BURNERS FOR URBAN WASTE BOILERS

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1 - MAIN GOAL

To design and make burners well adapted to the real operating conditions of urban waste boiler furnaces.

Such burners must take in charge the preheating of furnace before the introduction of urban waste, as well as maintaining a minimum temperature of 850 °C at the furnace outlet.

The FRENCH regulation applicable is dated Sept. 20th, 2002.

2 - THE PILLARD SOLUTION

The PILLARD "GROOM" burner is derived from the PILLARD "GRX" burner, already fitted to many boilers, but it has been specially engineered and adapted for urban waste boilers.

Such a type of burner is currently fitted to many waste disposal plants in France and Italy.

Fig.1 : Brescia Plant (Italy)

Fig.2 : Lagny Plant, St Thibault les Vignes (France)

The "GROOM" burner is manufactured in either in GAS or DIESEL OIL versions. It is fitted with a retractable head and with a closing device allowing to totally isolate its combustion head from the furnace when the burner is stopped. Such a device is called a "guillotine".

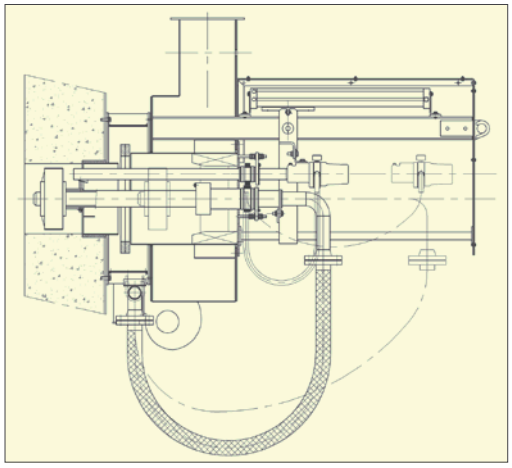

Fig.3 : PILLARD "GROOM" burner, principle

- Fuels : Gas (all types) or DIESEL OIL
- Heat release : 2 to 30 MW
- Diesel atomisation : by steam or compressed air
- Combustion air temperature : up to 250 °C
- Cooling air flow :
  . Fixed head (not retractable) : 14 % of TOTAL AIR
  . Mobile head retractable, without "guillotine" : 10 % of TOTAL AIR
  . Mobile head retractable, with "guillotine" : 3 % of TOTAL AIR
- Turn-down ratio : 1 to 6 thanks to a compound regulator
- Liquid fuel shut-off : by PILLARD safety block
- Combustion air fan : separated
- Self checking flame detector PILLARD type "PACKSCAN" ("all in one")
- BMS : "failsafe" type
- Electric ignitor type "PACKLIGHT" (all in one) including a PILLARD self checking ionization detector "IONY" and a H.T. transformer

Fig.4 : PILLARD "GROOM" burner, main characteristics

Fig.5 : PILLARD "GROOM" burner
AZALYS plant at Carrière sous Poissy (France)

Fig.6 : PILLARD "GROOM" burner
Brescia plant (Italy)

3 - BURNER PROTECTION IN SHUTDOWN MODE ("STAND BY")

It's necessary to choose between :

- Either ensuring a sufficient cooling air flow through the burner : Then in case of an electric interruption, the burner is exposed to the internal boiler furnace temperature. However the necessary cooling air flow slightly reduces boiler efficiency. Finally, the burner is not protected against any accidental furnace over pressure, which could seriously damage it.
- Or isolating the burner (when stopped) from the furnace by retracting it and closing a "guillotine" made with refractory concrete. Such a solution totally protects the combustion head from the furnace thanks to such a sturdy screen, and allows in addition to reduce to only 3 % (of TOTAL AIR) the amount of cooling air, therefore avoiding a decrease in boiler efficiency.

Feedback from experience :

- A recent enquiry from users confirmed the undisputable advantages of the "retraction (+) guillotine" system since it confirms an increase in operational reliability and availability. It's been confirmed that the PILLARD "guillotine" has never failed.
- It's also to be noticed that the burner, when stopped, is totally protected and very easy to maintain during boiler operation.

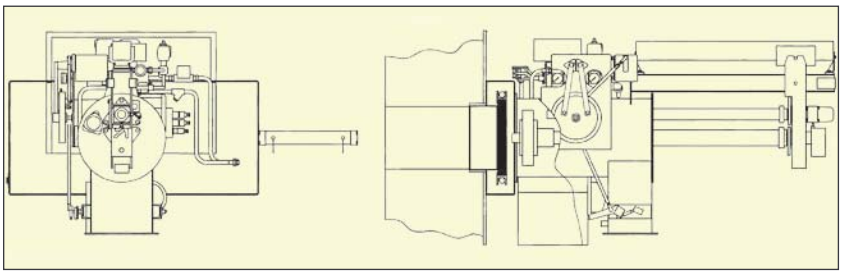

Fig.7 : Retraction of combustion head with "guillotine"

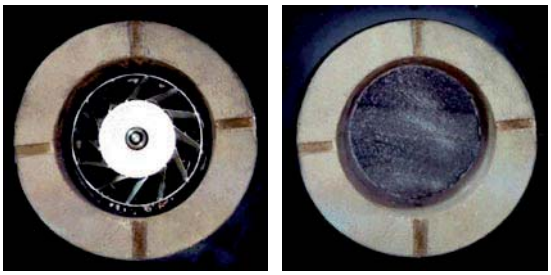

Fig.8 : View of a "GROOM" burner from the furnace : burner combustion head in place — head retracted, guillotine closed

4 - OTHER FEATURES OF THE PILLARD SOLUTION

- Fitting "GROOM" burners to waste boilers only needed a cylindrical hole of reduced diameter, the angle of the burner axis being freely chosen, as well as the flame shape thanks to the proper choice of combustion head sizing parameters.
- High turn-down ratio (1 to 6) when firing GAS or DIESEL OIL.
- PILLARD self checking flame detector, "PACKSCAN" type, all in one (without a separate electronics panel) based on "impulse totalization" allowing to discriminate the burner flame from those coming from the combustion of urban waste.

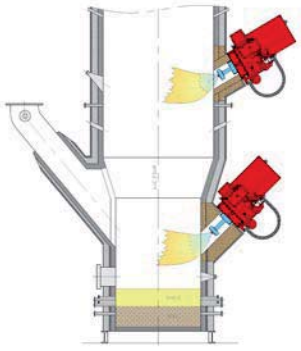

Fig.9 : (Example) fitting 2 «GROOM» burners on a fluidized bed urban waste boiler

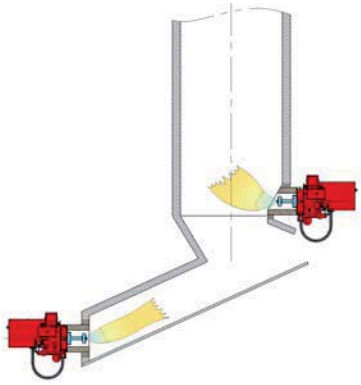

Fig.10 : (Example) fitting 2 «GROOM» burners on a grate fitted urban waste boiler

5 - SPECIFIC FEATURES OF THE BURNER MANAGEMENT SYSTEM

- The "GROOM" burner is piloted by an automatic sequence which makes it available in a very short time.
- Its high turn-down ratio allows it either to ensure furnace preheating by using up to maximum heat release, or to maintain the furnace temperature at the set point.
- In order to ensure safety and availability, it is essential to check that all the actuators are able to answer (notably guillotine position, starting up and stopping). Such a necessity leads to the use of "fail safe" programmable controllers, TÜV certified able to detect hidden defects and alert the personnel so as to prevent eventual failures.

6 - CONCLUSION

The users must have the last word to judge the reliability of the chosen technical solution.
It seems important that the Main Contractors take into account such judgment and do not under-evaluate the importance of a prior study on the flame shapes in the furnace (*) nor the importance of choosing reliable and sturdy combustion equipment even if it is more expensive, but avoiding the risk of unprogrammed shut-downs and meeting new standards of safety.

(*) PILLARD uses a powerful tool to simulate flames : Fluent® software.