

Application**brief**

Eclipse Product: TJ2000 ThermJet Burner (high velocity with alloy tube)

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Application: Smoke and fume incineration for coffee roasting process

Description: Conversion Products designs and builds pollution control equipment for many industries and process to bring customers into compliance with local and federal guidelines and requirements. Their systems usually revolve around a thermal or catalytic oxidizer and whenever possible heat recovery equipment such as the Exothermics heat exchanger. Some applications also involve cyclones and scrubbers and bag houses as well.

Conversion Products got their start many decades ago in the coffee industry and over the years grew and expanded their presence into many other processes that involve pollution control. The coffee industry was very big in San Francisco for many years due to the large number of cargo ships that used the ports here for unloading their cargo. So many of the major national coffee brands had plants here to grind and roast the beans as well as to manufacture metal cans that also had to be decorated with their emblem and metal and plastic lids and cardboard shipping boxes, etc. It was quite a sizeable industry.

The coffee roasting process was targeted by the local Air Quality Districts because of the chaff particulate, smoke from the oils and odor that are all by-products of the production of coffee. The chaff is usually captured in a cyclone but the smoke and odor are handled by incineration in either thermal or catalytic oxidizers. One of Conversion's customers is Peet's Coffee located in Emeryville, California, a suburb of Oakland. Peet's has been around for some 40 years in this business and does a large catalog and internet sales business shipping gourmet coffees all over the United States as well as to other countries and also operates local shops around the bay area that are much like the typical Starbucks store.

Peet's purchased a new roaster, larger than any of their others, to help increase their production and Conversion Products was called in to design and build and install the Thermal Oxidizer. There were many considerations to be dealt with on this project:

- A. The size of the oxidizer had to be sufficient to meet the Air Quality District Requirements for retention time and still fit in the space available over the roaster equipment and still stay under the roof.
- B. The burner had to be able to handle the volume of effluent during the roasting process as well as the additional volume of air introduced through the cooling air fan when the beans are discharged from the batch roaster. This cooling air volume can be 4 or 5 times the volume of effluent the oxidizer sees during the roasting cycle. In order to handle this volume difference and get a flame length that will fit into the oxidizer chamber and keep the costs down we settled on the use of two 20 MM btu Thermjet burners mounted side by side to fire into the chamber using the high velocity alloy firing tube. Any other combination of Ratiomatic burners or a single Vortometric burner did not work. We need approximately 33 million btu when the cooling air is introduced at the end of the roasting cycle. Yet during the roasting time we need only 8 million btu.

- C. Peet's roaster personnel are highly trained in the art of roasting the various types of beans and the decision as to when the beans are ready to come out of the roaster is a subjective one based on the discriminating eye of the roaster. The color he is looking for is a key indicator and this manual decision made it difficult to program the automatic shift of the second burner from an idle or low fire mode to go up to the 16.5 million btu at the same time as the other burner that had been operating at 8 million btu during the roasting process. A roast time may be 12 to 14 minutes and then the beans are dropped into the cooler and this large volume of air is now sent to the oxidizer to be incinerated at 1400F but the decision as to when this action happens is the one the roaster operator makes. We needed to be able to bring the one burner burner from 8 MM up to 16.5 and the 2nd burner from 400,000 btu up to 16.5 million btu as quickly as possible.
- D. Conversion Products wanted their program to alternate the burners so one did not do the bulk of the work while the other one sat in low fire ready to work for the two minutes during the cooling cycle. So the burners were programmed to alternate to equalize the wear on the firing tubes.

The wide turndown range, the great stability of the flame at all firing rates, the short fast mixing flame all worked to make this a great choice for this application. The burners were monitored with a Bi-Flame safeguard. The burners are lighted at main burner low fire and light smoothly and quietly. The gas safety valves are 4" Asco/Hydrmotor valves with proof of closure and overseal travel, the proportionator valves are Dungs FRG series.

The system was designed to use an Exothermics heat recovery exchanger but the space limitations in this facility did not permit it at this time. The plant anticipates relocating in the near future and at that time the Exothermics exchanger will be purchased and installed.

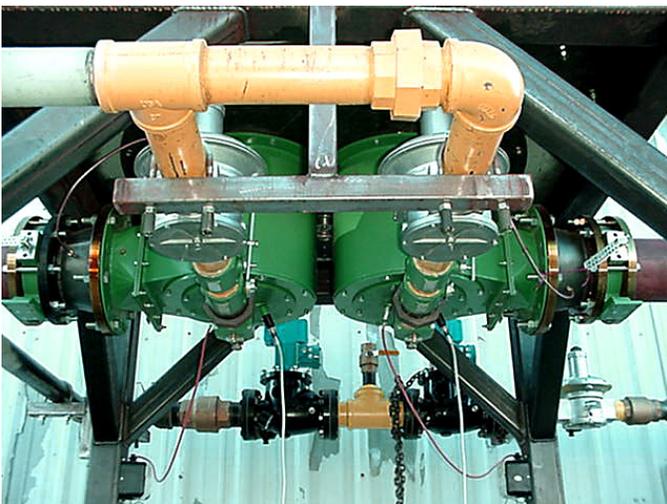
Both Conversion Products and Peet's Coffee are very pleased with the equipment furnished and plan to replace some of the other older oxidizers with new ones with these Thermjet burners and heat recovery.



Overall view of Thermal Oxidizer



Pre-assembled unit prior to installation



TJ burners installed and ready for operation

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