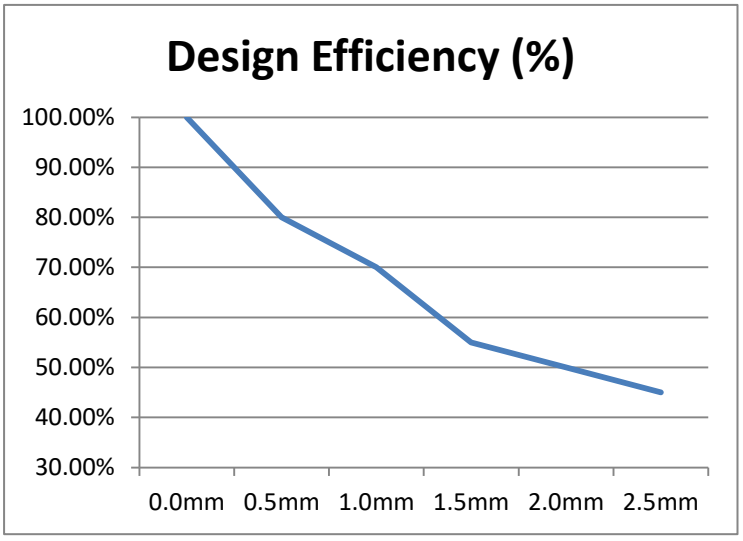
The following charts were made by some of the most known international companies which produce heat exchangers, condensers, and cooling towers. We can see the effect of scaling/sediment on the efficiency of heat transfer and the work of the compressor efficiency.

Carrier

Scale thickness	Fouling Factor(FF)
0.000"	Clean Tube
0.006"	0.0005
0.012"	0.001
0.024"	0.002
0.036"	0.003



OCTCS saves 2 types of losses:
1) Energy Saving
2) Water Saving



Energy Saving:
Condenser Capacity (TR/h) x Compressor efficiency (%) x working hours in a season (h) x cost of energy (INR/Kw/h) x Estimate Saving (%)

Water Saving:
Drainage water (m3/h) x working hours in a season (h) x Estimated Savings (%)

Even if Chemicals are used, 1-1.5 mm of scaling is formed. This data is provided after a thorough research of various condensers and equipment worldwide.

Energy Savings for Closed Cooling Systems

One important point that most people don't know regarding closed cooling systems, that those systems are not closed, as we think. All kinds of dirt, algae, and corrosive materials go through the cooling circulation and cause energy loss and technical problems. In the chart below we can see the effect of these factors on the energy transfer efficiency.

If we look on the other side of the cooling systems, we find the fan-coils. The Fan-coils are the last step between the cold water of the cold water of the condenser system and the cold air that we feel inside the room. The Fan-coils' structure and method of operation is similar to the structure and method of operation of a car radiator. The sedimentation in closed cooling systems blocks the optimal energy transfer and blocks the fan-coils. These factors, lead to the fan-coils demanding a lot of maintenance, replacement, and use of energy for the cooling.

Fouling Thermal Resistance (HR)(Sqft)(^{o}F)/BTU	Overall Heat Transfer Coefficient** BTU/(HR)(Sqft)(^{o}F)		Thickness of Scale* (Inch)	Increase of required Heat Transfer Area *** (Approximate %)	
	Chiller	Condenser		Chiller	Condenser
0.0000	400	850	0.000	0	0
0.0005	333	595	0.006	20	45
0.0010	286	460	0.012	40	85
0.0020	222	315	0.024	80	170
0.0030	182	240	0.036	120	250

Table: Heat Transfer Surface required to offset fouling

*Assume a mean value for the Thermal Conductivity of the scale of 1.0 BTU/(HR)(Sqft)(^{o}F per FT).
**The Over-all heat transfer coefficient selected for this illustration are typical for a flooded cooler and a water cooled refrigerant condenser. However, because it is possible to have different over-all heat transfer coefficient depending on the system, the effect on the Over-all heat transfer by the scale will vary.
***SQFT of inside surface of tube in heat exchanger.

Our Online Condenser Tube Cleaning System protects you from unnecessary expenditures, loss in efficiency, loss in production, and removes the need to choose between cost and environmental damage!!!

Power Stations

Oil Refineries

Chillers

Hospitals

Shopping Centers

Pharmaceutical Plants

Ships

Submarines

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