

HEATBASE FACTSHEET 17

Problems with Condensing Boiler Flues and plumes.

There are many problems and complaints with modern condensing boilers regarding their flue systems; especially the nuisance factor regarding the dispersal of condensate plumes, even when they have been installed in a manner better than the regulations and manufacturers state. They can, and do linger around the owners property as well as being blown into neighbours gardens and patio areas.

Standard efficiency boilers have a flue gas temperature that at its maximum should be 260 degrees C, but under normal circumstances it will average between 180 and 200 degrees C as it leaves the flue terminal. Since heat rises, and the gases are much lighter and hotter than external ambient temperatures; waste flue gases easily disperse and cause very few problems when installed correctly. Even during adverse weather conditions, problems are minimal due to the higher temperature of the gases.

High efficiency condensing boilers are another matter. They often have a maximum temperature of 100 degrees C and are usually much lower; often between 50 and 70 degrees C. Even during periods of good weather this can cause problems as the gases are so "cool" and much heavier due to the amount of moisture they contain, that the "plume" can hang around the flue terminal which can then lead to problems as the waste exhaust gases are drawn back into the burners own air supply; this is commonly known as vitiation. This can lead to problems with dirty photocells, damage to nozzle tips which can then lead to complete or intermittent boiler breakdowns. As well as the burner suffering from intermittent lockouts due to erratic combustion, if waste gases are drawn back into the burners own air supply it can also cause problems with metal fatigue and/or distortion of baffles inside the boilers heat exchanger. During colder weather the problem can be even worse as the gases rapidly cool upon leaving the flue terminal, making them even cooler and heavier than before. Add a foggy day, snow or heavy or drizzling rain and it becomes worse again!

Plume management kits can be purchased for most boiler manufacturers which **may** help alleviated the problems of vitiation and in some cases help with the nuisance factor of the plume. The main benefit is that it increases the distance between the termination of the flue gases and the point at which air for combustion enters and therefore reduces the chance of vitiation.

Conventional or vertical discharge flues used to help with the dispersal of products of combustion but can now cause more problems with modern condensing boilers; as the gases are cooling even further during the additional distance they need to travel before exiting the flue terminal, they become even cooler and more saturated with moisture, which further reduces the buoyancy of the plume.