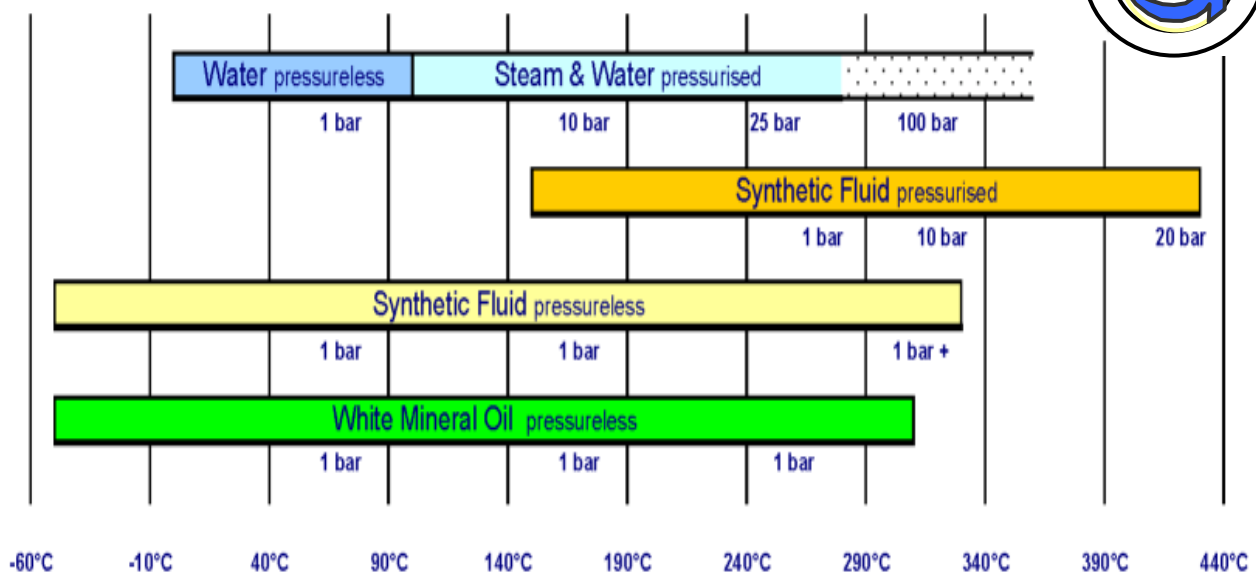




USE THERM - OIL (HTO) HEAT TRANSFER FLUID - TO REPLACE STEAM & CONDENSATE SYSTEM AND SAVE MILLIONS RS/ MONTH.

<p>THERM-OIL = HTO = Heat Transfer Fluid @320C , 6 bar Pr.</p> <ul style="list-style-type: none"> - Most Economical compared to Steam Generation - No Water Treatment cost - No Condensate Losses – like in Steam System - No Water Treatment cost 	<p>= HTO = HEAT TRANSFER OIL</p> <ul style="list-style-type: none"> - No Operator - No First Class Boiler attendant - No Annula Boiler Inspection - No Boiler Inspector Hidden fee - No Water Tankers cost
---	--

Operating Temperature Ranges for Alternative Heating Fluids





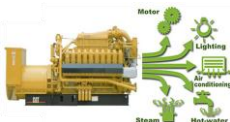
1. **THERM OIL = H.T.O = HEAT TRANSFER OIL - REPLACES STEAM SYSTEM FOR HEATING DRYING-AIR CONDITIONING**
2. HTO is formulated with highly refined, thermally stable paraffinic petroleum oil and offers clean and energy efficient system operation.

SYSTEMS BENEFIT & ECONOMY

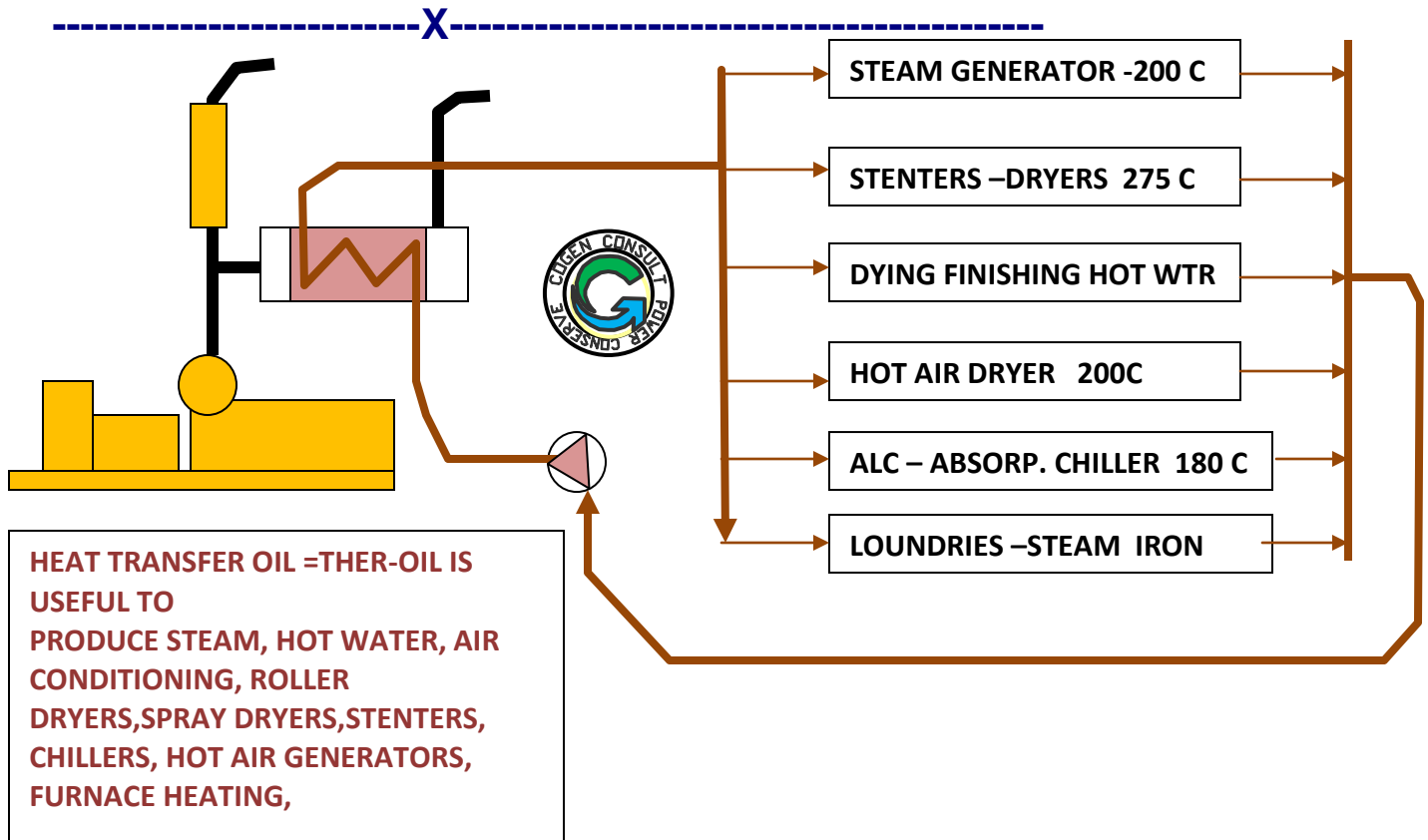
3. Offers Energy Efficient heat transfer performance, helping keep costs down
4. Thermal stability promotes long-life keep-clean system performance and assists with Sludge and coke deposit Resistance
5. Low temperature Fluidity aids cold system start-up, rapid fluid circulation and operation
6. Low Vapour Pressure at Elevated Temperatures helps Minimise Evaporation, vapour lock and pump Cavitation
7. Promotes Efficient operation at Lower system pressures, avoiding the need for expensive high pressure piping and heat exchangers

HTO - APPLICATIONS

8. **May be used in heat transfer systems in industrial drying applications,**
 - Rubber
 - Plastics Manufacture,
 - Heating of asphalt
 - Fuel oil tanks,
 - Factory Heating,
 - Manufacture of Soap,
 - Resin,
 - Glue,
 - Dyes,
 - Paints and Grease,
 - Wood Laminate,
 - Fibre Board & Veneer Manufacture,
 - Agricultural Heating & Drying,
 - Chemical,
 - Petroleum
 - Wax processing.



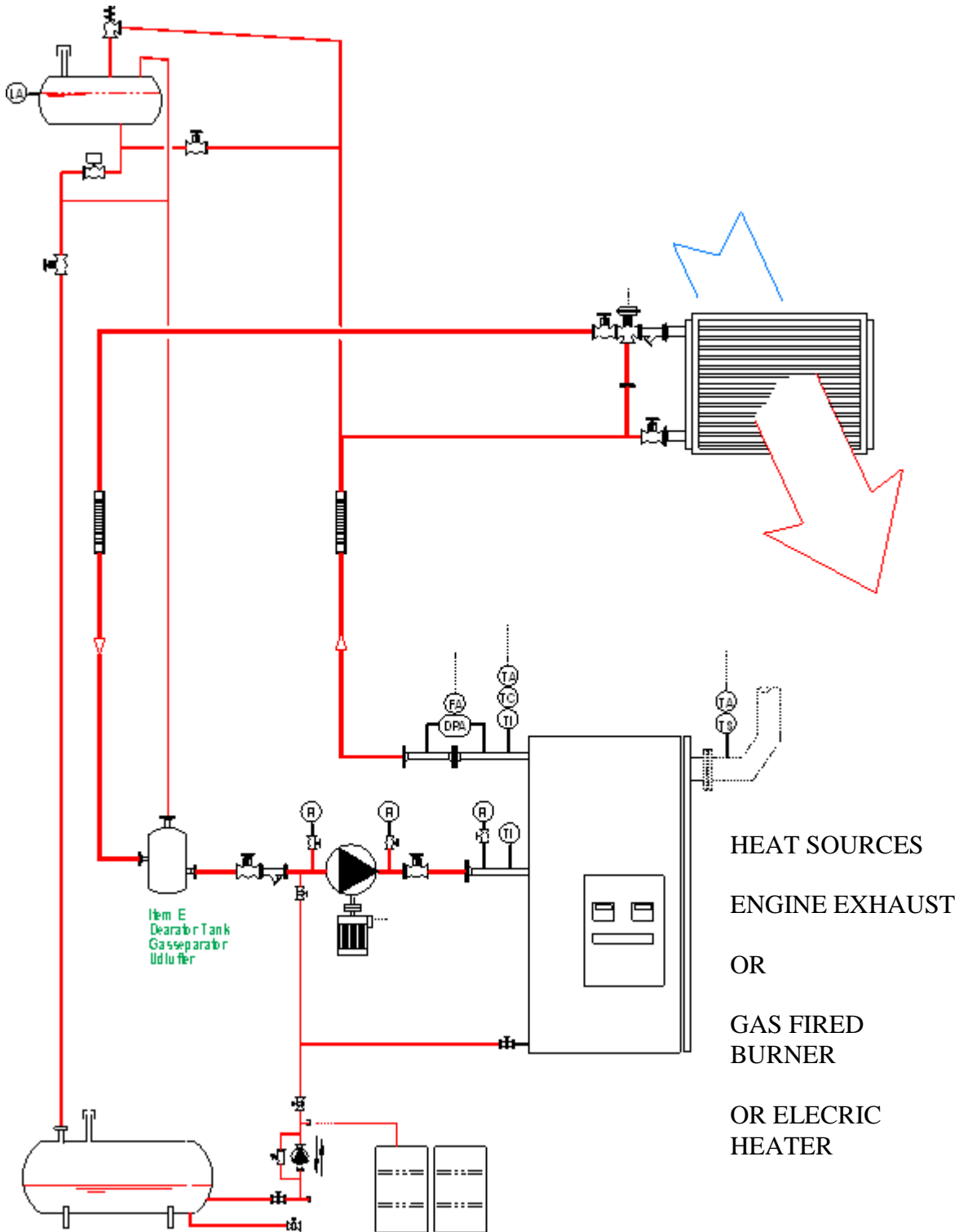
9. HTO = is Suitable for use in open systems operating at temperatures up to +200°C.
10. Hto = is Suitable for use in closed systems (sealed with cold oil or inert gas) operating at bulk oil temperatures up to +320°C
11. Hto = is good for long, trouble-free service in closed systems, the maximum film temperature on heater surfaces should be limited to +340°C
12. HTO = Systems must have forced heat transfer fluid circulation
13. HTO = While unused thermic Oil (HTO) is compatible with most organic heat transfer oils, prior laboratory testing is recommended before the product is added as a top-up to a system containing a competitive used oil.
14. Adding HTO as make up to severely used oil, especially aromatic types, may precipitate suspended sludge
15. Approvals, performance and recommendations
16. Performance= DIN 51522 (Q for heat transfer oils = HTO)

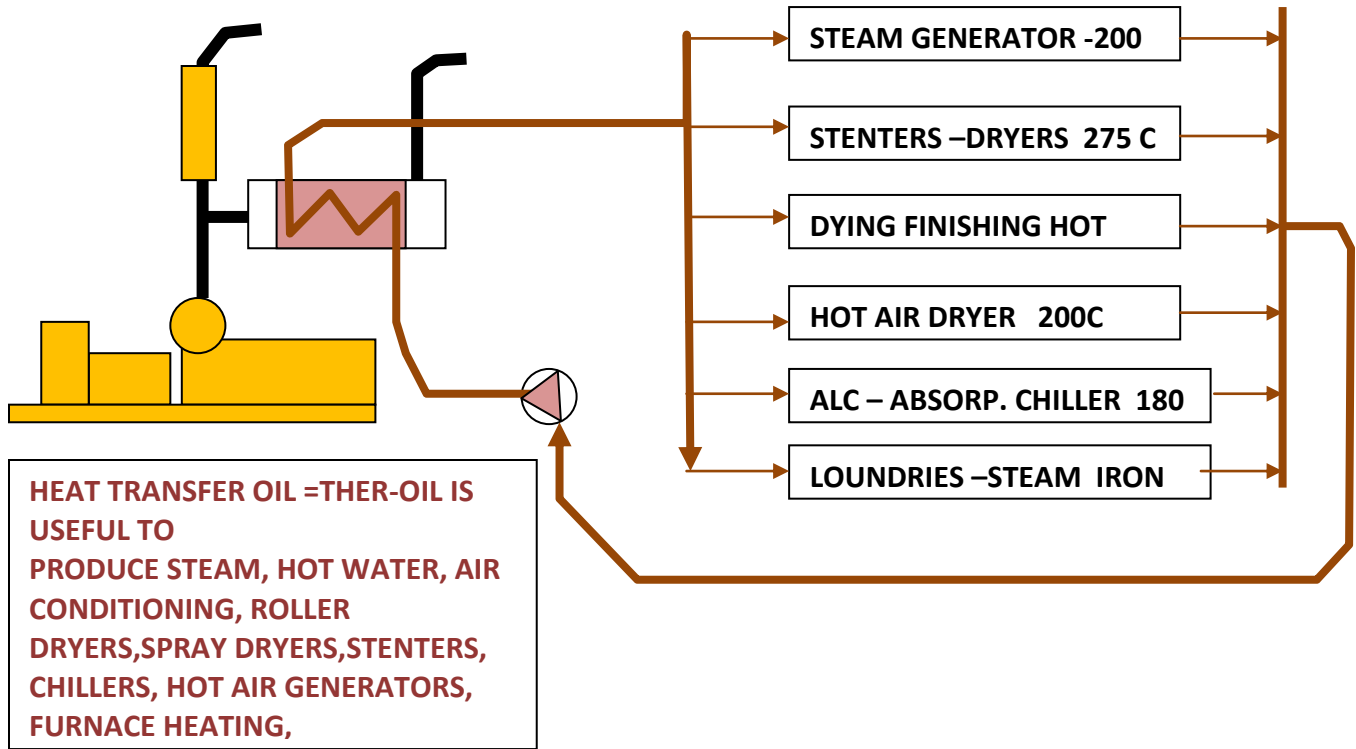


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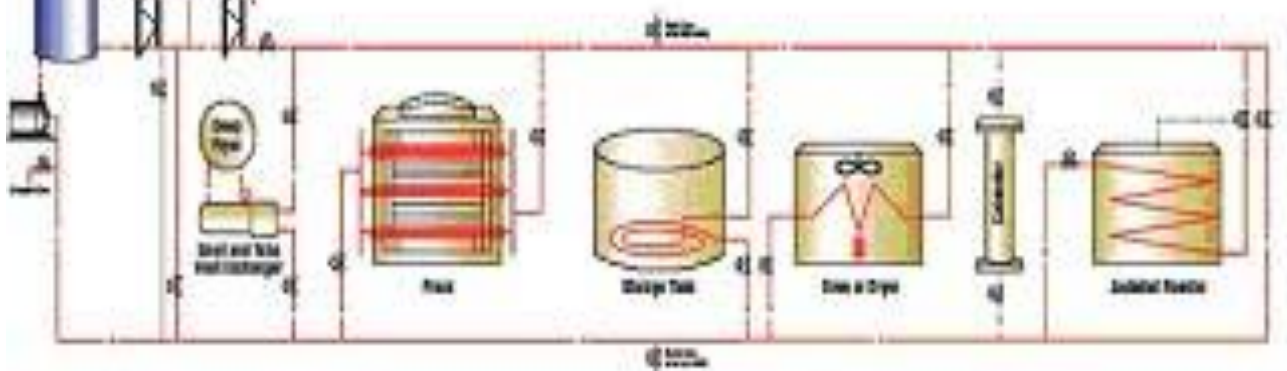


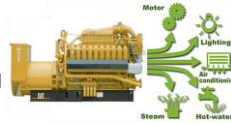
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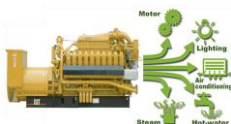
Thermal Fluid Closed Loop System Typical Heat Transfer System Layout



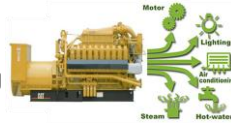


FEASIBILITY & ADVANTAGES OF THERMIC OIL VS STEAM SYSTEM

DESCRIPTIONS	UNITS	STEAM	HT OIL
STEAM CAPACITY	TON/HT	1	1
STEAM TEMP	DEG-C	178	350
STEAM ENERGY	KWTH	850	850
STEAM GEN FUEL COST	RS/TON	1650	1650
WATER FEED TEMP	DEG-C	90	150
FEED WATER REQUIRED	TON/HR	130	100
WATER TANKER COST 2000 GALLON	RS/TON	2000	NIL
WATER QTY	GALLONS	2000	NIL
WATER COST/LITER	RS/LITER	3.8	NIL
CONDENSATE LOST EVERY HR 30%	LITERS	300	NIL
NEW WATER NEED R.O PLANT 30 %	RS/LITER	0.3	NIL
CONDST ENERGY LOSR AYT 90C	KWTH	100	NIL
CONDENSATE LOSSES PER TON STEAM	%	10	NIL
PROJECT INSTALL COSTING	RS	STEAM+CONDST	THERM-OIL
THERMIC OIL SYSTEM CONTAIN VOL	LITERS	-----	6000
COST OF THERM-OIL LOCAL – CALTEX 46	RS/LITER	-----	260
TOTAL COST INITIAL FILLING	RS	-----	1,560,000
COST OF EXHAUST BOILER	RS	4000000	4000000
COST OF FEED TANK / HOT OIL TANK 2000 L	RS	350000	250000
COST OF FEED DEAERATOR /VENT 200 L	RS	1500000	250000
COST OF TANKS NO-2 OIL COLD 2000 L	RS	500000	500000
COST OF FEED TANK N PUMPS	RS	500000	500000
COST OF CONDENSATE TANK 2000 L	RS	125000	-----
WATER TREATMENT R.O.PLANT 1000 LIT/HR	RS	50000	-----
RAW WATER TANK STORAGE 5000 L	RS	50000	-----
TREATED WATER STORAGE TANK 5000 L	RS	750000	-----
PUMP RAW WATER TRANSFER 300 LITER/HR	RS	50000	-----
PUMP TREATED WATER TRANSFER 300 LIT/HR	RS	50000	-----
PUMP CONDENSATE TRANSFER 300 L/HR	RS	50000	-----

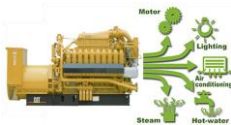


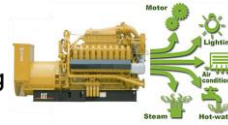
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BLOW DOWN TANK	RS	50000	-----
SURFACE BLOW DOWN TANK	RS	50000	-----
BOILER ANNULA INSPECTION FEE	RS	150000	-----
CHEMICAL DOSING ANNULA STOCK	RS	50000	-----
-----	-----	-----	-----
-----	-----	-----	-----
-----	-----	-----	-----
TOTAL COST OF 1 TON WHR SYSTEM		8,275,000	6,841,260

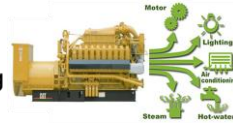




HTO- PLANT OPERATION COST PER TON/HR STEAM EQUIVALENT	UNITS	STEAM+CONDST	THERM-OIL
PLANT STEAM BOILER CAPACITY	TON/HR	1	1
BOILER L/PLANT RUNNING HR/YR	HRS/YR	8000	8000
CONDENSATE MAKEUP	%	30	NIL
CONDENSATE MAKEUP/TON IS 30% 300 LITERS	LIT/HR	300	
COST OF RAW WATER RS.2000/2000 GAS TNK	RS/LIT	0.263	
COST OF WATER TREAT R.O.PLANT	RS/LIT	0.5	
TOTAL COST OF MAKEUP CONDENSATE	RS/HR	90	-----
=====			
TOTAL WATER COST TO MAKEUP 300 LITER	RS	2700	-----
ANNUAL COST OF CHEM STORAGE	RS	500000	-----
PER HOR CHEM COST @ 8000 HR RUN/HR	RS	62.5	-----
=====			
COST OF BOILER INSPECTION ANNUAL	RS	150000	-----
COST OF BOILER OVERHAUL	RS/YR	150000	-----
COST OF BOILER OVERHAUL	RS/HR	18.75	
=====			
SALARY- FIRST CLASS BOILER ATTEND +HELP	RS/MPNTH	50000	25000
COST OF BOILER ATTENDATLYR	RS/YR	600000	300000
COST OF BOILER ATTEND /HR	RS/HR	75	37.5
=====			
SALARY- WATER TREAT OPERATOR+HELPER	RS/MPNTH	35000	20000
COST OF BOILER ATTENDATLYR	RS/YR	420000	240000
COST OF BOILER ATTEND /HR	RS/HR	52.5	30
=====			
SALARY- MAINTENACE CLEANING O&M	RS/MONTH	50000	15000
COST OF O&M TEAM	RS/YR	600000	180000
COST OF o&M TEAM RS/HR	RS/HR	75	22.5
=====			
ELECTRIC COST FOR BOILER OPERATION			
COST OF ENERGY GAS PER HR	RS/HR	12	12
ELECTRIC COST FW PUMP 1 KWE		12	



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			12
ELECT-COST CONDST TRANSFER PUMP	-----	12	-----
ELECT-COST ROP MOTOR PUMP 10 KWE	-----	12	-----
ELECT-COST TREATE WTR TRANSFER PUMP	-----	12	-----
=====			
COST OF 1 TON STEAM FUEL TO GEN 85 KWT	TON/HR	1	1
NATURAL GAS BURN PER HR EQUIVALENT	KWTH	850	850
GAS COST /9 KWTH/M3	RS	17	17
THERMAL ENERGY M3 GAS @ 9 KWT/M3g	KWTH/NM3	9	9
RS/TON STEAM /HOT OIL FUEL GAS COST	RS/HR	1606	1606
TOTAL COST OF 1 TON WHR SYSTEM		2,425	1,708
	Hr/Month	720	
hourly saving 1 ton/hr steam GEN	RS/HR	718	
MONTHLY SAVING	RS/Month	516,600	
ANNUAL SAVING	RS/YR	5,740,000	

ADVANTAGE -STEAM & CONDST SYS	ADVANTAGES THERM -OIL SYSTEM
30% CONDENSATE LOSSES	NO CONDENSATE LOSSES
30% MAKEUP - WATER TREATMENT	NO WATER TREATMENT
2% BLOW DOWN LOSSES	NO BLOW DOWN
HIGH COST QUALIFIED OPERATOR	NO QUALIFIED OPERATOR
ANNULA BOILER INSPECTOR	NO INSPECTOR
YRLY BOILER CEAN+OVERHAUL	NO ANNUAL CEANING
1% SURFACE BLOW DOWN LOSSES	NO BLOW DOWN
CHEMICAL DRAIN LOSSES	NO WATER TREATMTN
PURCHASE RAW WATER TANKERS	NO WATER TANKERS
CONDENSATE TRAPS COST+MAINT	NO SURFACE BLOW DOWN
COSTLY CHEM PURCHASE	NO CHEMICAL DOSING
HIGH PRESSURE SAFETY RISK	LOW PRESSURE SYSTEM
YRLY EXPLOSIVE LICENSE	NO SAFETY EXPLOSIVE HAZARD

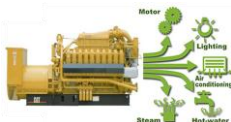


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RENEWAL	
LOW COST SMALLER DIA PIPING	LOW COST SMALLER DIA PIPING
THNIK SAFETY ALWAYS	NO FIRE HAZARD - NO EXPLOSION
ENGR KHALID SAEED COGEN CONSULT 0300 8287009	DISADVANTAGE
	ONE FILLED THER-OIL COST @260 RS/LTR
	THERMAL INSUALTION ON PIPING
	HIGHER THEN 380 C TEMP OIL MIST LAKAGE
	STRONG WELDING AND EXPANSION JOINTS
	HI TEMP PUMPS -SPECIALLY DESIGN FOR HTO
	OIL SPILL FLOOR MAKE DITY
	NEED STEAM FLUSHING FLOOR CLEANING
	OPERATORS TRAINING
	IF OIL LEAKS LOSS-OIL MAKEUP COSTLY
HI TEMP EXPANSION JOINTS FLEX BELLOWS	
CONTACT FOR TURNKEY PROJECT DESIGN	
ENGR. KHALID SAEED COGEN CONSULT 0300 8287009	



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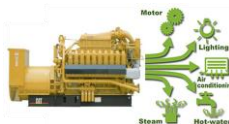
HTO = Thermal fluid systems are high temperature process heating systems, used for high performance industrial processes - most often as an alternative to high pressure steam, due to much higher oil operating temperatures at very low operation pressures; and because of significant less overall operation costs.

As it appears from above diagram, steam at high temperatures requires pressurised systems, whereas thermal oil can be operated atmospheric up to above 300°C. When pressurised, the thermal oil it can be operated even up to 400°C.



Fuel fired HTO - Process heat exchanger





Physical Properties of Therm-Oil (HTO)

Boiling Point: 646°F / 347°C (10% fraction)

Melting Point: Not applicable

Appearance: Clear liquid

Odour: Odourless

Vapour Pressure: <1 mm Hg @ 70°F (21 C)

Solubility: Negligible in water.

Soluble in hydrocarbons.

Percent Volatile: Nil @ Ambient Temperature

Vapour Density (Air=1): >1 Kg/M³

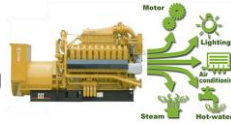
Evaporation Rate (EE=1): <1

Typical Specific Gravity: Approx. 0.8734 @ 25/25 C

Molecular Weight: Average Molecular Weight = 350



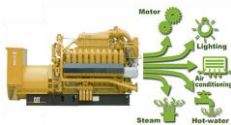
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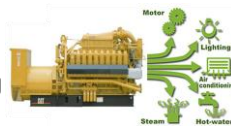


Fuel fired HTO - Process oil heater skid mounted





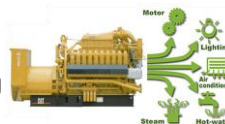
Oil to Hot air radiator using HTO - Process air heat exchanger



Fuel fired HTO - Process air heat exchanger

NORMAL OPERATING TEMP. = 50-316 C
MAX. FILM TEMPERATURE = 338 C
FLASH POINT = **174°C** (ASTM D-92)
FIRE POINT = **196°C** (ASTM D-92)
AUTO IGNITION TEMPERATURE = **366°C** (ASTM D-2155)

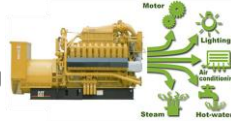




Properties vs. Temperature – HTO THERM-OIL FLUID					
Temperature	Density	Specific Heat	Therm Cond	Dynamic	Vapor Pressure
				Viscosity	
°C	kg/m ³	kcal/(kg·K)	W/(m·K)	mPa/sec	kPa
0	878.7	0.43	0.1345	195.00	0.00
10	874.7	0.44	0.1338	87.00	0.00
20	870.6	0.45	0.1331	43.20	0.00
30	866.5	0.46	0.1324	23.40	0.00
40	862.4	0.46	0.1316	14.80	0.00
50	858.4	0.47	0.1309	10.40	0.00
60	854.3	0.48	0.1302	7.50	0.00
70	850.2	0.49	0.1295	5.66	0.00
80	846.1	0.50	0.1288	4.45	0.00
90	842.0	0.51	0.1281	3.68	0.00
100	838.0	0.52	0.1274	3.09	0.00
110	833.9	0.53	0.1267	2.64	0.00
120	829.8	0.53	0.1259	2.29	0.00
130	825.7	0.54	0.1252	2.00	0.03
140	821.7	0.55	0.1245	1.78	0.06
150	817.6	0.56	0.1238	1.58	0.10
160	813.5	0.57	0.1231	1.43	0.16
170	809.4	0.58	0.1224	1.28	0.24
180	805.4	0.59	0.1217	1.16	0.38
190	801.3	0.59	0.1209	1.05	0.57
200	797.2	0.60	0.1202	0.96	0.85
210	793.1	0.61	0.1195	0.87	1.26
220	789.0	0.62	0.1188	0.80	1.84
230	785.0	0.63	0.1181	0.74	2.55
240	780.9	0.64	0.1174	0.67	3.57

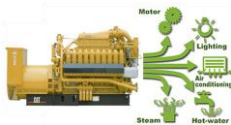


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250	776.8	0.65	0.1167	0.62	4.90
260	772.7	0.66	0.1160	0.57	6.67
270	768.7	0.66	0.1152	0.53	9.17
280	764.6	0.67	0.1145	0.50	12.39
290	760.5	0.68	0.1138	0.46	16.35
300	756.4	0.69	0.1131	0.43	21.63
310	752.4	0.70	0.1124	0.39	28.00
320	748.3	0.71	0.1117	0.35	37.60
330	744.2	0.72	0.1110	0.32	50.00
340	740.1	0.72	0.1102	0.28	66.82

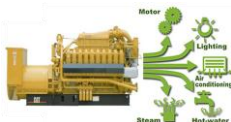


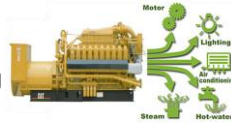
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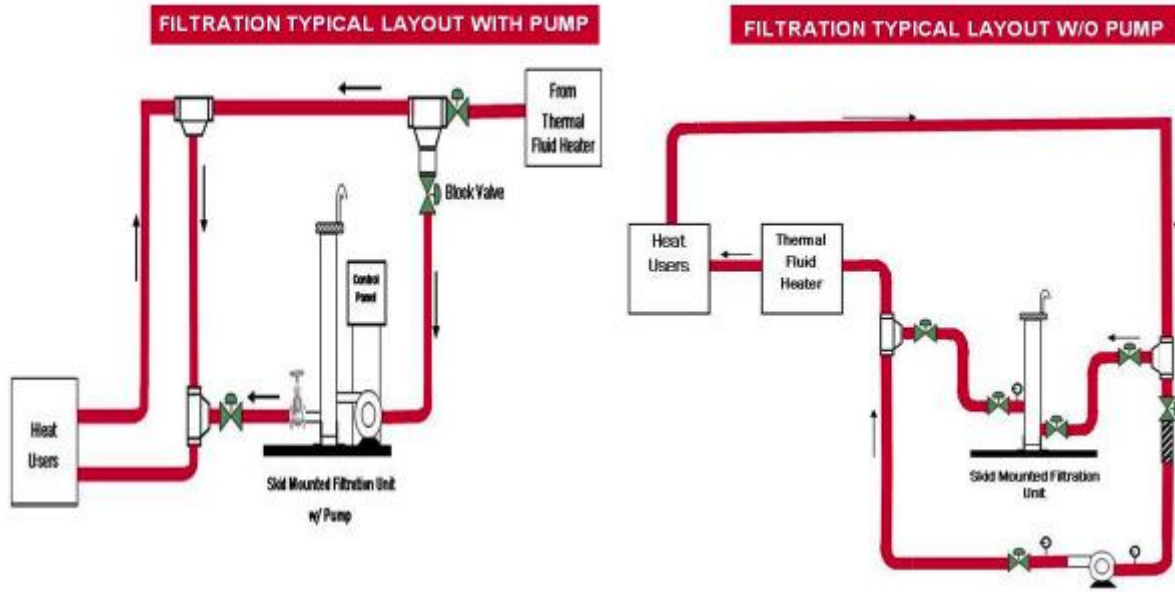
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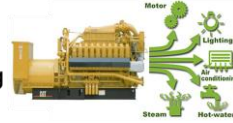
The HTO - heat transfer fluid is highly efficient, thermally stable and cost-effective. Completely non-toxic, it is exceptionally safe to use and is easy to dispose. Used fluid can be safely combined with spent lubricating oils and recycled locally (EPA, citation 57FR21524). The HTO Fluid is specified in a broad variety of applications, world wide. It is tough and durable with a proven record of success under demanding conditions, yet is easy and safe to handle.





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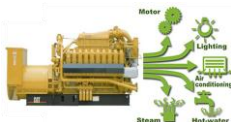
Steam Coils - Standard and Non-Freeze

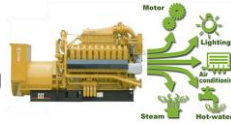
- Standard and steam distributing. Applications include preheat, boosters, reheat, duct heaters, process air and gas heaters and more
- All sizes, shapes, capacities, circuit patterns, fin/tube configurations.
- Duplication of obsolete coils; custom design for new applications
- Match existing dimensions and performance for existing coils



Hot Water Coils

- Applications include booster heat, reheat, waste heat reclamation, pre-heat, fluid process heat & more.
- All sizes, shapes, capacities, circuit patterns, fin/tube configurations
- Duplication of obsolete designs; custom design for new application
- match existing dimensions and performance for existing coils

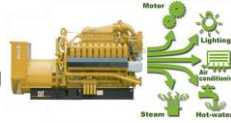




Chilled Water Coils

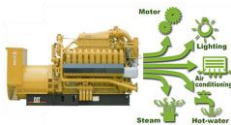
- For applications including comfort cooling, dehumidification, process cooling, and more
- All sizes, capacities, circuit patterns, fin/tube configurations
- Duplication of obsolete coils; custom design for new applications

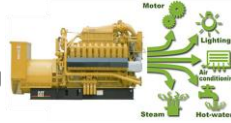




Refrigerant Condenser Coils

- For applications including storage, process, and comfort refrigeration
- For use with all types of refrigerants including HFC's & HCFC's
- All sizes, shapes, capacities, circuit patterns, fin/tube configurations
- 3 thru 10 rows, 4 thru 16 fins/inch



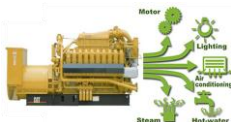


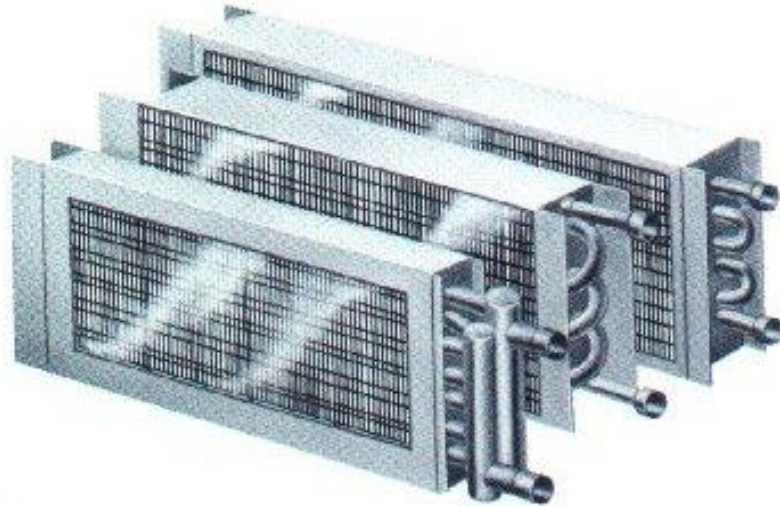
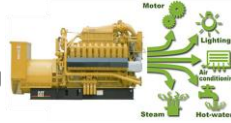
Cogen House # : 111-A/2,3rd. Street, Phase-6, Kh-e-Muhafiz, DHA, Karachi-75500, Pakistan, Ph-0092-21-35340068, 35340071, Mob-009221-8287009 E-mail: cogenpak@gmail.com, web: www.cogensys.pk,



Hot Water Duct Booster Coils

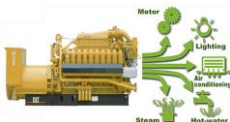
- More than 50 different sizes stocked
- One and two row copper tube, aluminum fin type
- Low pressure steam
- Shipments in 24 hours

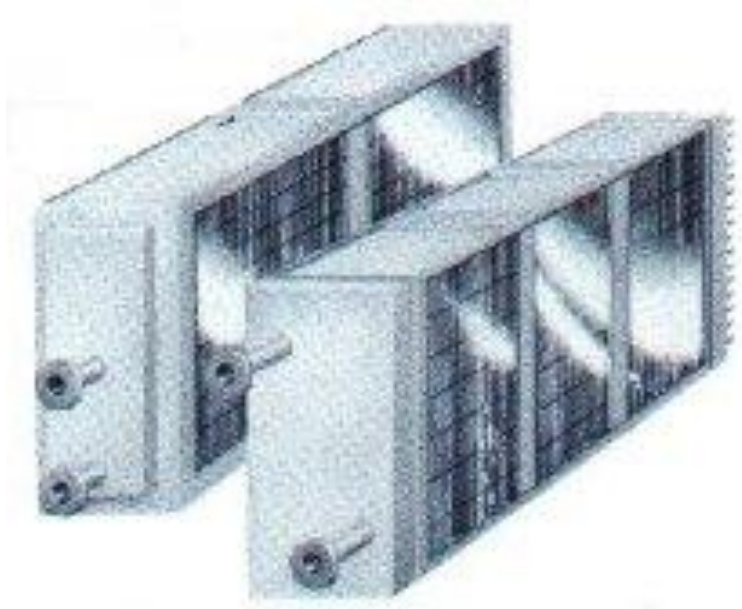
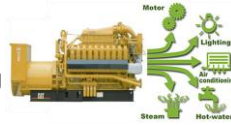




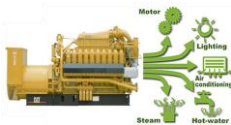
Industrial Coil Construction

- For steam heating, hot water or glycol heating, chilled water cooling, refrigerant cooling
- In a full range of materials including copper, brass, aluminum, stainless steel, carbon steel and 90/10 Cupro-Nickle
- Full range of finishes including bare tubes, hot dipped galvanizing, phenolic, Teflon
- Range of fin designs and spacings
- Pitched tubes for horizontal and vertical air flow; vertical tube mounting for horizontal air flow
- Multiple row depths and unlimited heights or length
- Gas-tight casings for high pressure applications or multiple stacking within breaching or duct





THERM OIL TRANSFER PUMP – DRUM PUMP



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Heat Exchangers

SHELL & TUBE EXCHANGERS

