

SUMMARY

CORGI Services Limited received a call from ----- of CORGI 1 Elmwood Chineham Park, Basingstoke, Hants RG24 8WG at approximately 17:55hrs on Friday 25 March 2005. ----- had been contacted by ----- of the Gwent Police Authority at approximately 17:45hrs on Friday 25 March requesting an investigation into the fatal incident at -----Cwmbran, Gwent -----.

The request was to assist the Gwent Police Authority in the investigation of the death of ----- aged 14 years at----- on the 25 March 2005 with carbon monoxide poisoning. ----- was found deceased at home at approximately 15:50hrs on the 25th March by her mother----- the Gwent Police Authority confirmed carbon monoxide poisoning of----- with 62.4% carboxyhaemoglobin in the blood on Saturday 26 March at approximately 12:10hrs.

The investigation into the carbon monoxide poisoning of ----- centred on the installation of an Ideal Mini C28 central heating combination boiler and a Focal Point flueless gas fire Installed within a period style fire surround in the lounge.

Gas safety defects were found with the installation of the gas fire, high gas pressures were found at the burner which contributed to the soot formation within the fire combustion chamber which in turn contributed to the failure of the catalytic converter allowing high levels of carbon monoxide to enter the lounge and emanate to the upstairs bedroom via the open plan spiral stairwell located within the lounge.

Author of this report Howard Reed CORGI Services Limited Incident Contracts Manager carried out the investigation between the hours of 10:00 and 20:22hrs on the 26 March 2005. Also in attendance were -----

Gwent Police (part attendance),-----

Gwent Police (part attendance),----- Gwent Police (part attendance) Scene of Crime ----- Gwent Police, Scene of Crime ----- and-----Health and Safety Executive Cardiff.

2 CASUALTY

2.1 — Fema — Aged 14yrs — Deceased 62.4% carboxyhaemoglobin in the blood -----of the Gwent Police Authority Cwmbran confirmed on 25 March 2005 at approximately 12:10hrs that ----- was confirmed as having 62.4% carboxyhaemoglobin in the blood. The confirmed results were as a result of the post-mortem carried out on the morning of 26 March 2005.

3 DESCRIPTION OF PROPERTY

3.1------(photograph 1) — is an end of link two bedroom house. The property is of brick construction with wooden frame single glazed windows and concrete tile roof. The property is approximately 10yrs old and a new central heating system and gas fire was installed in December 2004.

4 REPORTED EVIDENCE

4.1-----reported

-----called her daughter at home at approximately 22:00hrs on Thursday 24 March from work ----- works a 24hr shift pattern and spoke to her daughter there were no reports that anything was wrong.----- called home again on the morning of Friday 25 March at 10:00hrs and several times later without success.

----- returned home from work at approximately 15:50hrs on the Friday afternoon and found her daughter on the floor of the back bedroom,-----

The pet dog was found dead on the lounge floor along side the fireplace. When ----- entered the house it was very hot, the fire was on but no flames were present and there was a very uncomfortable atmosphere in all the rooms. ----- and her neighbours opened all the windows and doors to ventilate the house,

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INTRODUCTION

1.1 CORGI Services Limited received a call from ----- Field Manager of CORGI 1 Elmwood Chineham Park Basingstoke Hants RG24 8WG at approximately 17:55hrs on Friday 25th March 2005. ----- had been contacted by ----- of the Gwent Police Authority at approximately 17:45hrs on Friday 25th March

requesting an investigation into the fatal incident at -----Cwmbran, Gwent

1.2 The request was to assist the Gwent Police Authority in the investigation of the death of -----aged 14 years at ----- on the 25th March 2005 with carbon monoxide poisoning. ----- was found deceased at home at approximately 15:50hrs on the 25th March by her mother----- The

Gwent Police Authority confirmed carbon monoxide poisoning of----- with 62.4% carboxyhaemoglobin in the blood on Saturday 26 March at approximately 12:10hrs

1.3 The investigation into the carbon monoxide poisoning of----- centred on the installation of an Ideal Mini C28 central heating combination boiler and a Focal Point flueless gas fire installed within a period style fire surround in the lounge. It is alleged that both appliances had been installed new by----- of-----

CORGI registration No ----- during December 2004.----- had paid the sum of £1900 for the installation of the gas boiler and flueless gas fire, ----- had no receipts or paperwork for the work carried out by -----

1.4 Author of this report Howard Reed CORCI Services Limited Incident Contracts Manager carried out the investigation between the hours of 10:00 and 20:22hrs on the 26 March 2005. Also in attendance were-----Gwent Police (part attendance),-----Gwent Police (part attendance),-----Gwent Police (part attendance),

Scene of Crime ----- Gwent Police, Scene of Crime Manager -----

And ----- Health and Safety Executive Cardiff.

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The gas fire and central heating boiler was installed in December 2004 by a man called ----- he fitted the central heating boiler and fitted the gas fire, ----- paid him approximately £1900 there is no paperwork or receipts. We only have a mobile telephone number and a CORGI registration number of the gas installer, but we do not know if the registration number is correct.

S SERVICE HISTORY

5.1 The Ideal Mini C28 gas central heating combination boiler installed in the kitchen was installed new during December 2004. The Focal Point Elegance flue less gas fire was fitted within the lounge at the same time as the central heating boiler.

6 GAS INSTALLATION AND APPLIANCES

G.1 Gas Meter

Schlumberger 1995

S/No C0073265

Index reading 0281

6.2 Gas Boiler (photograph 2)

Ideal Mini C28 Combination Boiler

S/No N174931004 GB

GC 47348.19

UH158324

Manufactured 2004

Domestic Hot Water Max 31.10kw

Burner Pressure 11 .7mbar

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6.3 Gas Fire (photograph 3)

Focal Point Fires

Elegance Flueless Gas Fire

S/No FPN 1057179

Max input rating 2.6kw

Gas Inlet working pressure 20.0mbar

Burner operating pressure 7.0mbar (factory pre-set)

7 INVESTIGATION

7.1 On arrival at site I carried out a visual survey of the property and took photographs 1 — 14 (appendix 7) to assist the reader in the understanding and technical aspects of this report, I took measurements of the rooms within the property to assist in the calculation of the lounge size required for the fitting of the flueless gas fire

7.2 The central heating boiler is located on the wall within the kitchen (photograph 2) and the gas fire is fitted within a period style surround within the lounge. The fireplace surround of the gas fire is showing signs of scorching / burning photograph 3.

7.3 DC ----- reported that the central heating boiler was not working at the time of the incident Tests on the boiler are confirmed in section 7.8 below.

7.4 The cooker within the kitchen is electric and does not form part of this investigation.

7.5 I observed that a new ventilation grille in the wall alongside the fire (within 1 metre distance to the right hand side of the fire) had been fitted (photograph 4). This air grill was providing 100cm² of free air which is the correct amount of combustion air for the installation of the Focal Point Elegance flueless gas fire.

75.1 The manufacturer's installation instructions at point 1.0 *Important Notes* state quite clearly to reduce the possibility of draughts entering the room via the air vent, it is recommended that the use of a "Black Hole" or "Vortex" type vents featuring internal baffles are used. The notes also state that an installer should consult ALL instructions before installation and use of the appliance (Appendix 1 section 1.0).

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7.5 The installation instructions at point 4.1 Ventilation state that "ventilation fitted under or within immediate vicinity" of the appliance must not be used as it may adversely affect the performance of the Oxygen Depletion Sensor (ODS) system" (Appendix 1 section 4.1). As mentioned in 7.5 above the ventilation provision is by a Stadium ducted ventilation system without baffles and fitted within 1 metre distance of the appliance.

7.5 I carried out a gas tightness test in accordance with the International Institution of Gas Engineers and Managers Utilisation Procedures ICE / UP/ 1B Tightness testing and purging of Natural Gas installation. This test found the gas installation and appliance to be gas tight and satisfactory. A gas tightness test is to establish that the gas pipework and appliance are gas tight and there are no gas escapes.

7.7 I checked the working gas pressure at the gas meter and recorded it as 22.0mbar; the working pressure normal supplied by the gas supplier is between 19.0 and 23.0mbar this pressure proved to be satisfactory,

7.7 I observed that the gas pipe sleeve from the rear of the gas meter box containing the gas supply pipe into the property is not sealed. It is a requirement of the Gas Industry Unsafe Situation Procedure (USPI Edition 3) that the gas pipework sleeve is sealed, not to do so will render the installation as an “At Risk” installation and will require the engineer to turn off the meter and make the installation safe until such time as the sleeve is sealed.

7.8 I recorded the inlet gas pressure at the boiler gas valve as 20.0mbar the manufacturer’s inlet design pressure is 20.0mbar. This pressure setting was satisfactory.

7.8.1 I carried out a gas rate of the boiler and recorded the result as 32.94kW a gas consumption of 3.03m³/hr the recorded gas rate of the boiler was above the maximum recommended by the manufacturers data badge of 31.10 kW— 2.87m³/hr

I recorded the burner pressure at 12.0mbar. This pressure is above the burner pressure recommended by the manufacturer of 11.7mbar.

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These tests and readings are not in accordance with the manufacturer’s data badge and would indicate that the boiler has not been commissioned in accordance with the manufacturers installation instructions nor the Gas Safety (Installation and Use) Regulations 1998, regulation 26(9) and 33 (123) (appendix 2).

7.8 I carried out a gas rate of the gas fire and recorded the result as 5.40kW a gas consumption of 0.49m³/hr I recorded the gas burner pressure as 22.0mbar. The manufacturer’s data badge requires the gas rate to be 2.6kW a gas consumption of 0.24m³/hr and the gas burner pressure to be 7.0mbar, these tests and readings are not in accordance with the manufacturer’s data badge (Appendix 1 section 20). The results of the gas rate and burner pressure settings indicate that the gas fire was not commissioned in accordance with the manufacturer’s installation instructions or the Gas Safety Regulations as in 7.8.1.

7.9.1 The flame picture of the gas fire is unstable and lifting off the burner on the right hand side of the fire, this flame picture would indicate that excessive pressures were being supplied to the burner.

7.9.2 I observed that the gas supply to the fire is installed on the external wall at the side of the property and entered the lounge at the back of the fire. No isolation valve had been fitted for the purpose of turning off the gas to the fire or for maintenance or servicing requirements.

7.10 The manufacturer installation instructions relating to the installation, commissioning and servicing of the flueless gas fire require the carbon monoxide (CO) and carbon dioxide CO₂ to be checked during the service procedure and prior to leaving the appliance in a safe working condition. The carbon monoxide and carbon dioxide; CO/CO₂ ratio for the appliance is 0.0015.

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7.10.1 Using a Telegan Tempest electronic combustion gas analyser (ECCA) serial No 12804 I carried out a sample of the products of combustion being emitted from the appliance in accordance with the manufacturers installation instructions (via the front louver). I recorded an initial reading of carbon monoxide as 31 ppm (parts per million); within the time period of 25 seconds while the printer was printing the results of the first readings the second recorded reading was 2402ppm. This test provided a reading of 2402ppm carbon monoxide and a carbon dioxide CO₂ reading of 2.4%, this equates to a ratio of 0.0957 CO/CO₂ (Appendix 3) this reading confirms that the combustion process was unsatisfactory and the catalytic converter was not working correctly.

7.10.2 I terminated the initial test and sampling of the products of combustion leaving the fire on the grounds of safety for ----- (HSE) Scene of Crime -----Scene of Crime ----- and myself; the doors and windows of the property were opened immediately and the lounge ventilated.

7.10.3 I prepared the property for a full carbon monoxide simulation investigation. I moved the test equipment to an external location and placed sensing probes above the louver outlet of the fire (blue probe — photograph 5), centre of the room approximately 1.5 metres above floor level (black probe photograph 6) and within the back bedroom at approximately 200mm above floor level at position where ----- was found (pink probe -. photograph 7).

7.11 I connected the Electronic Gas Analysers to the probes as follows; the Telegan Tempest serial number 12084 was connected to the blue probe above the fire, the Telegan Tempest serial number 13897 was connected to the black probe within the centre of the lounge and a Telegan Raco II serial number 2R2253 was connected to the pink probe within the back bedroom.

7.11.1 The internal interconnecting doors were placed in an open position, the external front and back doors were dosed. All windows within the property were also closed.

7.12 I turned on the electronic gas analysers and the air within the probes allowed to purge through the analysers for approximately three minutes. I lit the fire at 5:20hrs and the electronic gas analysers were sampling the atmosphere within the property.

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7.12-1 table I appendix 4 tabulates the build-up of carbon monoxide being discharged from the fire which is being sampled by the blue probe at the front of the fire. The timing of the build-up is from 15:18 to 15:53hrs. I recorded high levels of carbon monoxide from 0 to 1047ppm in a time period of 35 minutes.

7.12.2 Table 2 appendix 4 tabulates the build-up of carbon monoxide in the centre of the lounge at 1.5 metres from floor level which is being sampled by the black probe. The timing of the build-up is from 15:19 to 15:52hrs. I recorded high levels of carbon monoxide from 0 to 1100ppm in a time period of 33 minutes.

7.12.3 Table 3 appendix 4 tabulates the build-up of carbon monoxide in the back bedroom at 200mm above floor level which is being sampled by the pink probe. The timing of the build-up is from 15:20 to 15:53hrs. I recorded high levels of carbon monoxide U to 856ppm in a time period of 33 minutes.

7.12.4 From the tabulated results of atmosphere recordings it will be seen that high levels of carbon monoxide is emanating from the fire and passing to the first floor bedroom area via the open plan spiral stair well located within the corner of the lounge (photograph 8).

7.12.5 I terminated the simulation testing of carbon monoxide build-up at 15:53hrs. I isolated the gas to fire, I opened the front and back door of the property and the property was allowed to ventilate before entering.

7.12.6 to confirm the carbon monoxide absorption by the human blood I have inc in appendix 4 the Cockburn Forester Kane chart. If it is to be assumed that ----- was resting at home, death may have occurred in a period of approximately 2.5hrs given the carboxyhaemoglobin levels of 62.4%. This is an estimation of time that a person resting would have reached the fatal level of 62.4% (Appendix 5)

7.13 I visually examined the fire in-situ, removed the front glass and I found the fire to be heavily soot stained (photograph 9) there is no evidence of physical damage to the fire or burner assembly. The catalytic converter assembly at the top of the fire is heavily soot stained (photograph 10).

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7. 14 I removed the fire from its location to examine the install process: the fire is installed within a proprietary metal box (photograph 1 1). The wall behind the metal box is protected by the installation of a heat protection board screwed to the wall (photograph 12). There is no isolation valve for the turning off the fire and I had to isolate the gas supply from the meter emergency control valve.

7.15 I carefully dismantled the fire and placed it in sealed bags for further examination. The sealed bags are provided by Scene of Crimes Dave Thomas and John Isgrove the fire is to be taken to a workshop location so the burner could be tested and a comparison made with a new fire,

7.16 I terminated all tests relating to the fire at 20:23hrs and raised a Warning Notice CP 14 (appendix 6). capped the gas off at the meter and made the installation safe.

7.17 29 March 2005 — WTJ Training Group Tadley Court, Basingstoke RC2G 3TB,
On the 29 March 2005 I met with Scene of Crimes ----- and -----

for the purpose of testing and making a comparison of the burner assembly of the incident gas fire and a new Elegance flueless gas fire purchased by Gwent Police on 29 March 2005 from B&Q Warehouse Cardiff Gate Cardiff The meeting was held at the gas training workshop of WTI Training Group Tadley Basingstoke between the hours of 14:30 and 18:45hrs on the 29 March. Also in attendance was -----

Gas Safety Consultant CORCI Services Limited.

7.18 I unpacked the new fire and assembled it in accordance with the manufacturer's installation instructions at the gas training centre, the gas fire details are as follows:

7.18.1

Focal Point Elegance Flueless Gas Fire

S/No EPN 1026970

Setting Pressure 7.0mbar

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7.19 I connected the gas fire to the gas supply and checked the inlet gas pressure to the fire and recorded it as 21.5mbar, I checked the burner pressure and recorded it as 7.2mbar this burner pressure is in accordance with the manufacturers installation instructions, I carried out a gas rate of the fire and recorded the rate of 3.5kW a gas consumption of 0.32m³/hr this gas rate is above the rate of 2.6kW a gas consumption of 0.24m³/hr as listed in the manufacturers installation instructions.

7.19 I allowed the fire to reach normal operating temperature and carried out a check of the catalytic converter to establish the carbon monoxide and carbon dioxide ratio as set by the manufacturer this setting is contained on page 14 of the instruction booklet and should not exceed a ratio of 0.0015CO/CO₂ This test is normally carried out during the first year of servicing and provides an indication of the performance of the catalytic converter. The test ratio of 0.0002 CO/CO₂ is satisfactory and in accordance with the manufacturers installation instructions.

7.20 I examined the new burner and identified that the burner adjuster screw is painted over with red paint as is the adjuster of the incident fire. I observed that the burner adjuster screw is screwed inwards on the new fire (photograph 13 identified as J13) and not screwed inwards on the incident fire (photograph 13 identified as DAT8). The painted adjuster screws on both the new fire and incident fire had not been broken, this would indicate that both adjusters had been set at the assembly line of the fires and not adjusted on site.

7.21 Photograph 14 shows the internal parts of the control valve on the top photograph (new control valve) the green arrow points towards the brass adjuster which has been screwed inwards to restrict the gas flow and regulating the pressure to 7.2mbar, the bottom photograph (incident control valve) does not show the brass

adjuster, this adjuster has not been screwed inwards and therefore allows the full rate of gas at 22mbar to the burner without any control. This would confirm that when the incident gas fire was tested on site a burner pressure of 22mbar was recorded; this pressure is also recorded as the working pressure at the gas meter.

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722 Competency

From my investigation research I am led to believe that-----is CORGI registered, registration number ----- It is a requirement of CORGI registration that operatives who carry out gas work shall be assessed by an independent assessment centre on their gas fitting competences. My research has found that ----- has competencies in the core gas safety assessment CCN1 for the installation of gas pipework and as central heating CEN I which includes the installation, service and maintenance of gas central heating boilers.

7.22.1 The National Accredited Certification Scheme (ACS) for gas fitting operatives requires gas fitting operatives to be assessed in the areas of work which they carry out. It would follow that for ----- to install a gas fire he would need to be assessed in space heaters HTR 1 which would involve being assessed in the installation, exchange, disconnection, service, repair, breakdown and commissioning of domestic Open, balanced and fan assisted flued gas fires and wall heaters, does not currently hold the competency HTR 1 for this type of work.

8 CONCLUSION

8.1 My investigation findings established that the Focal Point Elegance flueless gas fire is burning gas well above the gas burner pressure as required by the manufacturer. This burner pressure is recorded as 22.0mbar, the required burner pressure which is stated in the manufacturer's installation instructions should have been preset at 7.0mbar.

8.1.1 I recorded the gas pressure at the gas meter as 22.0mbar; this pressure is in accordance with the gas pressure normally supplied by the gas supplier of between 19.0 and 23.0mbar

8 I confirmed the gas rate of the incident fire as 5.40kW —. 0.49m³/hr as opposed to 2.6kw . 0.24m³/hr as indicated by the manufacturers installation instructions; this also confirms that the gas consumption is excessive for the size of fire.

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8.3 The excessive gas rate and the unstable flame of the fire allowed the fire to soot and contribute to the failure of the catalytic converter. This would allow high levels of carbon monoxide to be discharged into the lounge and eventually pass to the upstairs bedrooms via the open plan spiral stairwell located within the lounge.

8.3.1 From the tables in appendix 4 it will be seen that levels of 1100ppm carbon monoxide is present within the lounge within the time period of 27 minutes and levels of 856ppm recorded in the bedroom within a time period of 33 minutes.

8.3.2 The Cockburn Forester Kane chart contained in appendix 6 provide5 a guide to the time the carbon monoxide would have reached a level where it would have been fatal to -----

8.4 Further investigations of the gas fire control valve on 29 April 2005 found that the fire is not preset as indicated in the manufactures installation instructions, I found that the burner adjuster screw had not been turned down to allow the fire to operate at 7.0mbar but is set at full open adjustment allowing the gas fire to operate at 22.0mbar (that of the gas meter pressure) and of a gas rate of 5.4kw — 0.49m³/hr rather than that of 2.6kW 0.24m³/hr

8.5 It is evident from my findings that the gas fire burner pressure and gas rate had not been checked nor adjusted during the commissioning process of the newly installed gas fire, The Gas Safety (Installation and Use Regulations) 1998 regulation 26 (9) requires that where a person performs work on a gas appliance he/she shall immediately thereafter examine;

- a) the effectiveness of any flue,
- b) the supply of combustion air,
- c) its operating pressure or heat input or, where necessary both,
- d) its operation as to ensure its safe functioning, and forthwith take all reasonable steps to notify any defect to the responsible person and where different, the owner of the premises in which the appliance is situated or, where neither is reasonable practicable, in the case of an appliance supplied with liquefied petroleum gas, the supplier of gas to the appliance or, in any case the transporter i.e. Transco.

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8.5.1 Regulation 33 of the Gas Safety (and Use) Regulations requires where a person installs a gas appliance at the time when gas is being supplied to the premises in which the appliance is installed, he/she shall immediately thereafter test its connection to the installation pipework to verify that it is gastight and examine the appliance and gas fittings and other works for the supply of gas and any flue or means of ventilation to be used in connection with the appliance for the purpose of ascertaining whether a) the appliance has been installed in accordance with the Gas Safety (Installation and use) Regulations, b) the operating pressure is as recommended by the manufacturer, c) the appliance has been installed with due regard to any manufacturers installation instructions provided to accompany the appliance and d) all gas safety controls are in proper working order,

8.6 The ventilation grille providing 100cm of free air for combustion purposes is fitted within 1 metre of the fire, the manufacturers installation instructions clearly state that the ventilation should not be installed within the immediate vicinity of the fire. I am of the opinion that the ventilation grille fitted alongside the fire had a detrimental effect on the operation of the oxygen depletion system (ODS) in that cold fresh air was entering the room at low level and preventing the oxygen depletion system from operating at an early stage.----- reported that when -----entered the house it was very hot, the fire was on but no flames were present and there was a very uncomfortable atmosphere in all the rooms; this report is important and indicates that the fire may not have turned off via the oxygen depletion system until early afternoon.

8.8 I am of the opinion that the incident fire was not installed or commissioned in accordance with the manufacturers installation instructions. It would be basic practical gas fitting knowledge to check the burner pressure and flame picture of an installed gas appliance; had the incident gas fire been commissioned correctly and in accordance with the manufacturer's installation instructions the likelihood of this incident occurring would have been reduced.

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8.8.1 It is evident from the investigation findings that ----- competency levels in fitting gas fires falls below that required of his CORGI registration requirements, and of the requirement to fit gas fires. In my opinion ----- has not demonstrated competency in the installation of the gas fire.

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HSE

Health &.Safety Exec

Investigation Report (2)

Gas incident at -----

Cwmbran

On 25 March 2005

Name(s) of Dutyholders. Address of Dutyholders. Role of Dutyholder. Focus client

Number

----- Gas fitter 110417709

Address/location of incident ----- Focus location number 0309441

Date(s) of investigation 26th March 2005 to 4th November2005 Focus event

.....No.G074626

Names and positions of people seen

HSE investigation: Focus investigation number 1/012571

----- -incident Contracts Manager - CORGI Services

----- -Gas installer

----- -Managing Director-Focal Point Fires plc

----- -Technical Director-Focal Point Fires plc

----- -Quality Assurance manager

Police Investigation: See list within report

Factual Report

Brief description of incident

On 25th March 2005 -----, aged 14, was found deceased in her bedroom at -----, Coed Eva, Gwent, -----by her mother. The cause of death was confirmed as carbon monoxide poisoning.

Her mother -----owned the property and during November 2004 ----- installed gas central heating and a flueless gas fire.

The installations were inspected by a GORGI inspector on the 26 March 2005 and it was found that the Flueless gas fire had not been installed in accordance with the manufacturer's instructions and high levels of Carbon Monoxide were being emitted from it into the living areas of the property.

His records showed that he had installed flueless gas fires at two other properties and it was found. that there were defects of a gas safety nature in both.

Machinery/plant/process/activity/site/substances involved

Focal Point Fires, Elegance Flueless Gas Fire, Serial No. 1057179.

Circumstances leading to accident/incident

----- installed the appliance during November 2004. He trades as -----
- being the sole owner with no employees.

----- is a CORGI registered gas installer (No. 203341) and has recognised competencies (ACS) in core gas safety assessment for the installation of gas pipework (CCN1) and the installation, service and maintenance of gas central heating boilers (CEN1)

His competence in connection with space heaters (HTR1) which includes the installation of gas fires, had not been assessed,

When examined after the incident the gas appliance was not operating in accordance with the manufacturers instructions in that the gas rate/burner pressure was found to be 5.4 kW/22.0mbar as against the required 2.6 kW and 7.0 mbar; 2400 ppm of Carbon Monoxide was measured in the combustion products being emitted by the fire into the room.

Also no isolation valve had been fitted for the fire.

Summary of the incident

1.1. ----- had bought the property approximately a year before the incident and had contracted ----- to fit gas central heating and a gas fire which were installed by ----- during November 2004. He supplied all the parts and fittings for the central

heating boiler and system and ----- supplied the gas fire, having bought it from the Cardiff Warehouse store of B&Q.

1.2. The property was an end link two-storey two-bedroom house and the gas fire had been fitted in the lounge. A ventilation grille providing 100 cm² of free air had been fitted into the wall alongside the fire within 1 metre of it. An open plan spiral staircase well, located within the corner of the lounge, provided access to the first floor bedroom area.

1.3. On the 24th March 2005 ----- went to work at approximately 0845 hours and returned home on the 25th March 2005 at approximately 1600 hours. Normally in such circumstances her daughter stayed at her grandmothers but as it was the last day of school she wanted to stay in the house and this is what occurred.

1.4. At approximately 1600hrs on the 24 March her mother had a telephone conversation with-----she tried to contact----- several times by telephone on Friday the 25th March 2005 without success.

1.5. When she arrived home after work at approximately 1610 hours on the Friday she could smell fumes and it was very warm in the house and observed brown scorch marks on the fire surround and the mantle piece. She saw that the gas fire operating knob was positioned at the maximum on position, that there was no flame in the fire and that the dog was lying dead in front of the fire. She turned the control to off, went upstairs and found her daughter lying on her bedroom floor.

1.6. ----- reported that since the fire had been fitted she had suffered from headaches and ----- had complained of dizziness and sickness.

1.7. The cause of death was carbon monoxide poisoning; 62.4% carboxyhaemoglobin was found in the blood.

2. On the 26 March 2005 the gas system and appliances were examined by the incident contracts manager from Corgi Services Ltd and the following defects were found:

2.1 Flueless gas fire:

(a) The flow of gas to the burners was substantially greater than the manufacturers instructions; such that the gas rate of the fire was 5.4 kW as against 2.6 kW, the gas consumption was 0.49m³/hr against 0.24m³/hr and the gas burner pressure was 22.0 mbar against 7.0mbar.

(b) The flame picture of the burning gas was unstable and lifting off the burner on the right hand side of the burner.

(c) Gas analysis of the combustion products being omitted from the fire recorded up to 2402 ppm of Carbon Monoxide.

(d) Sampling points around the house recorded Carbon Monoxide values of:

- 1100ppm in the centre of the lounge at 1.5 metres above the floor after 25 minutes,
- 725ppm in the back bedroom after 30 minutes,

(e) There were brown scorch marks on the fire surround and the mantle piece.

(f) The internal area of the fire was heavily soot stained and the catalytic converter at the top of the fire through which the products of combustion pass through before being emitted into the room was heavily soot stained.

(g) There was no means at the inlet of the appliance to enable the gas supply to it to be shut off.

(h) 100 cm ventilation grill of without baffles had been fitted by the installer into the outside wall alongside the fire, which was within 1 metre of the fire. The manufacturer installation instructions require a minimum of 100cm² and also states “To reduce the possibility of draughts entering the room via the air vent, we recommend the use of ‘Black Hole’ OR ‘Vortex’ type vents featuring internal baffles.’ and “Any ventilation fitted must comply with BS 5871 part 2 and BS 5440 part 2 insofar as the relevant areas are not covered by these instruction. Ventilation fitted under or within immediate vicinity of the appliance must not be used as it may adversely effect performance of the ODS system.

2.2 Central Heating gas boiler:

Although the boiler was in use at the time of the incident its gas rate was recorded as 32.9 kW as against the manufacturers requirement of 31.1 kW. The tests indicate that the boiler had not been commissioned in accordance with the manufacturers instructions. This did not play any part in the incident.

2.3 The gas pipe sleeve from the rear of the gas meter box containing the gas supply pipe into the property was not sealed. This played no part in the incident.

3. 3.1 The gas rate to the flueless gas fire is adjusted by the turning of a screw on the fire’s flow valve, which either opens or closes the orifice between the incoming Gas supply and the gas flow to the fire’s gas burners, it has been confirmed by the manufacturer, Focal Point Fires Ltd that during the assembly of the fire at the factory the gas flow is measured and adjusted to the required value and a red varnish is applied to the top of the screw,

3.2 The gas fire flow valve has been examined by the Forensic Science service and they confirmed that the paint seal of the burner adjuster screw on the flow valve had not been broken.

3.3 The manufactures installation instructions state that the burner pressure when cold should be within 7.0 (+/- 0.25) mbar and it is set during assembly of the fire at the factory. The instructions gives advice on what to check if the pressure is too high or 1 but does not discuss altering the screw.

3.4 The Gas Safety (Installation and Use) Regulations 1996: regulation 26(9) requires that when a person performs work on a gas appliance he shall immediately thereafter examine, amongst other parameters, its operating pressure or heat input or, where necessary, both; and regulation 26(5) requires that no person carrying out an installation of a gas appliance shall leave it connected to the gas supply unless the appliance can be safely used.

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2. Focal Point F Ltd have incorporated an orifice between the flow adjustment screw and the outset to the burner, which limit the maximum gas flow rate to just above the design specification (as they have done on other similar models for approximately 12

months), This will significantly reduce the risk of safety to the public if the gas flow adjustment screw is set incorrectly or subsequently adjusted.

They have introduced a revised Audit procedure, which involves retesting a % of the units both at the gas tray testing area and the packing area.

Legal requirements

1. Re: -----

1.1. Health and Safety at Work etc Act 1974— Section 3(2).

1.2. Gas Safety (Installation and Use) regulations 1998:

1.2.1 Reg 3(1) not competent to work on gas fires.

1.2.2 Reg 5(1) with reference to 2(1)(a) — not using an ‘appropriate fitting’.

1.2.3 Reg 7(3); failing to protect a gas pipe against corrosion.

1.2.4 Reg 19(2gb); failing to incorporate protective measures to ensure that any gas from a leak from a gas pipe passing through a cavity wall is ventilated to a safe position.

1.2.5 Reg 26(6); means of shutting off the supply of gas at the inlet to the appliance.

1.2.6 Reg 33(1)(b); a person installing a gas appliance shall immediately carry out tests.

1.2.7 Reg 33(1)(c); an appliance shall be installed with due regard to any manufacturers instructions.

2. Re: Focal Point Fires Ltd: Health and safety at Work etc act 1974— Section 3(1)

Description of health and safety management system

1. ----- had obtained Certificates of Gas Safety Competence, Accredited Certification Scheme (ACS) in Core Gas Safety Assessment (CCN1) and Central Heaters (CEN1) with an expiry date of 9/7/2008; he was registered with CORGI on the 22/8/2003.

A Corgi inspector checked an example of his work on 30/4/2004. There was an issue regarding the checking of the gas boiler burner pressure, which indicated that he had not read the manufacturers instruction. The inspector told him that he must follow the appliance Instructions to ensure correct commissioning.

C :w u d

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4. A Prohibition Notice was served on ----- on the 1st April 2005 preventing him carrying out any work in relation to a gas fitting or service pipework until he has had his competence reassessed by a relevant certified accredited body

5. Corgi (also inspected other installations of as fires by -----

Newport and -----Caerleon and found that an appropriate fitting had not been used in the installation of flueless gas fires at both properties.

Gas pipework of 8 mm and 10 mm diameter were not connected using a proprietary copper pipe reducer but by pushing one into the other and soldering. Also, in regards to the house in Caerleon the gas supply pipework entering the builders opening behind the gas fire had not been sleeved to protect it from corrosion and the sleeve for the gas supply pipework entering the roof space was not complete and it had not been sealed. The installations were isolated from the gas supply and disconnected because they were deemed to be 'at risk' in accordance with the 'Gas Industry Unsafe Situations Procedure'.

6 With regard to the gas fire and its manufacturer, I visited the company's manufacturing site in Christchurch, Dorset with representatives of the Police and Trading Standards inspectors from Cardiff and Dorset. A summary of the observations is;

6.1 The design of the gas fire had been approved by Advantick in August 2004 under certificate EC—87/00/41/M9.

6.2 During assembly the burner gas flow rate of all gas fires are measured and adjusted to the required value; the adjustment screw is then coated with a red varnish.

6.3 An accredited inspection company checks the flow meters used to test the gas flow rate to external standards annually and company test the units to a master burner tray. The flow meters also measure the incoming gas pressure and if this is outside the tolerances it will not function.

6.4 Operators are trained and there are records.

6.5 The company had a quality audit procedure.

6.6 The Company's Quality Procedures have been approved to BS EN 9001:2000 by Bsi,

Preventive measures taken by dutyholder(s)

Before the incident

1. ----- He stated in a police interview under caution that he had carried out the relevant tests and that he had gained experience of fitting gas fires when working with his brother ----- who was a registered gas installer.

2. Focal Point Fires —As above.

After the incident

1. ----- None known

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He stated that he had gained experience of fitting gas fires when working with ----- his brother who was a registered gas installer.----- is a Corgi registered installer with assessed competency in core pipework and central heating but has not attained any successful assessment of his competence for installing or working on space heaters (gas fires).

2. Re: Focal point Fires Ltd. The company have a quality system approved to BS EN 9001:2000 by BSI.

List of photographs taken

1, Photographs taken by-----from Corgi Services Ltd of -----

Cwmbran:

I) I) Outside of property

I 2) Combination boiler

iii) 3) Focal Point Fires — Elegance Flueless Gas Fire

iv) 4) Purpose provided ventilation for the flueless gas fire

v) 5) Position of test probe within lounge

vi) B) Position of test probe within centre of lounge

vii) 7) Position of test probe within back bedroom

viii) 8) Open plan stair well Located in the corner of the lounge

i 9) Gas fire with glass front removed

x) 10) Close u of soot deposits within the catalytic converter assembly

xi) 11) Gas fire removed from its location showing metal box

xii) 12.) Protective heat board screwed to wall

xfli) 13) Gas fire flow valve of incident fire and another new fire.

xiv) 14) As above.