BIB Cochran Ltd

Five Day Accredited Training Course

BOILER OPERATIVE ACCREDITATION SCHEME

Newbie Works, Annan,
Dumfries & Galloway
Tel: 01461 202111

BIB Cochran Ltd, Newbie Works, Annan, Dumfries & Galloway, DG12 5QU
E: enquiries@bibcochran.com W: www.bibcochran.com
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DAY 1 - AM	
Registration & Introduction Aims & Objectives For The Course	0900 hrs
Aims & Objectives For The Day	0920 hrs
BASIC HEAT & HEAT TRANSFER CONCEPTS	
1. Terms ▪ Heat ▪ Temperature ▪ Pressure ▪ Volume	0930 hrs 1030 hrs
2. Conversation Of Water Into Steam ▪ Sensible Heat ▪ Latent Heat ▪ Super Heat ▪ Total Heat (Enthalpy) In Steam ▪ Dryness Of Steam ▪ Steam Tables	1045 hrs 1145 hrs
3. Units ▪ SI ▪ Imperial Units	1145 hrs 1230 hrs
LUNCH	
4. Heat Transfer ▪ Conduction ▪ Convection ▪ Radiation ▪ Their Importance In Different Parts Of The Boiler	1300 hrs 1330 hrs
5. Deposits ▪ The Importance Of Clean Surfaces. ▪ The Effects Of Internal & External Deposits On Heat Transmission & Efficiency ▪ Additives & Soot Blowers	1330 hrs 1400 hrs

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DAY 1 - PM	
DRAUGHT & COMBUSTION	
1. Elementary Principles Of Combustion ▪ Ignition Temperature Point ▪ Limits Of Flammability of Fuel/Air Mixture ▪ Use Of Refractory To Stabilise Ignition	1400 hrs 1415 hrs
2. Air ▪ Composition ▪ Primary Air ▪ Secondary Air ▪ Tertiary Air ▪ Preheated Air ▪ Deficiency of Air ▪ Excess Air	1415 hrs 1500 hrs
BREAK	
3. Combustion Products ▪ Carbon Dioxide in Flue Gases ▪ Carbon Monoxide in Flue Gases	1515 hrs 1530hrs
4. Natural, Induced & Forced Draught Systems ▪ Functions of a Chimney ▪ Conditions Affecting Draught ▪ Control of Draught	1530 hrs 1645 hrs
Summing Up & Question & Answer Session Evaluate Learning	1645 hrs 1700 hrs

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DAY 2 - AM	
Aims & Objectives Any Questions From yesterdays Session	0900 hrs
FEED WATER	
1. Feed Water For Different Boilers ▪ Steaming Conditions ▪ Types Of Hardness ▪ Alkalinity's & pH Value ▪ Total Dissolved Solids ▪ Suspended Solids ▪ Conductivity ▪ Silica ▪ Iron	0915 hrs 0945 hrs
2. Simple Principles of Water Treatment ▪ Evaporators - Lime/Soda Softeners ▪ Ion Exchangers & Reverse Osmosis ▪ Importance Of Instruction Regarding Treatment & Water Sampling ▪ Use Of Condensate ▪ Sources Of Condensate & Their Effects ▪ De-Aeration Of Feed Water	0945 hrs 1030 hrs
BREAK	
3. Blowdown Systems ▪ Intermittent ▪ Continuous	1045 hrs 1115 hrs
4. Carry-over ▪ Causes & Hazards ▪ Foaming ▪ Priming ▪ Hunting of Water Level Controls ▪ Water Hammer	1115 hrs 1200 hrs
5. Discharge Of Effluent To Drain ▪ Awareness Of The Implications Of Water Rejected From Treatment Plant e.g. Softener Regeneration	1200 hrs 1220 hrs
Summing Up & Question & Answer Session Evaluate Learning	1230 hrs
LUNCH	1230 hrs

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DAY 2 - PM	
Aims & Objectives Any Questions from this morning	1300 hrs
CONTROL & INSTRUMENTATION	
1. Boiler Instrumentation ▪ Descriptions & Practical Use of Instruments to indicate or record Draught, Temperature, Carbon Dioxide, Oxygen or Carbon Monoxide ▪ Water & Steam Flow ▪ Smoke Density & Fuel Consumption ▪ Portable Flue Gas Testing Equipment ▪ Ringlemann Charts ▪ Other Smoke Indicators & Their Uses	1305 hrs 1415 hrs
2. Water Testing Instruments ▪ pH & Density Including Conductivity Meters	1415 hrs 1430hrs
3. Pressure & Level Switches ▪ Alarms & Auto Pump Changeover	1430 hrs 1445hrs
4. Controllers ▪ Awareness Of 2 & 3 Term Control ▪ Distinction Between This & 2 Or 3 Element Control	1445 hrs 1500hrs
BREAK	
5. Works Tour ▪ Utilise A Works Boiler To Demonstrate Use ▪ See In Practice Equipment Discussed In The Working Environment	1515 hrs 1645hrs
Summing Up & Question & Answer Session Evaluate Learning	1645 hrs 1700 hrs

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DAY 3 - AM	
Aims & Objectives Any Questions from yesterdays Session	0900 hrs
SAFETY & LEGAL REQUIREMENTS	
1. Basic Need for Continued Awareness ▪ Attitudes to Safety ▪ Principal Causes of Accidents & Legal Implications ▪ Importance of Recording Events	0915 hrs 0930 hrs
2. Principal Legislation ▪ Health & Safety At Work Act 1974 ▪ Responsibility of Employers & Employees ▪ Environment Protection Act (EPA) ▪ Large Combustion Plant Directive ▪ Integrated Pollution Control (IPC) ▪ Control of Substances Hazardous to Health (COSHH) ▪ Pressure Equipment Regulations 1999 (as Amended) ▪ Pressure Safety Regulations 2000 (as Amended)	0930 hrs 1015 hrs
3. Legal Requirement ▪ Statutory Examination By A Competent Person ▪ Safety Devices Required By Law	1030 hrs 1045 hrs
BREAK	
4. Codes of Practice Applicable to Boiler Plant ▪ AcoP to the Pressure Systems Safety Regulations 2000 (as amended) ▪ HSE Guidance Notes PM5 & PM60	1045 hrs 1100 hrs
5. Safety Rules & Practices ▪ The Meaning Of The Permit To Work System ▪ Protective Clothing – Eye & Foot Protection ▪ Dangers Of Asphyxia & Carbon Monoxide Poisoning ▪ Explosion Hazards ▪ Escape Routes ▪ The Need To Be At Atmospheric Pressure Before Entry To Pressure Parts ▪ The Need For Safe Isolation Prior To Carrying Out Maintenance & Examination	1100 hrs 1145 hrs
6. Good & Bad Practices ▪ Procedures On Commencing & Concluding Shift ▪ Precautions To Be Observed Before, During & After Work On A Boiler ▪ When & How To Draw Fires In An Emergency ▪ Good House Keeping & Cleanliness	1145 hrs 1210 hrs
7. Permit to Work ▪ Awareness Of The Need For A Permit To Work E.G. Inspections Performed Within An Operating Boiler House	1210 hrs 1220 hrs
Summing Up & Question & Answer Session Evaluate Learning	1220 hrs 1230 hrs

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DAY 3 - PM	
Aims & Objectives Any Questions from this morning	1300 hrs
ENERGY EFFICIENCY	
1. Terms ▪ Boiler Efficiency ▪ Gross & Net ▪ Combustion Efficiency ▪ Boiler House & Plant Energy Efficiency	1315 hrs 1345 hrs
2. Methods ▪ Direct & Indirect Methods of Boiler Efficiency Determination	1345 hrs 1400hrs
3. Portable Instruments ▪ Their Use In Determination of Boiler Efficiency	1400 hrs 1415 hrs
4. Installed Instruments ▪ Temperature Measurements ▪ Flow Measurements ▪ Steam, Water & Fuel Gas Analysis ▪ Oxygen, Carbon Dioxide & Carbon Monoxide	1415 hrs 1445 hrs
5. Steam Tables	1445 hrs
BREAK	1500 hrs
6. Energy Efficiency ▪ Economisers ▪ Air Pre-heaters ▪ Tubular Rotary Plate	1515 hrs 1600 hrs
ENVIRONMENT	
1. Legislation ▪ Emissions Protection Agency (EPA) ▪ Integrated Pollution Control (IPC)	1600 hrs 1615 hrs
2. Emissions to Air ▪ Carbon Monoxide ▪ Sulphur Dioxide ▪ Oxides of Nitrogen ▪ Particulates	1615 hrs 1640 hrs
3. Other Emissions ▪ Water Treatment Plant Effluent ▪ Blowdown Water ▪ Materials Derived from Cleaning Activities	1640 hrs 1650 hrs
Summing Up & Question & Answer Session Evaluate Learning	1650 hrs 1700 hrs

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DAY 4 - AM	
Aims & Objectives Any Questions from yesterdays Session	0900 hrs
BOILERS & AUXILIARIES	
1. Principal Types of Boilers ▪ General Description ▪ Steam Raising Boilers ▪ Boilers used for High, Medium & Low Temperature Hot Water Systems	0915 hrs 0930 hrs
2. Construction Features ▪ Horizontal ▪ Vertical ▪ Cylindrical ▪ Shell ▪ Water Tube ▪ Sectional for Steam & Hot Water	0930 hrs 1000 hrs
3. Feed Systems ▪ Feed Pumps, Tanks & Connections ▪ Circulating Pumps ▪ Mixing Valves & Injectors ▪ Feed Water Heater & Regulators ▪ Continuous & Intermittent Blowdown Arrangements	1000 hrs 1030hrs
4. Fittings & Mountings ▪ Statutory Requirements ▪ Water Level Controls ▪ Safety Requirements	1045 hrs 1115 hrs
5. Methods & Pressurisation ▪ For High & Medium Temperature Hot Water Boilers	1115 hrs 1130 hrs
OPERATION	
1. Preparation ▪ Basic General Procedure For Pre-Filling Checks ▪ Inspection ▪ Drains & Air Cocks ▪ Filling & Venting ▪ Precautions To Be Observed	1130 hrs 1150 hrs
2. Raising Pressure ▪ Initial Checks ▪ Ignitions Procedure - Stabilisation Of Combustion Flame ▪ Action To Be Taken In The Event Of Failure To Stabilize Flame ▪ Equalisation Of Boiler Temperature ▪ Use Of Manual Blowdown To Assist Circulation Rate Of Pressure Rise ▪ Warming Up Procedure For Boiler	1150 hrs 1220 hrs
Summing Up & Question & Answer Session Evaluate Learning	1220 hrs 1230 hrs

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DAY 4 - PM	
Aims & Objectives Any Questions from this morning	1300 hrs
3. Special Precautions ▪ When Superheaters Or Economisers Are Fitted i.e. Use Of Drains For Purging Or Water Flushing For Cooling Of Elements ▪ By-Pass Damper Controls	1310 hrs 1320 hrs
4. Bringing on Load ▪ Precautions To Be Taken When Draining Systems Down-Stream Of Crown Valve ▪ Checking Of Drains ▪ Warming Up Pipe System ▪ Valve Opening Sequence - Crown, Screw Down & Non-Return Valves ▪ Hazards Due To Water Hammer ▪ Load Control Interaction Between Multiple Units When Operating In Parallel	1320 hrs 1350 hrs
5. On-Load Operations ▪ Inspection Of Plant During Operation ▪ Reporting Of Defects & Faults ▪ Checking For Fuel Or Combustion Gas Leaks ▪ Testing & Safety Equipment & Devices ▪ Water Level Gauges ▪ Water Alarms & Flame Failure Equipment ▪ Blowdown Procedures & Precautions ▪ Arrangements For Short Term & Long Term Laying Up Of Plant ▪ Procedures During Banking & Shutdown Periods ▪ Inspection On Plant Whilst Not In Operation ▪ Liaison With Those In Authority ▪ Safe Isolation Prior To Carrying Out Repairs, Modifications Or Examinations	1350 hrs 1400 hrs
6. Abnormal Conditions ▪ Actions To Be Taken ▪ Loss Of Fuel ▪ Loss Of Electrical Supply ▪ Failure Of ID Or FD Fans Or Auto Flue Damper, Where Fitted ▪ Failure Of Auto System ▪ Loss Of Pressure In Fully Flooded Boiler Systems ▪ Awareness Of The Time To Enter A Dangerous Condition Following An Alarm ▪ Actions To Be Taken Following Activation Of Safety Related Control Systems ▪ Checks & Monitoring To Confirm That The Automatic Controls Have Responded Appropriately	1410 hrs 1440 hrs
7. Routine Checking ▪ Automatic Controls For The Boilers Subject To Limited Supervision	1440 hrs 1450 hrs

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DAY 4 – PM continued	
8. Preparation & Use of Log Sheets ▪ Recording Boiler Operation & Information That Should Be Logged ▪ Recording Operators Observations ▪ Target Figures As In Indication Of Boiler Thermal Losses & Overall Plant Performance ▪ Logging Of Fuel Deliveries & Boiler Output ▪ Weekly/Monthly Evaporation Ratios ▪ Importance Of Noting Trends For Logged Instruments To Aid Diagnosis Of Problems ▪ The Need To Report Problems And To Secure Corrective Action	1450 hrs 1500 hrs
FUEL CONCEPTS	
1. Fuels ▪ The Characteristics Of Various Types Of Fuels	1515 hrs 1530 hrs
2. Terms ▪ The Meaning Of Gross, Nett & Calorific Value ▪ Viscosity Specific Gravity ▪ Bulk Density	1530 hrs 1550 hrs
3. Storage ▪ Bunded Oil Storage Tanks ▪ Trace Heating ▪ LPG Storage Facilities ▪ Insulation ▪ Solid Fuel Silos & Bunkers ▪ Hazards Of Fire Explosion	1550 hrs 1605 hrs
4. Safety Features ▪ Air Purge (Post & Pre-firing) Safety Interlocks ▪ Slam Shut Valves ▪ Fusible Links ▪ Fire Detectors ▪ Gas Detectors	1605 hrs 1630 hrs
Question & Answer Session With Evaluation Of The Week	1630 hrs 1645 hrs
Next Steps To Gaining Accreditation Under This Scheme	1645 hrs 1700 hrs

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DAY 5 – Written Assessment	
1.	Basic Heat And Transfer Concepts
2.	Draught And Combustion
2.	Feed Water
3.	Control And Instrumentation
4.	Safety And Legal Requirements
5.	Energy Efficiency And Environment
6.	Boilers And Auxiliaries
7.	Operation
Finished	

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