





## **Technical Bulletin**

## Product: Worcester 4000 series

## REVISED NATURAL GAS CO2 TOLERANCES

Due to deviations that can occur in mains gas quality and other variations that can affect readings taken with portable flue gas analysers, we have increased the permitted tolerance either side of the nominal setting for CO<sub>2</sub>.

All of our appliances are tested and adjusted to nominal  $CO_2$  settings with G20 Gas before they leave the factory and should not require any adjustment at the time of commissioning.

At commissioning, the advice in the commissioning section of the Installation and Maintenance manual should be followed (Fig 1). There is no requirement to measure  $CO_2$  at the time of commissioning.

## CO and combustion check The following combustion and flue integrity checks are mandatory and these values must be recorded on the Benchmark checklist, at the end of these instructions. ► Verify the appliance is connected to the correct gas type Ensure the appliance is supplied with the correct gas inlet press Once the gas rate and pressure have been confirmed as acceptable then and gas rate as specified previously in the Commissioning section. the CO and combustion checks can be undertaken. Visually check the integrity of the whole flue system and confirm that all the components are correctly assembled, fixed and supported. The flue gas analyser must be the correct type as specified in BS The flow chart is given for guidance, the details of the checks are given in the following sections: Checking flue integrity, (→ 6.9 "Checking flue integrity") 7967. Before use the analyser must have been calibrated as • Flue gas analysis, (→ 6.10 "Flue gas analysis") specified by the manufacturer. The installer must be competent in the ise of the analyser Check and zero the analyser in fresh air as specified by the ► The air/gas ratio valve is factory set and must not be adjusted during commissioning unless this action is recommended following contact with the Worcester, Bosch Group help line 0330 123 3366. Zero the analyser O<sub>2</sub> ≥ 20.6% Flue integrity test using analyser START Set boiler to CO<sub>2</sub> < 0.29 Verify flue integrity No No

Check all seals around the burner, internal flue seals, and case seals. Rectify where necessary.

Check CO and combustion

Turn off boiler and call Worcester, Bosch Group help line. 0330 123 3366

CO<sub>2</sub> < 0.2

Yes

CO < 350ppn

CO/CO<sub>2</sub> ratio < 0.004

Yes

Figure 1: IM Extract: CO & Combustion check

Record values Do not adjust

Whilst it is always our intention to fully assist, it is essential to recognise that all information given by the company in response to an enquiry of any nature is provided in good faith and based upon the information provided with the enquiry. We recommend that advice should always be checked with your installer or contract partner. Consequently, the company cannot be held responsible for any liability relating to the use or repetition of such information or part thereof. In addition, whilst making every reasonable effort to monitor the performance and quality of our supply, installation and service network, we do not accept responsibility for the workmanship or operation of any third party company that the company may have promoted either in conversation, e-mail, or other communication. Similarly, the views and opinions expressed in communication with individuals within the company may not reflect that of the business as a whole.

Check CO and

CO < 350ppm

Yes

Set boiler to

Boiler is operating satisfactorily. No further action

is required.

CO/CO<sub>2</sub> ra







At any subsequent visit where it is necessary to carry out flue gas analysis, CO<sub>2</sub> must be checked to ensure combustion has not drifted from the factory setting.

Due to the variations, it may be impossible to achieve the CO<sub>2</sub> tolerances that are stated in the *Inspection and Maintenance – Flue Gas Analysis* section of the current *Installation and Maintenance manual*.

To allow for these possible variations, we have increased the permitted tolerance on  $CO_2$  readings on Natural Gas appliances (Fig 2).

CO must remain <250ppm.

The revised tolerances can be applied to all 4000 series Natural Gas appliances. Manuals will be updated in line with this Technical Bulletin.

i Flue gas analysis ▶ Ensure that the gas inlet pressure has been checked and is satisfactory Refit the test point plugs after the test has been completed. ▶ Set the appliance to maximum and minimum output in chimney sweep mode (> 6.4 "Chimney sweep mode") for the flue gas analysis checks. ▶ Check that the readings conform to those given in the following tables. In addition to CO and CO/CO2 ratio checks also check the maximum and minimum CO2 percentage reading. CO/CO<sub>2</sub> settings Natural Gas appliances Maximum rated Output Between 8.4 and 10.4% <250ppm Minimum rated Output 1) A minimum of 0.2 lower than the maximum reading <250ppm taken and between 8.0 and 10.2% LPG appliances Maximum rated Output 1) Between 10.4 and 11.0% <250ppm Minimum rated Output 1) A minimum of 0.2 lower than the maximum reading <250ppm taken and between 10.0 and 10.4% 1) Should be measured 10 minutes after firing the appliance Table 30 CO<sub>2</sub> settings If the CO2 is out of tolerance then please check: ▶ The gas inlet pressure. ► The gas rate. The fan test pressure. ▶ The flue and air intake, plus any possible blockages in the condensate disposal. ▶ The condition of burner. For leaks or obstructions in the exhaust paths. ► That the injector is clean. After all checks have been completed and the CO2 is still out of tolerance then contact Worcester, Bosch Group helpline 0330 123 3366 before making any adjustment to the gas valve.

Important: All Flue gas analysis must be carried out with the boiler combustion case fitted.

If readings are taken with the case off, Wind conditions may prevent accurate readings from being obtained and may cause the boiler to lock-out at minimum output. If it is found that the gas valve does require adjustment, readings must be verified with the case on after the adjustment has been made.

Figure 2: IM Extract: Flue Gas Analysis

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