AROMEN ENGINEERING COMPANY (PRIVATE) LIMITED
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CST No: 628355 IAC 101, IEC: 3203009960, TIN: 33711920980 RC: AACCS4397 DFT001

COMPARISON OF THERMIC FLUID WITH STEAM SYSTEM

S.NO	ITEM	THERMIC FLUID SYSTEM	STEAM
1.	Higher temperatures up to 300 ^{o}C without any pressure.	Yes	No
2.	Elimination of water treatment, corrosion and scale formation in the heat generator and in the user equipment.	Yes	No
3.	Avoid explosion hazards in the system.	Yes	No

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4.	Minimization of operating costs by use of inexpensive fuels as a source of heat.	Yes	No
5.	Higher thermal efficiency (around 80%).	Yes	No
6.	Accurate temperature control within ± 1% in process.	Yes	No
7.	Minimize heat losses outside the process through condensate and dissipation to atmosphere.	Yes	No
8.	Even distribution of heat through the entire surface of the heat exchanger.	Yes	No

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9.	Include in the purview of Indian boiler regulations and other statutory regulations.	No	Yes
10.	Possibilities of the complete design, erection and installation of the entire heating system from one source (the manufacturers of heating equipment).	Yes	No

ECONOMIC IMPACT BY SWITCHING OVER TO THIS SYSTEM

1. FACTORY LEVEL

A standard 2500 T.C.D Sugar plant in India, crushes about 5,00,000 tons of sugar cane in a year and burns 250 T of sulphur and uses 2500 T of steam at 6kg/cm^2 pressure for 100% capacity utilization. If the above stated quantity of steam is made to pass through existing power turbine in condensing mode, we will generate 497 MW of extra power as per the standard data furnished by manufacturer. The calculation is as shown below:

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Table of Energy Savings :

1	Total Power generated using 64 kg/cm^2 steam pressure in back pressure mode at 6kg/cm^2, with specific steam consumption of 10.5 T/MW	(2500 / 10.5) = 238.10 MW
2	Total power generated using 64 kg/cm^2 steam pressure in condensing mode , with specific steam consumption of 3.4 T/MW	(2500 / 3.4) = 735.29 MW
3	Extra Power supplied to grid.	(735.29 - 238.1) = 497.19 MW
4	Revenue obtained by sugar unit/year by selling power at a rate of 3.25/Unit	Rs.16.62 lakhs

It also saves money by the return of pure condensate to boiler at a temperature of 48^{o}C. Further by complete recovery of heat via hot air supply for sugar drying additional benefits can be obtained.

2. NATIONAL LEVEL

Energy conservation is one of the prime needs for India. Considering annual internal sugar consumption of our country as 160 lakh tons, about 174 lakh tons of sugar cane is to be crushed (assuming indrawn average sugar recovery is 92%). By switching over to this new approach 0.25 T of fuel bagasse will be rendered surplus for every 100 T of cane crushed (Bagasse: steam ratio :: 1: 2).

This will result in saving of 43,500T of fuel bagasse every year. This when diverted for productive use like power generation or paper making, fuel resources will be preserved. The deforestation will be avoided thus improving the environment.

Sulphur Melted using Thermic Fluid (No Steam)

CITY

The New Indian Express Coimbatore 3

VLB engg students develop waste heat recovery system

Sugar mills give positive feedbacks and appreciation letters

By B Aravind Kumar

Coimbatore, May 23: Four of the mechanical engineering students in the city have come up with a novel energy conserving model, replacing steam with thermic fluid and eliminating the use of cold water in sulphur stations in sugar industry.

Anish Antony, R Narayanan, P Ravi Krishnan and U Vidhun Kumar of VLB Janakiammal College of Engineering, were to do a project in automobile engineering. When they approached Aromen Engineering Private Ltd in Erumadai for the project, they were told that they could do the project only in sugar industry.

After a brief by company's chief consultant V Vijayendran, the boys took it as a challenge. As energy conservation and process economy are given top priority world over, the students felt that energy could be conserved in the sulphur station in the sugar manufacturing process.

Sulphur is used in the form of 'SO2' gas for purification of juice and for bleaching the concentrated syrup to produce white sugar. The major expense in SO2 gas generation is for the quantity of sulphur and steam. "Any new approach to eliminate steam will substantially decrease the recurring cost," Vijayendran told them. The basic concept of project was to recover and re-use the heat energy liberated in the burning of sulphur.

This required an efficient and fail-proof heat transport agency which could withstand extreme operational situations. The students visited a few sugar industries, including the factories of Ponni Sugars at Erode and EID Parry's at Pugalur.

Browsing through chemical engineering text books, Anish came up with the idea of introducing thermic fluid in the sulphur station. Thermic fluid, a mineral oil with additives for oxidation resistance, was found to have all the desirable properties for efficient heat transfer, says B Geetha, internal guide for the students. "Incorporation of thermic fluid system in sulphur stations would eliminate the use of steam and also that of cold water," says R Narayanan.

The company invested Rs 60,000 towards organising a trial run for a prototype designed by them. Thus the project titled 'Steamless sulphur burner using thermic fluid system' turned real. About half-a-dozen mills went through the prototype and gave positive feedbacks apart from appreciation letters.

Ponni Sugars agreed that it was an efficient waste heat recovery system that reduced the live steam consumption. EID Parry remarked that about Rs 16.62 lakh for 5 lakh tons of sugar cane crush could be saved with the new system. "We have got a few enquiries. We are working on a bigger model that will be tested at a factory soon. Bigger prototypes demand investment of several lakhs. It is sure to click and we hope to get good business," says R K Menon, chairman, Aromen Engineering Private Limited.

Assuring to fund their higher studies as the students are keen to take up MBA, Menon has asked the students to take up work for two years and apply waste heat recovery system for other industries also.

Newspaper Report on SteamlessSulphur Burner