CEA TG01 Boiler Operations Accreditation Scheme Handbook
published by the Combustion Engineering Association 2017

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Introduction

The Combustion Engineering Association (CEA) is an educational charity originally formed to promote the science of combustion engineering which today embraces the study of efficient energy use, the exchange of new technology information, the training of industry professionals, the development of standards and good practice, and the provision of services for its ever growing membership.

Since the demise of the former City and Guilds boiler operative qualification, there has been no nationally-recognised qualification for boiler operators. The Boiler Operations Accreditation Scheme (BOAS) was devised to fill this gap, in collaboration with the Health and Safety Executive, the insurance industry, manufacturers of boilers and associated equipment, and employers, with the practical and financial support of The Carbon Trust.

Candidates for BOAS qualifications are expected already to be working as boiler Operators or boiler house Managers. In order to prepare those persons for BOAS Accreditation a number of independent and competing CEA Member organisations offer suitable pre-assessment training courses approved by the CEA. These courses are intended to supplement and confirm existing knowledge and prepare candidates for the higher level of qualification afforded by BOAS. Candidates who do not have sufficient prior experience may find the level of BOAS Qualification quite onerous; suitable Training Providers offer additional training to assist employers in bridging this gap.

Whilst it is recognised that by attaining BOAS Accreditation the candidate has demonstrated a measure of professional competence, the qualification should be viewed only as part of the candidate’s overall training and development programme. Candidates should be encouraged to develop their skills, knowledge and competencies further during their career, preferably in partnership with their employer.

BOAS has been designed based on legislation and best practices applicable within the UK. Candidates from other jurisdictions may find significant differences between the requirements for BOAS and those with which they are familiar. All elements of the assessment are carried out in English. For candidates without a sufficient grasp of the English language, and in particular of boiler related terminology, it may be difficult for them to demonstrate their competence to the satisfaction of a BOAS Assessor. For candidates who come from non UK jurisdictions an International version of BOAS is available.

BOAS Accreditation is valid for 5 years from the date of certification by the CEA, and renewal is required before this point in order to ensure boiler house Operators and Managers remain up-to-date with current legislation and best practice.

Although BOAS training and Accreditation is not a legal requirement for boiler Operators or boiler operations Managers it will help employers demonstrate that they have met their legal duty in providing suitable and appropriate training and assessment. Whilst BOAS is recommended in BG01 (Guidance on Safe Operation of Boilers) it is only one element in demonstrating a boiler operator’s level of competence and only one possible component that may help an organisation to demonstrate their corporate responsibility to provide suitable training for employees under the Health and Safety at Work Act.
The CEA owns and is responsible for the scope, syllabus and administration of the BOAS scheme and the selection of Training Providers and Assessors. Kiwa Training are contracted to the CEA to act as the independent Assessment Body for the scheme, and they allocate approved Assessors to specific courses, and issue and review examination papers and results. The CEA review all assessment results and award BOAS certificates and ID cards.

This handbook consolidates the mandatory regulations and guidelines governing the scheme, devised by the CEA’s BOAS Working Group and Training Committee. It is the definitive reference for BOAS Training Providers, Trainers and Assessors in all matters relating to the operation of the scheme. It will be kept under review and amended from time to time as necessary.

The Combustion Engineering Association and its BOAS Partners (Assessment Body, Training Providers, Trainers and Assessors) act in good faith to provide accurate and up-to-date information to BOAS candidates and undertake to assess them fairly and consistently in accordance with good educational and assessment practices and the rules of the scheme set out in this Handbook. No liability will be accepted by the CEA or any of its BOAS Partners for acts or omissions by them when reviewing candidate evidence, when training or assessing candidates, or when otherwise providing services to candidates under the BOAS scheme.

Candidates who provide evidence for Training Providers and Assessors to review do so freely and in the clear understanding that any comments made about company procedures by the reviewer are related to a discussion about the way the candidate operates or manages the boilers under their control and do not imply any approval or otherwise of the way the company requires the plant to be operated by its employees. If a clear potential breach of relevant legislation is identified during BOAS related discussions with candidates, the Assessor will inform the candidate and discuss the matter with them.

The BOAS mark and logo, Handbook, Learning Outcomes, training syllabuses, assessment processes, accreditation procedures and all related documents are all copyright of the Combustion Engineering Association and all applications for Training Provider or Trainer status, Assessor status or any other use of the BOAS material or logo must be made to the Director of the CEA. All matters relating to the provision and use of the BOAS material and processes are covered by English Law.

The Combustion Engineering Association
March 2017
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An overview of the Boiler Operations Accreditation Scheme (BOAS)

The BOAS scheme is comprised of four distinct stages which are the application process, training, assessment and registration. Since these are sequential steps a candidate may not advance until approval is given by the licenced Training Provider, Assessor or CEA. Stage 2 is not mandatory for candidates who are sufficiently knowledgeable – see option 2 in section 3.1.1.

1. Application
   - Candidate registers with a Training Provider, requiring the submission in advance of:
     - Application Form
     - Evidence Pack/Work experience/CV
     - Payment

2. Training
   - Candidate undertakes training if necessary, consisting of:
     - Lectures
     - Practical Training
     - Optional for experienced candidates – see 3.1.1

3. Assessment
   - Candidate sits the examination papers
   - Papers marked and orally assessed with the candidate.
   - Assessor interviews candidate and reviews candidate’s examination results and recommends:
     - Pass OR Deferred
     - Category confirmed
     - Operator/Manager
   - Assessor visits site if required (Cat 1 & Cat 2); mandatory for Water Tube Boilers (Cat 3)
   - Assessor and Trainer discuss any deferred candidates and Trainer arranges remedial actions for candidate

4. Registration
   - Assessment report and application folder returned to Kiwa for checking then forwarded to CEA Certification Officer
   - CEA reviews all results and randomly checks supporting documentation for consistency
   - CEA registers & issues certificate and ID card to candidate – certification granted from this date
   - CEA send certificate to candidate and copy Training Provider with assessment results
1 - Application Process

Applications for training and/or BOAS assessment may be made directly by individuals or by companies on behalf of their employees direct to a Training Provider using the standard form (appendix 1).

The CEA requires the identity of all candidates for both initial assessment and renewal to be checked by the Training Provider and confirmed by the Assessor. Formal identification of photo likeness will be by passport, driving licence or other photographic identity card such as a current BOAS ID card. Confirmation of the candidate’s address will be by a different document to that listed above, including, for example, council tax demand, utility bill, or driving licence if not used as photo ID.

All documents must be currently valid (in the case of passports, driving licences etc.) or less than 6 months old in the case of bills. Any queries regarding identity checks must be directed to the Assessment Body for clarification.

1.1 - BOAS Accreditation Types and pre-requisites

1.1.1 Operator Accreditation (BOAS ‘O’): This is designed for practising boiler house operatives, and candidates must have a minimum of six months or 100 hours verified practical experience of boiler plant operation in the appropriate category before taking the BOAS assessment. This practical experience should include elements such as working to start-up and shut-down procedures, checking water level controls and water quality, carrying out inspections and routine maintenance, and the other physical tasks required in the boiler house. As an option, boiler operatives who have less than the required experience for assessment at the end of their training course may request a deferred assessment – this must be clearly indicated on their application form, and may apply to candidates who are waiting for boiler installations to be commissioned, for example.

1.1.2 Manager Accreditation (BOAS ‘M’): This is designed for a person who manages a boiler house and its operators (e.g. a team leader, supervisor or shift leader) but who may not, for example, have recent demonstrable experience of physically operating boilers. Their responsibilities may include:

- Duties under current legislation;
- Managing the safe operation of a boiler house;
- Drafting or Approving boiler house procedures;
- Operating a Permit to Work system;
- Staff manning levels and training;
- Organising regular Statutory Examinations;
- Knowledge of environmental matters related to the installation;
- Knowing when to call for outside/additional expertise.

As an option, boiler house managers who have less than the required experience for assessment at the end of their training course may request a deferred assessment – this must be clearly indicated on their application form.

1.1.3 BOAS for professionally qualified persons. Occasionally prospective BOAS applicants may not be directly involved with day-to-day boiler house operations but still believe they have the necessary background and experience to qualify for a BOAS award. This might include design engineers, boiler inspectors, consultants, project managers, trainers and other professionally qualified persons who will currently be working on boiler house projects but cannot provide the necessary operational or managerial documentation normally required for the Evidence Pack.
The CEA encourages all who are interested in BOAS to apply for pre-assessment training and subsequent assessment, and applicants who do not have the specified documentation for their evidence pack should provide documentation relevant to their role for the Assessor to review and discuss with them.

For example, Project Managers constructing energy centres could provide drawings of the proposed installation, examples of relevant construction or operational method statements, commissioning reports for boiler plant, or other documents where they can show involvement with the boiler plant. Boiler Inspectors could provide examples of WSE that they currently work to, copies of recent boiler inspection reports they have issued, or copies of test and inspection procedures that they use regularly.

Applicants need to show a personal involvement with relevant boiler plant and will be expected to apply for Manager accreditation in the appropriate category. Applicants should however remember that BOAS is accreditation for the safe operation and management of boiler plant, and the examination papers and assessor’s questions will concentrate on daily and weekly operational tasks and the implementation of BG01.

1.1.4 Dual Accreditation: For candidates needing to demonstrate competence as both an Operator and a Manager, the experience detailed in both the above sections is required. Dual Accreditation will be given only where the candidate can justify this to the Assessor; an additional fee and extra examinations are associated with this training and assessment.

1.1.5 It may occasionally be unclear under which type or Category a candidate is best accredited. The CEA will assist candidates with this matter; please contact the CEA Director for further guidance.

1.2 - BOAS Categories

1.2.1 BOAS assessments are offered in four distinct categories:

1. **Category 1 (Cat 1)** – Hot Water Boilers at any pressure & temperature.

2. **Category 2 (Cat 2)** – Conventional Shell-Type Industrial Steam Boilers.

3. **Category 3 (Cat 3)** – Water Tube Steam Boilers, including composite and other complex water tube designs.

4. **Category 4 (Cat 4)** – International BOAS (IBOAS) awarded to suitable Operator and Manager Candidates from non-UK jurisdictions. IBOAS is designated Cat 4 to avoid any misunderstanding with UK based BOAS qualifications. Candidates from overseas who hold similar qualifications to BOAS and who wish to work in the UK are asked to contact the Director of the CEA for further guidance.

The CEA will issue IBOAS Cat 4 certificates and ID cards to all successful IBOAS candidates and keep a separate register including the details of the plant types assessed. All details for the administration of Cat 4 are in App10.

1.2.2 Assessment in one category would not represent a presumption of competence in another category. Where a candidate needs to demonstrate competence in two or more categories, they must be able to illustrate their operational and/or managerial experience in each category. Note that all Cat 3 initial assessments must be carried out on site. In cases where the Cat 3 candidate attends from outside the UK the Training Provider must notify the Assessment Body and the CEA at least two months in advance so that appropriate assessment arrangements can be made. A Cat 4 award might be more appropriate, but Cat 1, 2 & 3 are NOT interchangeable with Cat 4.
1.2.3 If a candidate wishes to apply for both Cat 1 and Cat 2 they must:

a - select a trainer who can deliver the relevant parts of the two syllabuses (both types of boiler required for practical elements);
b - provide clear evidence of operation/management of relevant plant in each category;
c - take all Cat 1 examination papers and paper 3 (operator) or 4 (manager) for Cat 2 also;
d - pay the additional examination and certification fees;
e - demonstrate to the Assessor at an extended interview that they have sufficient competence in each category.

1.2.4 Where a candidate wishes to apply for both Cat 2 and Cat 3 the oral assessment shall be site based and the candidate must:

a - select a trainer who can deliver the relevant parts of the two syllabuses (both types of boiler required for practical elements);
b - provide clear evidence of operation/management of relevant plant in each category;
c - take all Cat 3 examination papers and paper 3 (operator) or 4 (manager) for Cat 2 also;
d - pay the additional examination and certification fees;
e - demonstrate to the Assessor at an extended on site interview that they have sufficient competence in each category.

1.2.5 Changing from one Category to another (whether before or at renewal) requires the candidate to take current 'new category' examinations for Operator or Manager and pass an oral assessment. All changes of category or adding new categories require candidates to provide a complete evidence pack for the new or additional category. The Assessor cannot check the candidate's knowledge against actual plant that he works on unless details of that plant are provided.

1.3 - Candidate Applications for BOAS Assessment

1.3.1 Training Providers must obtain from candidates prior to assessment the following:

a) A fully completed Application Form (appendix 1) and two passport sized photographs to be used for the ID card. All applications for assessment must be validated and countersigned by the candidate’s Manager or a representative senior authority at the candidate’s employer.

b) Two different acceptable forms of ID, one photographic (passport, driving licence or other Government issued photo ID) and one to verify the candidate’s address (Council Tax demand, utility bill, driving licence (if not used as photo ID)). All forms of ID must be currently valid or less than 6 months old as appropriate.

c) An Evidence Pack with supporting documents (as shown in appendix 2) which has been completed at the Operator’s or Manager’s boiler plant. Large quantities of company procedures are NOT required- a maximum of 20 sheets of relevant information should be more than adequate – the Evidence Pack must show the candidate’s PERSONAL involvement with the boiler plant using documents printed on company headed paper. Applicants not currently operating or managing boiler plants must provide evidence of their continuing personal involvement with relevant installations e.g. boiler houses being designed, under construction, during commissioning or undergoing routine inspections etc.

Applicants who manage boiler houses on behalf of clients where confidentiality is required (such as contract energy management and contract maintenance organisations) should provide copies of their service or maintenance records with the boiler owner’s details blanked out.

d) Payment to the chosen Training Provider. The Training Provider will include in their invoice the Assessment Body assessment fees and CEA Accreditation fees.

Training Providers MUST check that all these steps have been followed before BOAS Training commences.
1.3.2 NOTES:
1. The above information should be submitted ideally 4 weeks in advance although the Training Provider may exercise discretion in this matter at their own risk.

2. The Evidence Pack and CV demonstrate important knowledge, skills and experiences that may not be specifically tested during the assessment.

3. The Evidence Pack is required because:
   a. The process of collating the information is part of the training process itself.
   b. The information provided will enable the Training Provider to identify features of the candidate’s plant which may warrant specific attention during the training process.
   c. It provides the Independent Assessor with information about the candidate’s plant which will inform the assessment process.

The Evidence pack is NOT a file of company procedures and original documents – it should be NO MORE THAN 20 sheets of relevant information copied from actual records on company headed paper made by and signed by the candidate in the course of their normal work, and ideally countersigned or approved by their supervisor.

The Training Provider will scan the relevant evidence sheets and make these available to the Assessment Body and CEA. The candidate may then take away the evidence.

4. The whole assessment must be completed successfully to achieve BOAS accreditation, however there is no requirement for the training and assessment to be completed in ‘one sitting’, but if more than ‘one sitting’ is required this will probably incur additional costs.

5. A Training Provider has the right to refuse to accept candidates for training should they not comply with these requirements. An Assessor will defer a candidate who does not provide the minimum required evidence in advance of their assessment interview.

6. In the case of persons holding a qualification obtained prior to BOAS or awarded overseas, the CEA may, at its discretion, allow such candidates to be treated as BOAS Renewal candidates. However each case will be judged on its own merits as it will be necessary to establish that the non-BOAS qualification may reasonably be considered to be equal to BOAS, and to confirm that the candidate has remained in a workplace situation where they have been continuously involved with appropriate boiler plant since the original qualification.

7. In cases where a Cat 3 candidate attends from outside the UK or offshore, the Training Provider must notify the Assessment Body and the CEA at least two months in advance so that appropriate assessment arrangements can be made. One option is to extend the assessment interview to allow the Assessor more time to assess the candidate, and in the absence of a site visit the candidate should bring drawings and photographs of the boiler installation to the assessment interview to allow the assessor to fully evaluate the plant and the candidate’s knowledge of it. The certificate of BOAS Accreditation will be annotated to say that an on-site assessment was not carried out in this exceptional case. If the assessment decision has to be deferred to allow information to be gathered this must not delay the assessment by more than 6 months.

8. The Training Provider will forward all supporting documentation supplied with the Application Form, including the scanned Evidence Pack and Log sheets, to the Assessment Body. This documentation is required in case of subsequent investigation or review by the CEA Certification Officer or outside audit.
2 - Training Process

BOAS has been designed based on legislation and best practices applicable with in the UK. Candidates from other jurisdictions may find significant differences between the requirements for BOAS and those with which they are familiar. All elements of the pre-assessment training and assessment are carried out in English.

For candidates without a sufficient grasp of the English language, and in particular of boiler related terminology, it may be difficult for them to fully understand the training and subsequently demonstrate their competence to the satisfaction of a BOAS Assessor. Such candidates, or their selected Training Provider on their behalf, should contact the Assessment Body for advice BEFORE undertaking an assessment. An alternative approach may be to apply for International BOAS as described in App 10.

2.1 - BOAS Pre-assessment Training

2.1.1 The objectives of the course are to:
- Train candidates in safe and energy efficient boiler and boiler house operation;
- Raise candidates’ awareness of wider safety and environmental, regulatory and legal requirements;
- Prepare candidates for BOAS assessment.

2.1.2 It must be stressed that BOAS Accreditation is not a legal requirement for boiler Operators or boiler operations Managers. It is a test of a person’s competence in relation to their current knowledge and experience at the time their assessment is completed. Although BOAS is recommended in BG01, it is only one possible component that may help an organisation to demonstrate fulfilment of their corporate responsibility under the Health and Safety at Work Act to provide suitable training for employees.

2.1.3 Pre-assessment training is not mandatory for people sufficiently knowledgeable; they can apply to a Training Provider for examination and assessment without attending a training course – see option 2 in section 3.1.1.

2.2 – Training Providers

2.2.1 The BOAS scheme recognises two categories of Training Provider licensed by the CEA as follows:

1. **Training Provider**: A Training Provider will normally be an organisation who shall either:
   a. Have, or have access to, the facilities (including an operational boiler and a classroom) to receive and train significant numbers of boiler operatives on a regular basis; OR
   b. Deliver on-site training on sites where there is access to a live boiler and suitable classroom facilities.

2. **Trainer**: This is an individual who may be retained by a Training Provider or work alone, and who can provide training either at a Training Provider’s location or on a customer’s site which includes an operational boiler plant and suitable classroom facilities.
2.2.2 Training Providers and independent Trainers (hereafter reference to Training Providers includes independent Trainers) are responsible for:

1. Receiving and vetting BOAS candidate applications and fees;
2. Recording the candidate’s evidence submission on the relevant form;
3. Requesting Assessors in advance of the course from the Assessment Body;
4. Delivery of the syllabus content to match the Learning Outcomes;
5. Organisation of the assessments and invigilation of the written examinations;
6. Providing all candidate’s documentation, checked as complete, including application form, evidence pack, completed examination papers etc. to the Assessor in good time to enable the Assessor to check the documentation and mark the written examination papers within the working day and prior to the oral examination;
7. Providing the Assessor with an adequate & suitable work station to carry out the tasks referred to in item 6 above;
8. Providing the Assessor with an adequate & suitable work station to carry out the oral interviews with the candidates on an individual and confidential basis.
9. Passing the completed candidate paperwork to the Assessment Body;
10. Assisting their candidates at every stage of the BOAS process;
11. Assisting their deferred candidates in achieving BOAS accreditation.

2.2.3 The CEA occasionally audit Training Providers and also require reporting of agreed KPIs at intervals throughout the year. ‘Yellow cards’ may be issued as a reminder to Training Providers who routinely do not follow the scheme requirements or consistently report low KPI scores. BOAS Training Provider Licences may be revoked at any time.

2.3 - The Syllabus and Learning Outcomes

2.3.1 The training syllabuses and Learning Outcomes (Appendix 3, 4, & 5) have been devised in consultation with the Health and Safety Executive, insurers, trainers and employers. They contain all those subjects in which a boiler operative or manager should have sound basic knowledge. It is expected that the Training Provider should focus particularly on aspects of health, safety and operation; other matters may be covered in less depth.

2.3.2 Whilst current guidance for shell type boilers is contained in INDG436 and BG01, there are many legacy sites which still have boiler controls and operational systems suited to PM5 or PSG2. The Training Provider must take this into account when delivering the course but should also refer the candidates to the advice contained in the current guidance with respect to these legacy sites.

2.3.3 BOAS training must always cover the whole syllabus and Assessors will assess candidates’ knowledge across the breadth of the syllabus. Under no circumstances should training be specifically tailored towards the topics arising in the question papers; the Assessor is expected to ask questions on subjects which are within the syllabus but not necessarily covered by the written examinations.
2.4 - Structure of Training

2.4.1 Table 1 details the recommended duration and location of training for each of the four categories and 5 year renewal course.

<table>
<thead>
<tr>
<th>Training</th>
<th>Recommended Duration of Training</th>
<th>Location of Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1</td>
<td>4 days incorporating a 1 day assessment</td>
<td>Training and all aspects of the assessment can usually be conducted at the Training Provider’s site.</td>
</tr>
<tr>
<td>Category 2</td>
<td>4-5 days incorporating a 1-2 day assessment</td>
<td>Training and all aspects of the assessment can usually be conducted at the Training Provider’s site.</td>
</tr>
<tr>
<td>Category 3</td>
<td>5 days incorporating a 1-2 day on site assessment</td>
<td>Not all Training Providers may be able to provide this training. Training may be performed on site.</td>
</tr>
<tr>
<td>Category 4</td>
<td>5 days incorporating a 1-2 day assessment</td>
<td>Training and all aspects of the assessment to be agreed between the Assessment Body and the Training Provider in advance.</td>
</tr>
<tr>
<td>Renewal</td>
<td>2 days incorporating a 1 day assessment</td>
<td>Training and all aspects of the re-assessment can usually be conducted at the Training Provider’s site, including Cat 3 unless the Assessor requires a site visit.</td>
</tr>
</tbody>
</table>

Table 1: Duration and location of BOAS training

2.4.2 The Training Provider determines the length of the course. They must allow sufficient time and facilities to deliver the syllabus content, invigilate the written examinations and allow the individual assessments to be completed. The Training Provider informs the Assessment Body in advance of the numbers of candidates and the categories being sought by those candidates to enable allocation of the correct number of appropriately qualified and approved Assessors.

2.4.3 Trainers will allow sufficient time at the end of each course to invigilate the exams and provide Assessors with a briefing on the candidates and the course just completed. Particularly, candidates who have had difficulty with the course material or who may require additional time in exams should be discussed, and specific exam protocols agreed and recorded on the Assessor’s report form.

2.4.4 Training for different categories in the same training course is strongly discouraged. Training Providers must make sufficient time available to allow the whole syllabus for each Category to be covered and this may not be possible within the normal course duration.

2.4.5 Training for Cat 4 International candidates will be decided by the Training Provider and the customer working together to ensure that candidates are fully prepared for BOAS assessment according to local requirements.

2.4.6 Training Providers will inform the Assessment Body at the start of every BOAS pre-assessment training course of the names and identities of the candidates who are attending on a form provided by the Assessment Body for that purpose.

2.5 - BOAS Five Year Renewal

2.5.1 BOAS Accreditation is valid for 5 years from the date of the original award when confirmed by the CEA Certification Officer. Renewal is required before this point if Accreditation is to be maintained. Renewed Accreditation is awarded on successful completion of the renewal examination and assessment, and is valid for a further 5 years. If BOAS is renewed up to 6 months early, before the original expiry date, the 5 years renewal period will start from the original expiry date.

2.5.2 There is no ‘grace period’ in relation to BOAS Accreditation but renewing candidates who have to wait for a short period before a suitable course is available will be allowed to continue as renewing
candidates. If a BOAS award lapses for more than 3 months the renewing candidate will generally be treated as a new candidate, and all examination papers must be successfully completed in the required category (or categories) in order to regain Accreditation.

2.5.3 There are three routes for renewing BOAS accredited Operators and Managers to follow:

a) If the renewing candidate believes that they do not require any further training or refreshing of knowledge or legislation issues, they could attend the written examination and oral assessment. These will be arranged with a Training Provider who is running a BOAS course, such that the candidate for renewal would join that course only at the end when the examinations and assessments are taking place.

b) The renewing candidate might wish to attend a complete BOAS course and go through the examinations and assessments as a new candidate.

c) The renewing candidate may attend a refresher course which a Training Provider may wish to offer, followed by the examinations and oral assessment.

2.5.4 In all three cases, the candidate will have to sit the renewal examination paper in the appropriate format followed by an oral assessment. Existing Operators who wish to upgrade to or add the Manager Accreditation to their BOAS Accreditation may do so at renewal on payment of the appropriate fees and passing the additional examination and assessment.

2.5.5 Training Providers will offer courses aimed at ensuring that the candidates have sufficient existing knowledge, providing an update of legislative changes over the past 5 years and reviewing key areas covered in initial training. Candidates for renewal will be expected to demonstrate to the Assessor their up-to-date knowledge of current legislation, guidance (BG01, BG04 etc.) and best practice.

2.5.6 All candidates seeking renewal must produce as evidence their previous BOAS Accreditation and I.D. card OR evidence of accreditation under another scheme deemed by the CEA to be an acceptable equivalent to BOAS Accreditation.

2.6 - Training Provider and Trainer Pre-requisites and Regulations

2.6.1 Any individual, including employees in suitable organisations, who wishes to be registered with the CEA for the provision of pre-assessment training for Operators and Managers of industrial and commercial boiler plant will be interviewed by a suitably experienced panel of CEA Officers and Members (excluding any currently practising Training Providers) and must meet the following pre-requisites:

A. The potential Training Provider (including Trainer in the rest of this section) must be a member of the CEA (either through their employer or as an individual member) and subscribe to its values.

B. The potential Training Provider’s business must be financially sound and without bad debt to the CEA. Should the finances of the Training Provider’s business deteriorate after appointment, the CEA Director must be notified immediately.

C. The potential Training Provider must attend an evaluation interview to demonstrate that they have the required competence, credibility and, where appropriate, facilities (i.e. suitable amenities, class room and access to live boiler plant) needed for the effective delivery and assessment of BOAS training.

D. The potential Trainers must provide their CV for review; this should provide evidence of the Trainer’s suitability, past experience and knowledge of relevant boilers. All potential Trainers will attend an evaluation interview. The CEA may require the evaluation interview to be conducted at the Training Provider’s site.
E. The potential Training Provider’s business must be recognised and well respected by the industry and CEA Council, and should ideally have been delivering industry recognised, high quality training in a related area for at least two years.

Sufficient evidence of non-BOAS training material, including any course hand-outs, must be supplied to the CEA as evidence of this high quality training. Training Provider’s own materials provided to the CEA will remain confidential.

F. The CEA must endorse any BOAS course materials compiled by the Training Provider before any pre-assessment training can commence. All pre-assessment training material will be treated confidentially and will be shared only with its originator.

G. The structure of the training course and assessment including the syllabus is owned by the CEA; the CEA and The Assessment Body together hold ownership of the examination papers. The Training Provider will be granted a licence to use this material for the duration of their appointment as a CEA Approved Training Provider provided that their CEA annual subscriptions and Training Provider licence fee have been paid. The licenced syllabus and examination papers shall be used for no other purpose than for the provision of BOAS courses. The CEA may, at any time, require the return of all BOAS materials of which it was the originator.

H. A Training Provider licence entitles the organisation or individual to deliver BOAS pre-assessment training. The fee for a Training Provider licence is set by the CEA from time to time and is subject to review and change – please see the CEA web site for the latest information or call the CEA office.

I. Copies of insurance documentation for Public Liability (PL) and Professional Indemnity (PI) must be supplied and approved to a level set by CEA Officers before any pre-assessment training can commence. The levels required are PL £5 million, PI £2 million. Evidence of continuing cover for the duration of the Agreement for PL and for 7 years thereafter for PI will be required.

Requests for exceptions to the above insurance requirements must be addressed to the CEA Director and be approved accordingly by the Training Committee, CEA Executive or Council.

There shall be no course of redress against the CEA or the Assessment Body by an employer of any BOAS certified Operator or Manager in the event that the employee creates a dangerous condition or causes a dangerous occurrence. Accreditation is based on how the candidate performed during the assessment process. The CEA or the Assessment Body cannot be held responsible for any non-approved acts that a candidate may carry out at any future date following BOAS training and assessment.

J. It is at the discretion of the CEA to award the potential Training Provider the right to provide BOAS pre-assessment training relating to any of the following three categories.
   a. Category 1 – Hot Water Boilers;
   b. Category 2 – Conventional Shell and Tube Industrial Steam Boilers;
   c. Category 3 – Water Tube Boilers.

K. The potential Training Provider (or their employing organisation) should have access to sufficient resources in order to be able to process a minimum of 30 candidates per year.

L. The potential Training Provider must supply at least one suitably experienced employee to contribute up to a total of 4 days per year towards the development of the BOAS scheme including contributions to the revision of the syllabus, handbook and scheme governance.

M. The CEA reserves the right to and will occasionally conduct audits on Training Providers to assess the services provided in relation to BOAS. The auditor will be independent and not be a current Training Provider.
N. The CEA requires the regular submission of Key Performance Indicator data from each Training Provider at timescales set and agreed by the BOAS Working Group.

O. The potential Training Provider will adopt the assessment and administration fee structure devised and published by the CEA and the Assessment Body, and will follow the requirements of the BOAS Handbook.

P. The Training Provider will provide the appointed Assessor(s) with candidate evidence packs and completed examination papers as required by the Assessor in sufficient time to enable the Assessor to commence review and marking as soon as practicable on the day before the formal interviews, and allocate suitable and confidential space for the Assessor to carry out these tasks.

Q. Trainer registration will be granted to an individual (whether employed by a suitable organisation or self-employed) and no substitution will be allowed without the prior knowledge and written approval of the CEA. Approved Training Providers may employ individual CEA Approved BOAS Trainers to deliver specific parts of the BOAS syllabus within the limits of their approval as set out in their letter of appointment.

R. A BOAS Training Provider licence is valid for 5 years and remains the property of the CEA. The CEA has the right to revoke the licence of any Training Provider or any of the Training Provider’s Trainers at any time.

S. The CEA logo and the BOAS Trade Mark may not be used by the Training Provider in any way other than in publications and other documents directly associated with the provision of CEA approved BOAS courses.

T. Granting of Training Provider licences is at the discretion of the CEA and its decision is final.

U. An Assessor may make an application for registration as a Trainer. Once licenced, any individual can train or assess any candidate providing they do not assess the candidates they train.

3 - Assessment Process

The assessment provides the opportunity for candidates to demonstrate their technical competence, practical experience and the approach required for the safe operation of industrial and commercial boiler plant. The whole assessment must be completed successfully to achieve BOAS accreditation, however there is no requirement for the training and assessment to be completed in one ‘sitting’, but if more than one ‘sitting’ is required this will probably incur additional costs.

3.1 - Structure of Assessment

3.1.1 The assessment comprises two distinct stages as follows: written examination and oral assessment. The assessment can be carried out in alternative ways:

- Option 1 – Following the end of a training programme undertaken at an approved training centre (Cat 1 & Cat 2) with the assessment carried out on site for Cat 3.

- Option 2 - For experienced candidates not requiring pre-assessment training, as a stand-alone assessment undertaken at an approved training centre (Cat 1 & Cat 2) or at the candidate's place of work for Cat 3.
• Option 3 - Following the end of a training programme undertaken at the candidate’s place of work (all Categories).

In all cases above, the candidate may opt to defer their assessment by agreement in advance with their Training Provider.

Whenever an Assessor is required to carry out their assessment on the candidate’s site there will be an additional charge.

3.1.2 Assessors will give candidates an indication of their assessment result at the end of their interview, but this will always be subject to their results in any exam papers that have not yet been marked and the final approval of the CEA Certification officer.

3.1.3 BOAS Assessors will work to the current version of the Assessment Manual published by the Assessment Body. The current issue of the manual takes precedence over details described in Appendices to this handbook which are provided for information only.

3.1.4 In exceptional cases where a Cat 3 candidate attends from an ‘offshore’ installation or outside the UK the Training Provider must notify the Assessment Body and the CEA at least two months in advance so that appropriate assessment arrangements can be made. Assessors have the right to request additional plant and operational information in the Evidence Pack (e.g. drawings, photographs etc.) in the absence of a site visit, and may defer the assessment result until the candidate has been able to provide the necessary information and assurances to allow the award of a BOAS certificate. The certificate will be annotated to say that an ‘on-site assessment’ was not carried out in this exceptional circumstance.

Written Examination
3.1.5 Candidates being assessed must sit examination papers during or towards the end of their training course so that the Assessor may mark the papers prior to conducting the oral assessments. For Cat 3 candidates, all papers must be passed prior to on-site assessment. Experienced candidates falling under ‘option 2’ as above are required to sit all papers.

3.1.6 The papers consist of a mixture of questions requiring descriptive and multiple-choice answers on all aspects of boiler house operation. The candidate must record the time of starting and finishing each exam on the front of the examination paper. The examinations can be sat at the Assessment Body’s premises in Cheltenham, or at any CEA office or approved training centre.

3.1.7 The Assessment Body will issue the Training Provider or Trainer with the current examination for the relevant Categories of assessment. Examinations may be compiled from a pool of suitable questions that are changed on a regular basis, and the examinations to be used will be randomly rotated by the Assessment Body.

3.1.8 The Assessor is expected to ask the candidate to provide verbal answers to questions that they have not answered correctly, and the successful completion of those questions may give the Assessor sufficient evidence that he can award a pass for that examination. If the Assessor is not satisfied with the oral answers he may require the candidate to re-sit that examination at a later date. Candidates that are unable to meet the required pass mark for more than one examination will be interviewed by the Assessor but will also be required to re-sit the relevant examinations at a later date. A further interview after the re-sits is at the Assessor’s discretion.

Invigilation of BOAS examinations
3.1.9 It is essential for the credibility of the BOAS scheme that all examinations are taken under controlled conditions. Candidates are expected to be sat sufficiently far apart to prevent them easily viewing other candidates’ exam papers, and all BOAS exams are ‘closed book’ meaning that all sources of reference material, whether paper, verbal or electronic are prohibited during the examination. Exam papers must be clearly annotated with the candidate’s name and the start and finish times. All exam papers are to be handed back to the invigilator at the end of the allotted time.
Candidates who declare a need for assistance or more time during the exams are to be examined in accordance with the rules in Appendix 10.3.

3.1.10 Invigilators will normally be the course Trainer. Training Providers are required to ensure that all BOAS Examinations are invigilated correctly and robustly. Other staff from a training centre or staff from a customer site may be asked to invigilate, but they must be properly briefed by the Trainer beforehand.

Invigilators are responsible for:
- familiarising themselves with BOAS requirements relating to assessment activities that they invigilate;
- briefing candidates on the requirements and conditions that apply to the assessment activities that they invigilate;
- supervising candidates whilst they are undertaking written assessment activities such as multiple choice examinations and assignments;
- the conduct and integrity of all assessment activity that they invigilate;
- accurately observing and recording the time allotted for the assessment activity;
- ensuring that all assessment documents and candidate answer documents are collected immediately after the assessment and handed to the relevant Assessor.

Re-sits

3.1.11 Up to 90 days after their initial assessment candidates may re-sit any papers up to a total of three times but each re-sit of each paper will entail a fee. Beyond this would require a full re-sit of all papers as a new candidate, and in this circumstance it is strongly recommended that such candidates undertake further training. **All exam re-sits must be advised to and authorised by the Assessment Body** – a charge will apply.

3.1.12 Re-sits may not be taken on the same day as the original examination. If necessary and time permits, a paper may be re-taken a day after the first attempt and before the Assessor carries out the interview; otherwise they must be re-taken at a later date and may require another interview to be arranged. The candidate must not be informed which questions were incorrectly answered but may be allowed private revision time away from other candidates if this facility is available.

3.1.13 A re-sit of examination papers may require another interview at the Assessor’s discretion, but the candidate will be advised of this at their assessment interview. Candidates wishing to defer resits beyond 90 days must obtain approval from the Assessment Body prior to the expiry of this period.

3.1.14 Re-sits can be undertaken at an approved Training Provider’s premises or at a candidate’s own workplace, subject to the availability of a suitable location and an invigilator for the examination. The latter option may attract an administration fee for an on-site invigilator to be provided. The Assessor will then mark the examination paper and re-interview the candidate if necessary – additional re-assessment charges will apply.

3.1.15 In the case of Cat 3 candidates the on-site interview must normally be completed within 90 days of passing the written papers. Beyond this time the candidate will be required to re-sit both the written assessment and on site interview as a new candidate.

Oral examination

3.1.16 The assessment interview, which typically takes 45 minutes for Cat 1 & Cat 2, is carried out on a one-to-one basis at the Training Provider’s or candidate’s site on the nominated assessment date. It is led by an approved BOAS Assessor who has extensive general knowledge of safe and efficient combustion and the safe operation of boiler plant. Their primary aim is not to find faults but to be confident that they have allowed each candidate the opportunity to give a full account of their knowledge, skills and experience.

3.1.17 The assessment investigates a candidate’s knowledge of legislation and best practice rather than of the actual practices adopted on the plant that they operate. In cases where an Assessor identifies unsafe or inappropriate practices during the assessment interview the candidate will be
expected to show an insight into these and answer the questions in accordance with best practice. The Assessor will request that the candidate illustrates how they will bring the shortfalls to the attention of their management.

3.1.18 The interview will include a review of marked papers and the evidence pack/work experience records in order to verify the candidate’s practical expertise. The Assessor may not be familiar with the candidate’s plant but will base his assessment around answers to the written examination questions, especially those that do not clearly demonstrate understanding of the topic or may not have been answered in accordance with the model answer. This approach enables the Assessor to ensure that the knowledge and understanding of the candidate is the basis of the Accreditation decision rather than the candidate’s written communication skills.

3.1.19 The BOAS assessment process requires proficiency in both written and spoken English, and in particular familiarity with the English words for boiler specific terms. Lack of proficiency in English may result in candidates being deferred at the assessment regardless of their technical capabilities and knowledge.

3.1.20 The Assessor has the right to assess any candidate in a live boiler situation, and this is likely in the instance of the largest steam plant and is mandatory for Cat 3, and may take 1-2 hours to complete.

3.1.21 The Assessor is expected to mention and record any deficiencies in a company’s procedures and processes when identified during the candidate’s assessment. The Assessor may state that the candidate has failed to provide enough evidence to demonstrate competence in boiler operation and will defer completion of the assessment until the appropriate documentation is received. In cases of imminent danger the candidate will be advised to discuss the matter with his Manager immediately on return to work, and the Training Provider will set out the Assessor’s requirements for later re-assessment of the candidate.

3.1.22 Model answers (Rationales) to the examination questions and oral questions will be provided by the Assessment Body based on agreement between Assessors at their regular meetings. The model answers will be controlled and reviewed from time to time as appropriate.

3.1.23 Assessors must hand back or send all the evidence, marked exams and their completed candidate report form to the Training Provider without delay so that the Training Provider may follow up any issues on deferred candidates and forward completed assessment reports to the Assessment Body without delay. Assessors will send course report forms direct to the Assessment Body under separate cover.

### 3.2 – Appointment of Assessors

3.2.1 Any individual, including employees in suitable organisations, who wishes to be registered with the CEA as an Assessor for Operators or Managers of industrial and commercial boiler plant will be interviewed by a suitably experienced panel of CEA Officers and Members and must meet the following pre-requisites:

A. Assessors will be employed by the Assessment Body, the independent body appointed by CEA to oversee the BOAS scheme. The potential Assessor must be a member of the CEA, either through their employer or as an individual member, and subscribe to its values.

B. The potential Assessor must provide their CV for review; this should provide evidence of the candidate’s suitability, past experience and knowledge of relevant boilers.

C. The potential Assessor must attend an evaluation interview to demonstrate that they have the required competence and credibility to assess BOAS candidates.

D. It is at the discretion of the CEA to award the potential Assessor the right to assess candidates relating to any of the following three categories:
a. Category 1 – Hot Water Boilers;
b. Category 2 – Conventional Shell and Tube Industrial Steam Boilers;
c. Category 3 – Water Tube Boilers
Assessors required to assess Cat 4 (IBOAS) will already be approved to assess the relevant Category from the list above.

E. The potential Assessor will be expected to contribute up to a total of 2 days per year towards the development of the BOAS scheme including contributing towards revising the syllabus, handbook and scheme governance, and to attend the regular Assessor CPD meetings.

F. The CEA reserves the right to audit any Assessor in relation to BOAS, and to withdraw their approval as an Assessor.

G. An Assessor may make an application for registration as a Trainer. Once licenced, any individual can train or assess any candidate providing they do not assess the candidates they train.

### 3.3 - Deferred Assessment

3.3.1 In some circumstances it is recognised that a candidate may not wish to undertake the BOAS pre-assessment training and assessment in one sitting. Here it is the duty of the Training Provider to evaluate the circumstances to ensure this is the most appropriate course of action for the candidate and to make the appropriate recommendation to the Assessment Body.

3.3.2 Candidates may elect to have their Assessment deferred by discussion with their Training Provider.

### 3.4 - Deferred Result

3.4.1 When an Assessor is considering deferring a candidate he must inform the Training Provider why the candidate was unable to satisfy the Assessor during the interview. Training Providers are to assist candidates in gaining accreditation where further training is required or examinations are to be re-taken, for example.

3.4.2 It is recognised that a candidate may not be able to achieve BOAS Accreditation in one sitting. Where the candidate attends training and passes the written assessment but does not demonstrate to the Assessor during interview the required practical experience, the Assessor (and ONLY the Assessor) has the authority to defer completion of the assessment.

3.4.3 When a candidate is deferred, the Assessor records on his Candidate report form the reasons for deferral and the additional actions required to award a pass. These will include one or more of the following items:

   a) Examination(s) not passed – re-sit required, specify which exams – additional charges will apply;
   b) Oral Interview not passed – re-interview required – specify timescale - additional charges will apply;
   c) Evidence of boiler operations not provided – specify which items must be supplied by the candidate and by when;
   d) Experience of boiler operations insufficient – specify how long and who validates this (Manager, Supervisor etc.);
   e) Candidate ID not proved – specify missing documents.
3.4.4 Some of the more common reasons for deferral require the submission of the following information:

a) A statement from the employer confirming that the candidate has been working regularly in the boiler house under the guidance and supervision of a competent colleague, or, in the case of a Manager, routinely supervising the work of others.

b) Evidence that has been countersigned by a more senior employee (supervisor, manager etc.).

c) Evidence that the candidate has undertaken standard daily and weekly safety checks on the boiler. This would typically be signed extracts from the boiler house log book, and extracts from the relevant procedures against which these checks have been conducted.

d) If applicable, evidence of the candidate having responded to boiler alarm conditions and the actions he/she undertook (e.g. log book entries).

e) If applicable, confirmation that the candidate has participated in the preparation of a boiler for annual inspection or maintenance.

f) In the case of Managers, evidence of the candidate supervising the above tasks and managing other relevant parts of the safe and efficient operation of the boiler house.

3.4.5 Assessors may also defer candidates if the site specific data (the Evidence Pack and supporting documents) is incomplete, and any deficiencies must be rectified within 6 months of original assessment in order for the BOAS Certificate to be awarded. The candidate will be advised verbally and in writing of the steps necessary to gain accreditation, and the Training Provider will write to the candidate’s employer to advise them of those necessary steps, and send a copy of the letter to the Assessment Body.

The Training Provider will remind employers one month before the end of the 6 month period for providing the necessary information to allow a BOAS Certificate to be awarded, and if the required information is not submitted on time it will be assumed that the candidate no longer requires BOAS accreditation.

3.5 - Renewal

3.5.1 The BOAS Renewal process is similar to the original qualification in that the renewing candidate may wish to take advantage of training offered by CEA approved Training Providers and will be required to attend a suitable location for examination and assessment.

Cat 3 renewals will usually be assessed at the examination centre, not on site, unless the Assessor has specific reasons to request a site visit.

3.5.2 There are 2 options for examination depending on the candidate’s wish to take either the Operator renewal examination or the Manager renewal examination.

At renewal, if a candidate wishes to renew more than one category i.e. Cat 1 and Cat 2 they must:

a) select a trainer who can deliver the relevant parts of the two syllabuses (both types of boiler required for practical elements);

b) provide clear evidence of operation/management of relevant plant in each category;

c) take two renewal exams, one for each category);

d) pay the additional examination and certification fees;

e) demonstrate to the Assessor at an extended interview that they have sufficient competence in each category.

3.5.3 The same process would apply for renewal of Cat 2 + Cat 3 and the assessment is at the examination centre unless the Assessor requires a site visit.
### 3.6 – Change of Award (by category or classification)

#### 3.6.1 Existing Operators wishing to upgrade to Manager at any point in time will be asked to take the current Manager examination in the relevant Category and attend an assessment, and be asked to pay an additional fee for re-certification. They will be required to attend a suitable training location for examination and assessment. Assessment will be on site for Cat 3. The Candidate Evidence Pack will need to be updated in advance of the examination and assessment process. The BOAS certificate will be renewed and will expire at the 5 year anniversary of the original award.

#### 3.6.2 Existing Operators wishing to apply for a dual award at any time will take the Manager examination and Assessment and be asked to pay an additional fee for dual certification. They will be required to attend a suitable training location for examination and assessment and be assessed on site for Cat 3. The Candidate Evidence Pack will need to be updated in advance of the examination and assessment process. The BOAS certificate will be renewed and will expire at the 5 year anniversary of the original award.

#### 3.6.3 Changing from one category to another (whether before or at renewal) requires the candidate to take the relevant examinations (Operator or Manager as appropriate) in the new category and pass an oral assessment. Additionally, all changes of category or adding new categories require the candidates to provide a complete evidence pack for the new or additional category.

#### 3.6.4 - CHANGE OF CATEGORY AT ANY TIME (whether before or at renewal)

<table>
<thead>
<tr>
<th>Current award</th>
<th>Cat 1</th>
<th>Cat 2</th>
<th>Cat 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cat 1</td>
<td></td>
<td>Take current Cat 2 examinations* and pass oral assessment</td>
<td>Take current Cat 3 examinations* and pass oral assessment at site</td>
</tr>
<tr>
<td>Cat 2</td>
<td>Take current Cat 1 examinations* and pass oral assessment</td>
<td></td>
<td>Take current Cat 3 examinations* and pass oral assessment at site</td>
</tr>
<tr>
<td>Cat 3</td>
<td>Take current Cat 1 examinations* and pass oral assessment</td>
<td>Take current Cat 2 examinations* and pass oral assessment</td>
<td></td>
</tr>
</tbody>
</table>

* - Operator or Manager Paper as appropriate

Note: Assessment for more than one category will require the candidate to take and pass all examination papers in the numerically higher category plus a paper in the numerically lower category, and to be assessed for both categories at an extended oral interview. Lapsed awards exceeding 5 years will require a new BOAS Application.
### 3.6.5 - CHANGE OF GRADE BEFORE RENEWAL

<table>
<thead>
<tr>
<th>Current award</th>
<th>Change to</th>
<th>Operator</th>
<th>Manager</th>
<th>Dual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Current award</td>
<td>take current Manager examination* and pass oral assessment (on site if Cat 3)</td>
<td>take current Manager examination* and pass oral assessment (on site if Cat 3)</td>
<td></td>
</tr>
<tr>
<td>Manager</td>
<td>take current Operator examination* and pass oral assessment (on site if Cat 3)</td>
<td></td>
<td>take current Operator examination* and pass oral assessment (on site if Cat 3)</td>
<td></td>
</tr>
<tr>
<td>Dual</td>
<td>No change</td>
<td>No change</td>
<td></td>
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</tr>
</tbody>
</table>

* - Examination papers must relate to the chosen Category

### 3.6.6 - CHANGE OF GRADE AT RENEWAL

<table>
<thead>
<tr>
<th>Current award</th>
<th>Change to</th>
<th>Operator</th>
<th>Manager</th>
<th>Dual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>Current award</td>
<td>take current renewal examination and pass oral assessment</td>
<td>take both current renewal examinations and pass oral assessment*</td>
<td></td>
</tr>
<tr>
<td>Manager</td>
<td>take current renewal examination and pass oral assessment</td>
<td></td>
<td>take both current renewal examinations and pass oral assessment*</td>
<td></td>
</tr>
<tr>
<td>Dual</td>
<td>take current renewal examination and pass oral assessment</td>
<td>take current renewal examination and pass oral assessment</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* - oral assessment on site for Cat 3 when upgrading at renewal

NOTE: Change of grade will require additional documented evidence to be provided

### 3.7 – Fees

#### 3.7.1 Fees

The current fees for BOAS application, examination and assessment are available on the CEA web site or on application to the CEA offices or to any BOAS Training Provider. Training charges are set by the Training Providers.

#### 3.7.2 BOAS Assessment and CEA Administration fees depend on the accreditation being sought:

**Assessment fees:**
- Cat 1 or Cat 2: Assessment at the Training Provider’s premises – ‘off-site’
- Cat 1 or Cat 2: Assessment at the Candidate’s work premises – ‘on-site’
- Cat 3: Assessment at the Candidate’s work premises – ‘on-site’
- BOAS Renewal Assessments as per the above categories
- Additional category Assessments
- Examination re-sit fees
Assessment fees cover the costs of administration of the assessment process and deployment of a qualified Assessor to anywhere on the UK mainland and Northern Ireland. Deployment of Assessors to locations outside of this geographic area may attract charges to cover the additional expenses involved.

CEA Administration fees in addition to the above:

- Single certification (Operative or Manager)
- Dual certification (Operative AND Manager)

Re-sits and Deferred candidate re-interviews:

Examination re-sits will incur an administration charge that will be collected by the Training Provider on behalf of the Assessment Body. Where candidates are to be re-interviewed by the Assessor this will incur an administration charge that will be collected by the Training Provider and be payable to the Assessment Body.

3.7.3 The figures are periodically reviewed and are subject to change.

3.7.4 The fees stated above shall be collected on behalf of the independent Assessment and Accreditation bodies by the Training Provider in addition to their fee for the provision of a BOAS approved training course if required.

3.7.5 Training and assessment can be conducted at a candidate’s site and this may incur additional cost.

4 - Registration Process

The BOAS assessment process is designed to determine whether a candidate can demonstrate at the time of assessment competence as either a boiler Operative or/and as a boiler house Manager. The Assessment Body submit an Assessment Report on each and every candidate to the CEA Certification Officer. This summarises the evidence collected (including the application paperwork, evidence of experience and written and oral examination results) and gives the Assessor’s recommendation for the candidate based on the evidence collected. Based on this summary and recommendation the CEA Certification Officer makes the certification decision.

The CEA Certification Officer as he determines to be necessary has the right and responsibility to request from the Assessment Body the detailed evidence upon which the Assessment report is based, including application forms, completed examination papers, log book and evidence of experience, etc. This additional level of scrutiny will be applied to a random selection of assessments and any assessments with regards to which the Certification Officer identifies concerns.

It is essential that the Training Providers provide all candidate supporting information to the Assessment Body.
4.1 - Certificates of Achievement

4.1.1 Successful Operator and Manager candidates will receive a certificate of achievement confirming their BOAS Accreditation, valid for five years, together with an identification card. This documentation will indicate the categories of boiler plant for which the candidate has been Accredited. Accreditation starts from the date the CEA Certification Officer validates the completed assessment paperwork for each candidate and runs for 5 years from that date.

4.1.2 It is important to note that the Accreditation is awarded to the candidate who has undergone assessment and does not imply any approval or otherwise of activities in his employer’s organisation.

4.1.3 Successful candidates will be eligible to use the designations ‘Certified Industrial Boiler Operative’ (CertIBO) in the case of Operators and ‘Diploma in Boiler plant Operation Management’ for Managers (DipBOM).

4.1.4 Certificates and ID cards will lapse after 5 years and renewal is required if certification is to be extended for a further 5 years. Should the individual not wish to make an application for renewal of their BOAS Accreditation at the end of the 5 year period, their certificate and identification card must be returned to the CEA Director on expiry.

4.2 - Additional Benefits

Successful candidates will qualify for one year’s free (non-corporate) membership of the Combustion Engineering Association and will receive an electronic copy of the CEA ‘Guide to Steam Plant Operation’.

4.3 - Appeals and Complaints Procedure

4.3.1 Candidates who feel that they have not been fairly assessed or have another complaint about the BOAS process should contact the Head of Training at the Assessment Body in writing for an initial review within 1 month of their assessment. The Assessment Body will undertake a review of the candidate’s assessment file and provide a report within one further month.

4.3.2 Where an appeal application is reviewed and found to be potentially valid, the Assessment Body and the CEA will discuss the appeal at one of the allocated appeal hearing days scheduled throughout the year. The appeal will then be heard by a panel consisting of a senior member of the CEA (e.g. Chairman, Certification Officer, Chair of the Training Committee) and a senior member of the Assessment Body staff (e.g. General Manager, Technical Director, Head of Training) and at least one other senior and relevant additional person. The appellant may ask to be present to submit evidence, and the appellant may be accompanied by his employer or manager if necessary.

Attendance by the appellant at the appeal is not mandatory, and not attending will not influence the panel’s decision.

4.3.3 The decision of the appeal panel will be made available to the appellant within 10 working days of the hearing.

4.3.4 A further appeal is possible to the Director of the CEA within 1 month of the Assessment Body appeal panel report being issued. The decision of this appeal will be final.
# Appendix 1 – Candidate Application Form

**BOILER OPERATION ACCREDITATION SCHEME APPLICATION**

**MANDATORY INFORMATION** – Complete all unshaded boxes in block capitals

## BOAS CANDIDATE’S PERSONAL DETAILS

<table>
<thead>
<tr>
<th>Field</th>
<th>Details</th>
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<tbody>
<tr>
<td>Surname</td>
<td></td>
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<tr>
<td>Forename(s)</td>
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<tr>
<td>Date of Birth</td>
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<td>Home Address</td>
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<td>e-mail</td>
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</table>

**Attach ID Card Photo here.**

Please ensure that it is either glued or stapled such that the staples are not actually on the image.

**PLEASE WRITE YOUR NAME ON THE BACK OF LOOSE PHOTOGRAPHS.**

The Assessor will verify the likeness of the photograph and candidate’s signature.

The identity of the Candidate will be checked by the Assessor. Formal identification of photo likeness will be by passport, driving licence or currently valid photographic identity card (such as a BOAS ID card).

Confirmation of the candidate’s address will be by a different document to that listed above, including council tax demand or utility bill (must be less than 6 months old), or driving licence.

Any queries regarding identity checks must be directed to the Assessment Body for clarification.

## BOAS CANDIDATE’S EMPLOYER DETAILS

<table>
<thead>
<tr>
<th>Field</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candidate’s Position in Company</td>
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<tr>
<td>Employer</td>
<td></td>
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<tr>
<td>Address</td>
<td></td>
</tr>
<tr>
<td>Candidate’s Manager’s Name and Position</td>
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<td>Office Telephone</td>
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<tr>
<td>Manager’s Mobile</td>
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<tr>
<td>Manager’s e-mail</td>
<td></td>
</tr>
</tbody>
</table>
BOILER OPERATION ACCREDITATION SCHEME APPLICATION
MANDATORY INFORMATION – Complete all unshaded boxes in block capitals

YOUR APPLICATION CANNOT BE PROCESSED WITHOUT A COMPLETED EVIDENCE PACK

**BOAS APPLICATION CATEGORY** - tick below or add details as required

<table>
<thead>
<tr>
<th>Operator</th>
<th>Manager</th>
<th>Dual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renewal of Operator Accreditation – give existing cert no. and date of expiry</td>
<td></td>
<td>awarded only in exceptional circumstances</td>
</tr>
<tr>
<td>Renewal of Manager Accreditation give existing cert no. and date of expiry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upgrade from existing Operator to Manager - give existing cert no. and date of expiry</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TRAINING PROVIDER NAME

**CATEGORY OF PLANT APPLIED FOR**

Please apply for the category of plant for which you seek qualification. You may apply for more than one category if relevant to your needs, but this requires additional evidence of experience and will incur additional cost. Please ensure that the Approved Training Provider you choose can offer training on your chosen category / categories.

<table>
<thead>
<tr>
<th>Category 1</th>
<th>Hot Water Boilers at any pressure &amp; temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional shell type hot water boilers. The training and all aspects of the assessment can usually be carried out on the Training Provider’s site.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category 2</th>
<th>Shell-type Industrial Steam Boilers</th>
</tr>
</thead>
<tbody>
<tr>
<td>The training and all aspects of the assessment can usually be carried out on the Training Provider’s site.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category 3</th>
<th>Water Tube Boilers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment will take place at the candidate’s place of work where the plant is located. Training may also be performed on site, but please note that this may entail extra costs.</td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**

I consent to all personal information provided in this form to be used for the sole purpose of BOAS. Data Protection Act. The Assessment Body will hold your details in accordance with the Data Protection Act 1998. Data will be used for Training and Accreditation purposes as part of the scheme requirements. Information relating to Operative/Manager competence and registration will be available to the public or any other parties with a legitimate interest. All documentation provided by BOAS candidates will be destroyed after the 6th year anniversary of their accreditation unless a candidate has renewed when their details will be retained for a further 6 year period.

This fully completed form must returned together with your purchase order and/or payment to your Training Provider who will include in their invoice the Assessment Body fees and CEA Administration fees as shown on the CEA website.

**Medical or Special requirements:** Should you have any medical condition that may affect the way you work or the assessment process or any other special requirements please provide details on a separate sheet.

<table>
<thead>
<tr>
<th>Candidate’s Signature on application</th>
<th>Date</th>
</tr>
</thead>
</table>
Appendix 2 – Candidate Evidence Pack

Candidate Name

Candidate Registration #
(CEA Office use)

BOILER OPERATION ACCREDITATION SCHEME EVIDENCE PACK
MANDATORY INFORMATION – Complete all boxes in block capitals

Important Information – Please read before submitting your application.

The Boiler Operation Accreditation Scheme (BOAS) is intended to give Accreditation to persons who already have experience of boiler operation. CEA-approved BOAS courses are not intended to train persons with limited experience or those new to boiler plant. We recommend that before being assessed a candidate should have been operating boilers or managing boiler houses as part of their daily duties for a minimum period of six months or 100 boiler operational hours, and all evidence must span at least this timescale. If you are inexperienced, the CEA-approved BOAS Training Providers will be able to offer a suitable foundation course which, in conjunction with instruction from the boiler manufacturer, will enable you to safely operate your boiler plant under the guidance of a competent and experienced colleague.

Should you feel that you have sufficient experience to not require training, we would still recommend that you undertake the BOAS course by way of ensuring that you are up-to-date with current legislation and recognised best working practices. Similarly, if you hold a formal boiler operating qualification which is more than five years old, the BOAS training course should be undertaken to ensure up-to-date knowledge. Without the recommended level of prior experience you are likely to find the BOAS training and assessment process excessively onerous and you are unlikely to pass the examinations and assessment at the first attempt.

The BOAS assessment process requires proficiency in both written and spoken English, and in particular familiarity with the English words for boiler specific terms. Lack of proficiency in English may result in candidates not passing the assessment regardless of their technical capabilities and knowledge.

This evidence gathering form must be used both for new applications and renewals. In the case of renewals the original certificate number and date of expiry must be stated on your application form. Renewal candidates whose qualification was gained before the BOAS qualification was awarded for either Operatives or Managers should now choose the appropriate category, and seek dual qualification only when essential.

If you do not have the recommended level of experience, it is important that you discuss this with the CEA before making an application. Please call the CEA on 01740 625538 and they will be able to suggest foundation courses available from CEA-approved Training Providers which are appropriate for your needs.

BOAS accreditation is personal to the candidate. The assessment is not a judgment of the candidate’s particular site or the plant with which they work. It is to ensure that they are fully aware of how that site and plant should operate. However, if the Assessor uncovers an issue which is considered dangerous, unsafe, or potentially illegal the candidate should be informed, asked for their view on the matter, and give some reassurance that the matter will be raised to management level when the candidate returns to work. The Assessment Body will write to the candidate’s manager to inform them of the Assessor’s findings.

If you are responsible for a number of sites (Boilermaker Service Engineer, Project Commissioning Engineer etc.) it is only necessary for you to complete the Evidence Pack in respect of one site (preferably the largest). Managers need to provide evidence of tasks they have personally supervised or organised. Applicants who manage boiler houses on behalf of clients where confidentiality is required (such as contract energy management and contract maintenance organisations) should provide copies of their service or maintenance records with the boiler/site owner’s details blanked out.
In order to verify that you have the required level of experience, please state below the nature of boiler with which you are now working (please give the highest pressure and largest output if more than one)

### Hot Water

<table>
<thead>
<tr>
<th>Rating</th>
<th>MW input</th>
<th>Temperature</th>
<th>°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience</td>
<td>Years</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Steam

<table>
<thead>
<tr>
<th>Pressure</th>
<th>bar [g]</th>
<th>Rating</th>
<th>kg/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience</td>
<td>Years</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please list here any relevant qualifications that you hold

---

**DECLARATION**

- I understand that in making this application, should I give false or misleading information the CEA may withdraw or cancel BOAS ID cards and certificates.
- I confirm that I have the appropriate experience to be assessed immediately or upon completion of the BOAS training course.

**I would like to defer my assessment to a later date** (optional)  

**Proposed date**
As part of the application AND renewal processes, this document must be completed prior to attending the training course, to be made available for both the Training Provider and the Independent Assessor for their review. Please provide the information below that is relevant to your type of plant, the type of work you do, and the BOAS Category for which you are seeking Accreditation.

If the Assessor is not provided with sufficient documentation to demonstrate that your boiler plant is currently operated or managed in a safe manner the assessment may not be completed. You may, if you wish, bring additional material (such as company procedures that you have not provided in your evidence pack) to the assessment interview to show the Assessor. If your current operating practices or procedures are, in the opinion of the Assessor, not safe or not to the required best practice standard, you will be expected to discuss how your current procedures may be brought up to the required standard and explain how you will bring this to the attention of your site management. The Assessment Body is required to report any clear breaches of legal requirements or obvious matters of unsafe operation to your employer.

Candidates are NOT expected to submit huge volumes of company procedures, manuals and drawings; the object of the evidence gathering exercise is for the Assessor to view a small but representative selection of the candidate’s own work and gain an understanding of how they operate or manage their boilers. BOAS is awarded to the candidate, not their employer, so requires evidence of personal involvement, not reams of corporate paperwork.

A maximum of 20 sheets of relevant evidence per candidate is required. The Evidence Pack requires that you provide specific details of your boiler plant, as well as information on the distribution system and the process equipment as appropriate. This is required for three main reasons:

- Firstly, the exercise of gathering the information is part of the training process itself;
- Secondly, the information provided may enable the Training Provider to identify detail of your plant which warrants specific attention during the training process;
- Thirdly, it will enable the Independent Assessor to understand and therefore discuss your own plant.

If you are responsible for a number of sites (Service Engineer, Commissioning Engineer, Boiler Inspector etc.) it is only necessary for you to complete the Evidence Pack in respect of one site you work on, preferably the largest.

Please note the documents which are required to be provided in support of your application. Each candidate is expected to present a CV and other documents with details of the work that they personally have undertaken in the boiler house and around the Distribution system. These will be used as a discussion point during the oral assessment. Applicants who operate boiler houses on behalf of clients where confidentiality is required (such as contract energy management and contract maintenance organisations) should provide copies of their service or maintenance records with the site owner’s details blanked out.

It is recognised that not all sites may operate to the expected standards, and if any document is not available please put N/A in the tick box. You should, however, understand that by the time you are assessed you will be expected to discuss some of these with the Assessor. You should provide at least three examples of the documents under the Previous Work Experience category. Training Providers will keep copies of the evidence provided by each candidate for sending to the Assessor and subsequently filing with the Assessment report and exam results. All other evidence will be returned to the candidate for them to keep. All candidates, whether for Operator or Manager qualification and both for initial Accreditation and renewal, should provide copies (NOT ORIGINALS) of the following documents.
### Mandatory Documents – Operator

<table>
<thead>
<tr>
<th>Document Description</th>
<th>Tick here if provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brief CV for candidate (one page): this CV should demonstrate the candidate’s current role in relation to boiler plant.</td>
<td>✓</td>
</tr>
<tr>
<td>Company organisation chart to show candidate’s line management.</td>
<td></td>
</tr>
<tr>
<td>Schematic diagram of plant or boiler house equipment from water ‘in’ to steam (or water) ‘out’, hand drawn ideally, including water treatment plant. (see example below)</td>
<td></td>
</tr>
</tbody>
</table>

### Demonstrable Appropriate Previous Work Experience – Operator

Operators should be able to provide sufficient copies of at least three of the documents listed below to demonstrate at least 6 months operational experience with their boilers.

<table>
<thead>
<tr>
<th>Document Description</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Records of functional tests of limiters &amp; controls carried out by the Operator at all specified frequencies and in the specified manner, and signed by the Operator.</td>
<td></td>
</tr>
<tr>
<td>Records of the Operator carrying out the recommended water quality tests and routine water treatment activities, with records of making adjustments where necessary, signed by the Operator.</td>
<td></td>
</tr>
<tr>
<td>Records of daily boiler house and equipment checks undertaken by and signed by the Operator.</td>
<td></td>
</tr>
<tr>
<td>Written start-up procedure/shut-down procedure for boilers, with evidence of this being carried out by the Operator.</td>
<td></td>
</tr>
<tr>
<td>Procedures for and records of the Operator responding to alarms and taking appropriate action.</td>
<td></td>
</tr>
<tr>
<td>Completed boiler house safety check carried out and signed by the Operator.</td>
<td></td>
</tr>
<tr>
<td>Service report, commissioning record or maintenance report for work personally carried out on the boiler and signed by the Operator.</td>
<td></td>
</tr>
</tbody>
</table>

If you have any questions concerning evidence requirements please contact your chosen Training Provider in the first instance. Copies of electronically stored data that is printed out and countersigned by your supervisor are acceptable.

In exceptional circumstances where assessment of Cat 3 candidates from outside the UK cannot be undertaken on site, the candidate must provide additional details of their plant including detailed drawings of the pipework and main components, and photographs showing the layout of the plant and the main operational and safety items.
The log sheets and records should be on company headed paper legibly signed by the manager candidate as being their own work; please tick to confirm that they are included with the application:

**Mandatory Documents – Manager**

<table>
<thead>
<tr>
<th>Document</th>
<th>Tick here if provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brief CV for candidate (one page); this CV should demonstrate the candidate's current role in relation to boiler plant.</td>
<td>✓</td>
</tr>
<tr>
<td>Company organisation chart to show candidate’s line management and subordinates</td>
<td></td>
</tr>
<tr>
<td>Schematic diagram of plant or boiler house equipment from water ‘in’ to steam (or water) ‘out’, hand drawn ideally, including water treatment plant. (see example below)</td>
<td></td>
</tr>
</tbody>
</table>

**Demonstrable Appropriate Previous Work Experience – Manager**

Managers should be able to provide sufficient copies of at least three of the documents listed below to demonstrate at least 6 months operational experience in managing their boiler house.

<table>
<thead>
<tr>
<th>Document</th>
<th>Tick here if provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>Records of functional tests of limiters &amp; controls and daily boiler house and equipment checks carried out by their Operators at all specified frequencies and in the specified manner, validated by the Manager.</td>
<td></td>
</tr>
<tr>
<td>Records of their Operators carrying out the recommended water quality tests and routine water treatment activities, with records of making adjustments where necessary, validated by the Manager.</td>
<td></td>
</tr>
<tr>
<td>Written start-up procedure/shut-down procedure and emergency procedure for the boilers written or approved by the manager, with validated evidence of this being carried out by their Operators.</td>
<td></td>
</tr>
<tr>
<td>Procedures for and records of their Operators responding to alarms and taking appropriate action, and the Manager checking them.</td>
<td></td>
</tr>
<tr>
<td>Completed boiler house safety check or audit carried out by or counter-signed by the Manager.</td>
<td></td>
</tr>
<tr>
<td>Boiler house risk assessments or permits for work written or approved by the Manager, with actions taken.</td>
<td></td>
</tr>
<tr>
<td>Evidence of compliance with relevant legislation by the Manager such as PSSR or environmental permits.</td>
<td></td>
</tr>
</tbody>
</table>

Managers are expected to demonstrate that they are managing the installation, not necessarily doing all the tasks themselves but understanding what has to be done, have developed the necessary operational procedures for the installation, and showing they have checked the work of their staff and that it is in accordance with legal requirements, recognised best practice, and site procedures.

A comprehensive log book with chronological operator entries that have been checked and countersigned by the Manager will usually contain sufficient evidence to meet the above requirements.
BOILER OPERATION ACCREDITATION SCHEME
CANDIDATE EVIDENCE PACK AND SUPPORTING DOCUMENTS

Please complete the information so far as you are able for up to three boilers you normally operate.

<table>
<thead>
<tr>
<th>General Boiler Details</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Make</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure (bar [g])</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output (kg/h)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date of manufacture</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Combustion Details</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Burner manufacturer/type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel(s) (and storage arrangements if applicable)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control (e.g. on/off or modulating)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Boiler Feed Water Control</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump on/off or modulating valve</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level sensors: direct-mounted or external chambers?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type: float or electrode?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low levels – standard or high-integrity?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High level alarm fitted?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Main Blowdown</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual or auto?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TDS Control</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto TDS fitted? Yes/no</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blowdown receivers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blowdown vessel or pit?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Blowdown Heat Recovery</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes/no - type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Treatment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Type (e.g. softener + chemical injection, or de-alk / de-min)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Treatment chemicals used</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Is eyewash or a shower provided?</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Who is responsible for treatment regime and routine test/sampling? How frequently?</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Who is monitoring and adjusting water treatment levels including boiler water TDS/ Conductivity levels</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Feed water System</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Open tank / pressurised de-aerator?</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Capacity (m²)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Normal temperature range</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Steam injection?</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>General Safety</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fire alarm call points at every exit?</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Emergency lighting provided as required by Fire risk assessment?</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Fuel emergency stop button location(s)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>First aid kit provision</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Boiler house ventilation - natural or mechanical</strong></td>
<td></td>
</tr>
</tbody>
</table>
Please provide a list or sketch of the type of equipment that the boilers serve. This need not be an exhaustive list of all equipment, but should be sufficient for the Trainer and Assessor to understand what the steam or hot water is used for on your site and whether/how condensate is returned to the boiler house. If any of the listed equipment uses direct steam injection this should be mentioned.

Both Operative and Manager candidates must attach a sketch to show the layout of their boilers and how they connect to the various ancillaries such as the water treatment system, feed water tank, and blowdown system.

If you have two or more boilers which are connected to provide a common steam supply to the plant, please also provide a drawing to show the layout of the manifold (header), including the positions of the steam inlets and outlets, as well as major valves and steam traps.

These drawings are not expected to be precise CAD engineering drawings; it is preferred that they be hand drawn by the candidate which will demonstrate that they have a proper understanding of the layout of the boiler house.

**In the case of Cat 3 candidates**, due to the complexity of water tube boilers, it is preferable that a Piping and Instrumentation Diagram (PID) be provided, however please note that the Assessor will expect the candidate to demonstrate a proper knowledge of how the boiler operates.

*Insert sketch of plant above, or provide as a separate attachment.*
GUIDANCE FOR CANDIDATES – EVIDENCE REQUIREMENTS

All candidates for the BOAS scheme are required to provide evidence of their involvement with relevant boiler installations over a period of at least 6 months before they are assessed. The requirements for evidence are specified above. **A maximum of 20 relevant sheets of evidence are required.**

This additional note gives further guidance regarding what is, and is not, expected by the Assessor to meet the evidence requirements. It applies to new candidates and to renewing candidates. Print-outs of electronic records are acceptable if they are countersigned by a Supervisor or Manager.

Candidates are expected to provide copies of the following documents which the Training Provider will scan and return to the candidate. The evidence supplied needs to make sure the candidate’s contribution is clearly marked, especially where entries are simply initialed, and evidence of candidates following procedures they have submitted will be required.

Operators – mandatory evidence – countersigned by a Manager:
- **a cv**, one or two pages only, giving brief details of current and recent employers, roles, responsibilities, etc. specifically related to boiler operations;
- **an organisation chart** showing the candidate's position in the company and relevant relationships - one page, hand drawn if necessary;
- **a line diagram of their boiler plant**, hand drawn preferred, showing main plant items and pipework etc. from water ‘in’ to steam (or water) ‘out’;(example in the Handbook, Appendix 2)

Operators - Demonstrable Appropriate Previous Work Experience:

Operators should be able to provide sufficient copies of at least three of the documents or activity records listed below to demonstrate at least 6 months operational experience with their boilers and all records should be **signed by the operator as being his own work**:

- Records of functional tests of limiters & controls carried out by the Operator at all specified frequencies and in the specified manner.
- Records of the Operator carrying out the recommended water quality tests and routine water treatment activities, with records of making adjustments where necessary.
- Records of daily boiler house and equipment checks undertaken by and signed by the Operator.
- Written start-up procedure/shut-down procedure for boilers, with evidence of this being carried out by the Operator.
- Procedures for and records of the Operator responding to alarms and taking appropriate action.
- Completed boiler house safety check carried out by the Operator.
- Service report, commissioning record or maintenance report for work personally carried out on the boiler.

A comprehensive log book may well include sufficient information from the items listed above to demonstrate the candidate’s experience in sufficient detail.
**Evidence Pack**
**Guidance for candidates**

**BOILER OPERATION ACCREDITATION SCHEME**
**CANDIDATE EVIDENCE PACK AND SUPPORTING DOCUMENTS**

**Managers – mandatory evidence:**

- a cv, one or two pages only, giving brief details of current and recent employers, roles, responsibilities, etc. specifically related to boiler operations;
- an organisation chart showing the candidate’s position in the company and relevant relationships - one page, hand drawn if necessary;
- a line diagram of their boiler plant, hand drawn preferably, showing main plant items and pipework etc. from water ‘in’ to steam (or water) ‘out’ (an example is in the Handbook, Appendix 2);

**Managers - Demonstrable Appropriate Previous Work Experience:**

Managers should be able to provide sufficient copies of at least three of the documents listed below to demonstrate at least 6 months operational experience in managing their boiler house

- Validated records of functional tests of limiters & controls and daily boiler house and equipment checks carried out by their Operators at all specified frequencies and in the specified manner.
- Validated records of their Operators carrying out the recommended water quality tests and routine water treatment activities, with records of making adjustments where necessary.
- Written start-up procedure/shut-down procedure and emergency procedure for boilers written or approved by the manager, with validated evidence of this being carried out by their Operators.
- Procedures for and records of their Operators responding to alarms and taking appropriate action.
- Completed boiler house safety check or audit carried out by the Manager.
- Boiler house risk assessments or permits for work written or approved by the manager with actions taken.
- Evidence of compliance with environmental permits and relevant legislation such as PSSR.

**Evidence that DOES NOT MEET the requirements:**

We do not want, for example:

- evidence that cannot be directly related to the day-to-day work of the candidate;
- complete written scheme documents, operating manuals, installation records;
- detailed drawings of boiler pipework and fittings;
- copies of BG01, PSSR, PM5 etc.;
- boiler makers and burner makers operating instructions, especially if generic;
- operating instructions, wiring diagrams, and other plant operating instructions;
- copies of candidates’ training records and certificates.

**Process**

Training Providers will scan the relevant information and hand/send it to the Assessor for validation. The Assessor will advise if the evidence is sufficient or needs supplementing in some way. The candidate cannot be accredited for BOAS until all the evidence is complete and meets the Assessor’s requirements. Candidates will take their original evidence away with them after scanning.
Examples of the diagrams and log sheets that are required as follows – note these are NOT necessarily best practice or technically perfect but included here only as a guide:

### Log Book: Weekly Evaporation Tests

<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Boiler</th>
<th>Firing Rate</th>
<th>Data Rate</th>
<th>High Level Test</th>
<th>High High</th>
<th>High</th>
<th>Extra Low</th>
<th>High</th>
<th>OK</th>
<th>OK</th>
<th>OK</th>
<th>OK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>1/5/2014</td>
<td>D. Gent</td>
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- Each boiler or line to be tested for low water level test by evaporation.
- Each boiler to be tested for high level alarm.
- The isolation valve upstream of the boiler is to be closed and the boiler allowed to steam to the test condition.
- Low water level condition.

### Notes:
- Extra care should be taken to ensure all tests are accurately recorded.
- All readings should be verified by a second operator.
- All tests should be signed by the operator and verified by a supervisor.
Examples of the diagrams and log sheets that are required as follows – note these are NOT necessarily best practice or technically perfect but included here only as a guide:
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#### SETTINGS

- Low Med High
- Low Med High

#### COMBUSTION ANALYSIS

- Low Med High
- Low Med High

#### REPORT

**ASSISTED WITH REBUILD OF BOILER**

**BOILER LIFED, WATER LEVELS, FLAME, FAIL AND PRESSURE SWITCHES ETC ALL TESTED**

**SAFETY VALVE LIFED AND BOILER PUT ON LINE, HIRED BOILER DE COMMISSIONED READY FOR TRANSPORT**

---

**Client Name**

**Client Ord No**

---

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Notes for Trainers and Assessors:

This syllabus is applicable to Operators and Managers with responsibility for hot water boilers which are directly fired, waste heat boilers and combination boilers (direct fired boilers with a waste heat section).

• It is recommended that an operational boiler will be available for demonstrating key points of the training.

• Whilst current guidance is contained in INDG436 and BG01, there are many legacy sites which still have controls and operational systems suited to PM5 or PSG2. The Training Provider must take this into account when delivering the course but should also refer candidates to the advice contained in the current guidance with respect to these legacy sites.

• The core syllabus specifically excludes solid fuels - coal, biomass etc as these are included in a separate module due to the number of significant differences which apply to solid fuel fired boilers. The relevant parts of Module 10 are required to be taught only for solid fuel BOAS courses and may be omitted otherwise. Trainers are however, free to include aspects of this module in the standard course if they feel that it aids their teaching.

• Candidates may work with boilers that utilise liquid or gaseous bio-fuels which possess specific characteristics not shared with the more common hydrocarbon fuels. The Training Provider shall identify any candidates to whom this applies and adjust their teaching accordingly whilst otherwise covering the topic in an appropriate manner. It is expected that the oral examination rather than the written papers will cover this aspect of operation for applicable candidates.

• In instances where the BOAS course is taught and examined in locations outside the United Kingdom it is recognised that certain parts of the syllabus as written, such as applicable United Kingdom legislation, may be inappropriate. In these instances the Training Provider shall offer IBOAS as an alternative. Any resulting changes must then be approved in writing and in advance of the training by the examining body to ensure consistency of the taught material, examinations and examination standards; the examining body cannot modify the papers or the marking scheme on an ad hoc basis. The CEA shall be kept informed, in writing and in advance, of all changes and agreements. The CEA will have final approval of any changes, taking into account the recommendation(s) of the examining body. The Assessors shall be adequately briefed of any changes and it is the responsibility of the examining body to ensure that this is performed. Any associated charges to be levied by the examining body, oral examiner(s) and the CEA for the preparation of such courses, together with payment terms, shall also be agreed in advance and in writing between the candidate’s employer, the Training Provider, the Assessment Body and the CEA.

1. HEAT AND HEAT TRANSFER CONCEPTS

A  Principles Covered
1. Terms: Heat, temperature, pressure and volume.
3. Units, SI and Imperial units.
4. Heat transfer, conduction, convection and radiation and their relative importance in different parts of a boiler.
5. Condensing & non-condensing boilers.

B  Examination Objectives
1. State the units for heat, pressure, temperature, volume.
2. Explain the difference between the terms sensible heat, latent heat, superheat, total heat and dryness fraction as applied to steam generation.
3. Describe the effects of pressure on the boiling point of water and on the volume of steam.
4. State the principal modes of heat transfer in boilers.
5. State the factors that affect heat transfer including the effects of scale or deposits on heat transfer surfaces.
6. State the influence of low water flow on fully flooded boiler integrity.
7. Explain the factors which influence optimum heat transfer in a boiler, and how these may affect the integrity of the boiler.
8. Explain how a boiler contains stored energy, and the consequences of its uncontrolled release.
9. Relate the terms heat, pressure and temperature to the plant being operated.
10. Indicate the parts of the boiler plant where flash steam may be produced.
11. Point out the areas where heat transmission may be affected by internal and external deposits.
12. List possible hazards to plant due to fouling of heat transfer surfaces.

2. COMBUSTION AND DRAUGHT

A Principles Covered
4. Natural, induced and forced draught systems. The functions of a chimney.
5. Control of air by dampers or VSD of fan.
7. Boiler house ventilation, importance of adequate supply of fresh air, natural and mechanical systems.

B Examination Objectives
1. List the principal products obtained from combustion of fuels.
2. Explain the function of air in the combustion process.
3. Explain how air affects combustion efficiency.
4. State the conditions necessary for obtaining maximum heat output from fuel.
5. Explain the significance of CO₂ or O₂ as a measure of excess air.
6. Explain the significance of building and boiler house ventilation.
7. Describe the principal methods of supplying combustion air.
8. Explain how chimney draught is affected by dimensions of stack and temperature of gases.
9. Explain the importance of turbulence in the combustion process.
10. Explain the importance of gas tightness in the casing of boilers and expansion joints.
11. State the dangers of fuel and flue explosions, e.g. the energy released and appropriate precautions to avoid these events.
12. Obtain data from portable instruments and interpret the results with regard to combustion efficiency (where available).
13. State the causes of poor performance and state possible remedial measures. Point out areas of the boiler where air ingress can occur.

3. FEED WATER

A Principles Covered
2. Simple principles of water treatment, evaporators, lime-soda softeners, ion exchangers, chemical dosing and reverse osmosis. The importance of instructions regarding treatment, water sampling. De-aeration of make-up-water.
4. The nature of water hammer.
5. Discharge of effluent to drain. Awareness of the implications of water rejected from treatment plant, such as through softener regeneration.
6. Consideration of other materials of construction in the piping system.
**B Examination Objectives**

1. State the common impurities in raw water.
2. State the effect of impurities on boilers and boiler operation.
3. Describe a method used for treating raw water.
4. Describe a method for chemical dosing of boiler water.
5. Describe the methods used to check the condition of boiler water.
6. Explain the action needed to maintain optimum boiler water condition.
7. List possible hazards due to scale formation within the boiler.
8. Describe the water treatment system and checking procedure at the plant being operated.
9. Interpret the results of water tests (performed by others) and state conclusions,
10. Describe the system for chemical dosing of the boiler and feed water,
11. Describe the actions to be taken if the permitted levels of impurities are exceeded.

**4. CONTROL AND INSTRUMENTATION**

**A Principles Covered**

1. Boiler instrumentation and gauges. Simple descriptions of the significance and the practical use of instruments to indicate or record draught, temperature, carbon dioxide, oxygen, or carbon monoxide. Water flow and level, smoke density and fuel consumption. Portable flue gas testing equipment. Ringelmann charts, other smoke indicators and their use.
2. Water testing instruments, pH and density including conductivity meters.
3. Pressure and level switches. Alarms and auto pump changeover.
4. Valves - types, purpose and operation - steam and HPHW.
5. Temperature, pressure, and level switches, safety devices/limiters.
6. Controllers. Awareness of two- and three-term control, and the distinction between this and two- or three-element control.

**B Examination Objectives**

1. State the principal measurements relevant to a boiler house.
2. Describe the different instruments available and their principles of operation.
3. Describe the control systems used in boiler practice and the basic principles of operation.
4. Describe the methods of testing controls and the action to be taken when faulty.
5. Describe the alarm systems. (Note that their testing is covered under 'Safety and legal requirements').
6. Identify the measurements taken at the plant being operated.
7. Describe the preferred method of recording instrument data and interpretation of this.
8. Describe the control systems used at work, relevant automatic control settings and control actions.
9. Indicate the circumstances which would cause you to suspect instrument inaccuracy.
10. Describe checks for proving instruments and controls and the procedure for reporting defects.

**5. SAFETY AND LEGAL REQUIREMENTS**

**A Principles Covered**

1. Basic need for continued awareness, attitudes to safety. Principal causes of accidents and legal implications. Importance of recording events.
3. Legal requirements, statutory examination by a competent person. Safety devices required by law.
5. Safety rules and practices, the meaning of the Permit-to-Work system. Protective clothing, eye and foot protection. Dangers of asphyxia, carbon monoxide gas poisoning. Explosion hazards. Escape routes. The need for boiler to be at atmospheric pressure before entry to
pressure parts. The need for safe isolation prior to carrying out maintenance and examination.

6. Good and bad practices. Procedures on commencing and concluding shifts. Precautions to be observed before, during and after work on a boiler. When and how to draw fires in an emergency. Good housekeeping and cleanliness.

7. Fire safety - specific procedures and instrumentation.

8. Permit to Work. Awareness of the need for a Permit to Work, with special reference to work such as inspections being performed within an operating boiler house.

B Examination Objectives
1. Define the principal responsibilities of employers and employees.
2. Identify the fittings which are mandatory for hot water boilers and explain the significance of a relevant fluid.
3. Outline the principal basic safety procedures and the consequences of failing to follow proper procedures.
4. Explain briefly the method of preparing a boiler for statutory examination i.e. when cold, and any additional procedures for preparing the boiler for examination during operation, and the reasons for such examinations.
5. State the actions to be taken in response to the recommendations from the examination report.
6. Explain the importance of logging observations, regarding defects and legal significance.
7. Explain the various hazards that exist in the boiler house such as stored energy, scalding hazards, electrical hazards and asphyxiation hazards.
8. Describe the alarm systems, how frequently they are tested, and the test methods.
9. Describe the procedures to be followed in response to an alarm.
10. Describe the procedures to be followed in the event of the manning levels being changed.
11. Explain the health and safety reporting procedure for the boiler house being operated.
12. Point out the safety devices and explain their function.
13. Identify fire fighting equipment and locate escape routes,
14. Demonstrate safety precautions to be observed when raising pressure from cold or taking a boiler out of service.

6. ENERGY EFFICIENCY

A Principles Covered
3. Portable instruments. Their use in the determination of boiler efficiency.
4. Installed instruments. Temperature measurements, flow measurement of water and fuel, flue gas analysis, oxygen, carbon monoxide and carbon dioxide.
5. Steam Tables.

B Examination Objectives
1. State the methods commonly used to establish boiler efficiency,
2. State the factors which affect boiler efficiency.
3. State possible causes for a decrease in boiler efficiency.
4. State what indications there may be of a reduction in efficiency.
5. Describe systems which may be used to improve plant efficiency.
6. Point out the instruments provided which may be used to determine overall boiler house efficiency.
7. Point out possible sources in the boiler house of a potential reduction in efficiency and state the remedial actions which should be taken.
8. Suggest possible measures which may be taken to improve boiler house efficiency.
7. ENVIRONMENT

A  Principles Covered
1. Legislation. Environment Agency (EA), Integrated Pollution Control (IPC).
2. Emissions to Air. Carbon monoxide, sulphur dioxide, oxides of nitrogen (NOx) and particulates.
3. Other Emissions. Water treatment plant effluent and materials derived from boiler cleaning activities.
4. Abatement plant such as may be needed for large biomass plant.

B  Examination Objectives
1. State the legislation applicable to boiler stack emissions to the atmosphere.
2. Standard legislation applicable to air quality, within the boiler house. Point out the location of any permanent instruments to measure emissions.
3. Point out the location of access points for temporary instruments.
4. Demonstrate the use of portable instruments if available.
5. Where emissions measuring equipment is fitted, state the permitted emission limits for the plant in use, readings to be taken and frequency of testing.

8. BOILERS AND AUXILIARIES

A  Principles Covered
1. Principal types of boilers. The different designs of boiler, and the differences between domestic, commercial, and industrial boilers. General description of steam raising boilers, boilers used for high, medium and low temperature hot water systems, modular boilers. Advantages and disadvantages of HPHW systems with respect to steam systems.
2. Construction features. Horizontal/vertical, cylindrical shell, water tube and sectional boilers for hot water with appropriate reference to steam.
3. Waste heat boilers and boilers with separate combustors.
4. Feed system. Feed pumps, feed tanks and connections, circulating pumps, shunt pumps, mixing valves and injectors. Make-up water and make-up water regulators.
6. Fittings and mountings, statutory requirements, water controls, safety requirements. Expansion tank, open and closed system.
7. How a boiler is connected into a heating system. Shunt circuits and boiler back-end protection.
8. Sizing boiler plant against a heating load - building regulations past and current.
10. Methods of pressurisation for high, medium and low temperature hot water systems. Automatic control requirements. Steam cushion in certain types of HTHW boilers.
11. Air separation methods, automatic topping-up, thermal expansion and pressure relief within the heating system.
12. Selecting pressure relief valves.

B  Examination Objectives
1. Identify the types of boilers in use.
2. Outline the basic construction and application of a given type of boiler.
3. State the fittings and mountings required to comply with established safety standards.
4. Explain the function and operation of auxiliary plant used with boilers.
5. Describe the methods of pressurisation used with high temperature/medium temperature hot water boilers.
6. Definition of low, medium and high temperature systems.
7. Describe the type of boiler in use at work.
8. Identify the boiler mountings and ancillaries.
9 OPERATION

A Principles Covered
1. Preparation. Basic general procedure for pre-filling checks, inspection, drains and air cocks, filling and venting, and precautions to be observed.
2. Raising pressure. Initial checks, ignition procedure stabilization of combustion/flame, action to be taken in the event of failure to stabilise flame. Equalisation of boiler temperature. Use of drain valve to assist circulation, rate of pressure rise. Warming-up procedure for boiler.
4. 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 the activation of a safety-related control system, and the checks and monitoring to confirm that the automatic controls have responded appropriately.
5. Routine checking of special automatic controls for the boilers subject to limited supervision as required by PM5 & PSG3.

B Examination Objectives
1. Explain the procedure for lighting up a boiler.
2. Explain the procedure for bringing a boiler on line.
3. Explain the procedure for on-load control.
4. Explain the procedure for isolation and shutting down of a boiler.
5. Identify the principal operating hazards to plant and life.
6. Describe the inspection procedure for plant during operation.
7. Describe methods of identifying and recording defects.
8. Explain the procedure for initiating defect repair.
9. Explain the methods of testing safety devices.
10. Describe a system of logging tests made and the procedure for initiating action.
11. State the action required when an abnormal condition occurs.
12. Describe the procedures in preparing plant for short and long term lay-up and statutory inspection.
13. Identify all valve positions relevant to start-up and shut-down procedures.
15. Demonstrate how flame failure equipment is proved.
16. Show how chemical dosing is carried out.
17. With solid fuel system, demonstrate how fuel feed-rate is regulated.
18. Demonstrate plant logging procedures.
19. Demonstrate how to deal with an abnormal operating condition.
20. Demonstrate the safe procedure for bringing a boiler on line.
21. Demonstrate the appropriate responses to alarms and abnormal (but foreseeable) events such as safety valve opening.
10. FUEL CONCEPTS

A Principles Covered
1. Fuels. The characteristics of various types of fuels,
2. Terms. The meaning of gross and net calorific value, viscosity, specific gravity, bulk density.
4. Safety Features. Air purge (post & pre firing), safety interlocks, slam-shut valves, fusible links, fire detectors, gas detectors, etc.
5. Fire risks with solid fuel storage.
6. Air quality within biomass fuel bunkers & risk of asphyxiation.

B Examination Objectives
1. State the different types of fuels (solid, liquid, biomass and gaseous) available for use in boilers.
2. Describe the methods used for safe storage and handling of fuels, and the associated dangers, including the restrictions covering the siting of CNG & LPG storage facilities and equipment, changing of fuel filters, etc.
3. Explain the dangers associated with stored fuels e.g. fuel leakage.
4. State the safe methods of determining whether there is a fuel leak, and the actions to be taken.
5. Explain the need for pre-purge and post-purge.
6. State the qualifications necessary to be able to work on fuel systems.
7. Explain the need for adequate ventilation.
8. Explain the dangers of liquid fuel ingress into the condensate return system of a steam boiler.
9. Describe the fuel system fitted to the boiler plant.
10. Demonstrate the ventilation systems fitted to the boiler plant room.
11. State the factors which might give reason to suspect a fuel leak, and the actions which should be taken.
12. Describe the methods of safe start-up and shut-down of the boiler plant and the procedures to be followed if a burner does not ignite properly at start-up.
13. State the procedure for change-over of fuels (where a dual- or multi-fuel burner is on site).
14. Explain the system for service and maintenance of the burner equipment.

NB: It is not intended that a boiler Operator should perform work on a fuel system; such work is the duty of an appropriately trained competent person. The intended scope of this training syllabus is to ensure that the trained boiler Operator has a basic understanding of fuels safety, and recognises the need to engage appropriately qualified persons to perform any work necessary on the fuel systems within his boiler house.
Appendix 4 – Industrial Steam Boiler Learning Outcomes for Boiler Operators and Managers (Cat 2)

Notes for Trainers and Assessors:

This syllabus is applicable to Operators and Managers with responsibility for horizontal multitubular shell boilers which are directly fired, waste heat boilers and combination boilers (direct fired boilers with a waste heat section). It is essential that an operational steam boiler will be available for demonstrating key points of the training. Whilst current guidance is contained in INDG436 and BG01, there are many legacy sites which still have controls and operational systems suited to PM5 or PSG2. The Training Provider must take this into account when delivering the course but should also refer the candidates to the advice contained in the current guidance with respect to these legacy sites.

In instances where the BOAS course is taught and examined in locations outside the United Kingdom it is recognised that certain parts of the syllabus as written, such as applicable United Kingdom legislation, may be inappropriate. In these instances the Training Provider shall offer IBOAS as an alternative. Any resulting changes must then be approved in writing and in advance of the training by the examining body to ensure consistency of the taught material, examinations and examination standards; the examining body cannot modify the papers or the marking scheme on an ad hoc basis. The CEA shall be kept informed, in writing and in advance, of all changes and agreements. The CEA will have final approval of any changes, taking into account the recommendation(s) of the examining body. The Assessors shall be adequately briefed of any changes and it is the responsibility of the examining body to ensure that this is performed. Any associated charges to be levied by the examining body, oral examiner(s) and the CEA for the preparation of such courses, together with payment terms, shall also be agreed in advance and in writing between the candidate’s employer, the Training Provider, the Assessment Body and the CEA.

The Learning Outcomes for BOAS Cat 2 are arranged in 10 sections as follows:

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<td>Operation</td>
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Each Section is split into several sub-sections and covers the Learning Outcomes for Operators and Managers of fire tube steam boiler installations.

**Operator requirements** – things an operator and a manager of steam boilers should know and be able to discuss with an assessor.

**Manager additional requirements** – additional things a manager of steam boiler plant should know and be able to discuss with an assessor. Operators should be aware of these issues but will not be examined or assessed on them. Managers will be required to pass the Operator examinations and the additional Manager examination.
Section 1 - Safety and Legal Requirements

1 – Be able to define the principal safety responsibilities of employers and employees, and understand the health and safety reporting procedure for the boiler house being operated, and compare to best practice.

Operator requirements
1.1 Describe an employee's principal responsibilities under HASAWA 1974 and subsequent legislation
1.2 Outline the process of performing risk assessments and their scope and frequency when applied to their installation
1.3 Describe the health and safety reporting procedure for the boiler house being operated
1.4 Compare the site operating procedures to best practice
1.5 Describe who may report an accident or Dangerous Occurrence under RIDDOR
1.6 Explain where statutory and other legal advice and guidance may be found

Manager additional requirements
1.7 Describe an employer’s responsibilities under HASAWA 1974 and subsequent legislation
1.8 Explain the requirements of the PSSR / ACoP to the PSSR including Written Schemes of Examination and how they are applied to the candidate’s boiler operations
1.9 Explain the requirements of RIDDOR and how they are applied to the candidate’s boiler operations

2 - Know the principal hazards associated with steam boilers and their operation.

Operator requirements
2.1 Explain the causes and effects of:
   a) excessive exhaust temperature in the boiler
   b) excessive steam pressure
   c) sudden decrease in steam pressure
   d) uncontrolled release of stored energy
   e) relative amount of stored energy in different boiler types
2.2 Be able to identify the principal hazards associated with the operation of steam boilers
2.3 Be able to propose appropriate control measures for the principal hazards associated with the operation of steam boilers
2.4 State actions to be taken in the event of a dangerous occurrence or accident
2.5 Outline the fundamental safety requirements applicable to steam boiler houses and the consequences of failing to follow procedures in relation to:
   a) Work at height
   b) Slips and trips
   c) Fuel storage and isolation
   d) Electrical isolation
   e) Hazards due to pressure and temperature during normal operation
   f) Safe systems of work in relation to plant normally at elevated pressure and temperature
   g) The handling of chemicals
   h) Ventilation to the boiler house
   i) Confined spaces
   j) Good housekeeping
2.6 Describe the hazards associated with asbestos, the need to report it and the need for special training for persons working with asbestos
2.7 Relate risk assessments, method statements and permits to work to the candidate’s own plant

Manager additional requirements
None
3 - Know the concepts underpinning HSE guidance documents to the candidate’s work activities (this should be appropriate to the candidate’s role and responsibility) and describe how they may be used.

**Operator requirements**

3.1 Show appropriate working knowledge of guidance applicable to boiler houses
a) HSG253 (The safe isolation of plant and equipment)
b) INDG436 (Safe management of industrial steam and hot water boilers)
c) HSG250 (Guidance on permit to work systems)
d) BG01 (Guidance on safe operation of boilers)
e) BG04 (Boiler water treatment guidance for boilers)

**Manager additional requirements**

3.2 Describe how HSE (and other) guidance documents may be used and quote their legal status

4 - Know the methods for preparing a boiler for statutory examination and the reasons for such examinations.

**Operator requirements**

4.1 Explain the reasons for carrying out statutory examinations and typical defects likely to be found as a result of inspections
4.2 Explain the isolations typically required for boiler annual inspection and the precautions to be taken
4.3 State what action is to be taken if the Competent Person is of the opinion that the pressure system under examination will give rise to imminent danger

**Manager additional requirements**

4.4 State which boiler shell fittings and mountings are usually removed for inspections
4.5 Explain the process for issuing a permit for work
4.6 State the actions that should be taken in response to the recommendations from the examination report

5 - Know importance of logging observations, particularly defects, and understand the legal significance of omission of action with regard to safety related faults.

**Operator requirements**

5.1 Demonstrate understanding and importance of routine logs
5.2 Give practical examples of items to be logged relating to steam boiler operations
a) Identity of operators
b) Daily routines
c) Weekly routines
d) Gauge glass drills
e) Evaporation tests
f) Water treatment reports
g) Meter readings
h) Faults and alarms
i) Maintenance items
j) Works undertaken by external contractors

**Manager additional requirements**

None
6 - Understand the importance of boiler safety devices and alarm systems and describe how alarms arise and are actioned.

**Operator requirements**
6.1 Describe the main functions of boiler alarm systems:
   a) Low water
   b) High water
   c) High pressure
   d) Burner lockout
   e) Fire alarms
   f) Gas alarms
   g) water quality alarm
   h) condensate quality alarm

6.2 Describe the action(s) to be taken in the event of a failure of the safety devices fitted to a steam boiler or other relevant plant
6.3 Describe the alarm systems installed at the place of work, how frequently they are tested, and the test methods.
6.4 Describe the on-site procedures to be followed in response to an alarm, both for the alarms fitted to the boiler and other alarms at the site and near misses (Dangerous Occurrences)
6.5 Describe the procedures to be followed if the alarm systems are faulty or not to the current required standards

**Manager additional requirements**
None

7 – Be able to describe the supervision arrangement in relation to BG01 of the candidate's own plant and describe the procedures to be followed in the event of the manning levels being changed.

**Operator requirements**
7.1 Relate BG01 to the candidate's own place of work; both systems of work and installed plant

**Manager additional requirements**
7.2 Describe the basic elements of the different boiler manning arrangements in BG01
7.3 Describe the procedures to be followed in the event of the manning levels being changed

8 – Be able to describe in general and particular terms how oversight is exercised.

**Operator requirements**
8.1 Describe how staff competencies are assessed and maintained
8.2 Explain how training and competence impacts professional responsibility

**Manager additional requirements**
8.3 Describe the need for and methods of exercising change management
8.4 Describe how plant is assessed in relation to safety, legislative compliance and its effective operation
Section 2 – Basic Heat & Heat Transfer Concepts

1 - Understand and explain the terms and concepts in SI and Imperial units for heat, pressure, temperature, volume, energy.

Operator requirements
1.1 State the SI and Imperial units for
a) Temperature
b) Pressure
c) Volume
d) Energy
e) Heat flow
1.2 Define the relationship of heat, pressure and temperature when associated with boiler operation.
1.3 Explain these terms as applied to steam generation and distribution:
a) differential pressure
b) specific enthalpy
c) specific volume
d) density
e) sensible heat
f) latent heat
g) superheat
h) sub-cooling
i) saturation temperature and pressure
j) two phase fluids (liquid-vapour mixture)
k) superheated steam
l) saturated (dry) steam
m) wet steam
n) dryness fraction
o) condensate
p) flash steam

Manager additional requirements
None

2 - Be able to relate fundamental terms and concepts to steam generation and distribution under normal operation.

Operator requirements
2.1 Differentiate between bar ‘gauge’ and bar ‘absolute’
2.2 For pressure gauges, convert between kPa and bar
2.3 Explain how to convert Imperial to SI measurements (and vice versa)
2.4 Describe the effects of pressure on the boiling point of water and specific volumes of water and steam
2.5 Describe the effects of change in pressure on steam velocity inside a boiler and in the distribution system
2.6 Describe the effect of air in steam systems

Manager additional requirements
None
3 - Understand and explain the conceptual functions of a steam boiler, and why and how steam is used.

**Operator requirements**
3.1 Describe different types of steam boiler
a) two pass  
b) three pass  
c) wet back  
d) dry back
3.2 Discuss need for correct water level (and consequences of inappropriate level) and need for sufficient steam space in a shell boiler
3.3 State the principal modes of heat transfer within boilers (conduction, convection and radiation)
3.4 Explain the effect of thermal expansion on steam boilers and the negative effects of rapid thermal expansion
3.5 Discuss the importance of clean surfaces (fireside and waterside) in steam boilers and the effects of deposits (e.g. soot, scale and fouling)
3.6 Identify when heat transfer may be impaired and actions to be taken for both fireside and waterside
3.7 Explain the functions of a boiler as
a) an energy converter  
b) a heat exchanger  
c) a store of energy
3.8 Explain flow and at rating
3.9 Explain the factors that may adversely affect the structural integrity of a boiler as a result of:
 a) over-pressure  
b) low water condition  
c) water side fouling  
d) excessive firing rate  
e) pressure cycling  
f) flame impingement  
g) corrosion  
h) excessive TDS  
i) cracks in the pressure vessel
3.10 Explain the following catastrophic failure modes applied to steam boilers:
 a) furnace collapse not leading to explosion  
b) explosion due to furnace collapse  
c) explosion due to weld failure (all types)
3.11 Identify the precautions to be observed to maintain the structural integrity of a boiler

**Manager additional requirements**
3.12 Explain why steam is used instead of other forms of heating system.

4 - Be able to explain the changes that occur in the boiler when the burner is firing as opposed to when the burner is not firing.

**Operator requirements**
4.1 Describe the effects of pressure on the boiling point of water and on the volume of steam.
4.2 Explain the process of steam generation inside a boiler, including change in density with pressure and two phase nature of water when the burner is firing.

**Manager additional requirements**
None
5 - Understand and explain how and why steam and condensate move around a distribution system and their interactions

Operator requirements
5.1 Explain why steam moves around a distribution system and the effect of this movement on the steam
5.2 Explain why condensate forms in steam systems
5.3 Discuss heat loss from steam lines and the formation of condensate
5.4 Explain what is meant by sub-cooling of condensate
5.5 Explain the effect of insulation on condensate formation rates
5.6 Discuss the effect of non-condensable gases in steam lines
5.7 Show awareness of steam hammer and water hammer events and suitable preventative and corrective actions
5.8 Discuss the potential negative consequences of unexpected steam release to atmosphere

Manager additional requirements
5.9 Explain the effect of gravity on condensate
5.10 Discuss the principles of steam line design including pressure rating and maximum bulk velocity
5.11 Explain the mechanisms by which steam hammer and water hammer events occur
5.12 Explain the effect of pressure changes/excessive demand on line velocities

6 Understand the functions of basic steam distribution system equipment.

Operator requirements
6.1 Explain the role of basic steam equipment fitted to steam systems
   a) isolation valves
   b) control valves
   c) pressure reduction valves
   d) non return valves
   e) strainers
   f) traps
6.2 Explain the reasons for collection and return of condensate to the boiler house
6.3 Explain safe practice when opening and closing manual valves on boilers and steam lines (hot and cold)
6.4 Explain the function of safety valves
6.5 Describe actions to be taken when safety valves act

Manager additional requirements
None

7 - Be able to demonstrate the use of steam tables.
The ability to perform complex calculations is not required.

Operator requirements
None

Manager additional requirements
7.1 Explain the use of steam tables and standard notation
7.2 Interpret the basic elements of steam tables
Section 3 – Feed water and boiler water analysis

1 - Know the common impurities in raw water.

Operator requirements
1.1 Describe the uses of the scientific terms and units used in water chemistry
   a) pH
   b) tds and uS/cm
   c) ppm
   d) mg/l
1.2 State the main conditions of raw water that can have an adverse effect on steam boiler operation:
   a) Hardness
   b) Alkalinity
   c) pH
   d) corrosive substances
   e) Total dissolved solids
   f) phosphates
   g) Suspended solids
   h) Conductivity

Manager additional requirements
None

2 - Know the effect of impurities on boilers and boiler operation

Operator requirements
2.1 State the effect of pH changes on boiler water and the relationship between alkalinity and corrosion rate
2.2 State the causes and effects of scale in boilers
2.3 State the effect of oxygen in boiler water
2.4 Understand the effects of contaminated condensate

Manager additional requirements
None

3 - Be able to describe common methods used for treating raw water and describe the water treatment system and testing procedure at the candidate’s own plant.

Operator requirements
3.1 Describe different primary raw water treatment methods in basic terms and their relative advantages and disadvantages:
   a) base exchange softener
   b) Reverse Osmosis
   c) de-alk/demin
3.2 Describe the water treatment control methods (including common chemicals and the hazards they pose)
   a) oxygen control (thermal methods)
   b) oxygen control (chemical methods)
   c) pH control
3.3 Describe the water treatment plant and associated test regime used at their plant
3.4 Detail the importance of following instructions regarding treatment and water sampling

Manager additional requirements
None

4 - Understand methods for supplying, storing and chemical dosing of boiler water. Relate the terms and concepts to operation under normal and abnormal conditions.

Operator requirements
4.1 Describe operational regimes for hot wells:
a) Recommended temperature regime for a hot well
b) Causes of too low or too high a temperature
c) Negative consequences of too low a temperature
d) Negative consequences of too high a temperature
e) Effect of water temperature on oxygen levels in feed water
f) De-aeration of feed-water
g) Control of level
h) Control of temperature
i) Monitoring requirements
4.2 Discuss potential sources of contamination of condensate with their likely effects in the boiler
4.3 Explain methods of detecting condensate contamination
4.4 Specify which chemicals are used on the candidate’s plant and what their purpose is
4.5 Discuss the safety requirements for storage, handling water treatment chemicals (COSHH, Manual Handling, PPE, etc)

Manager additional requirements
4.6 Describe different methods used for storing and supplying water for steam boilers and their relative merits and disadvantages
a) Hot well
b) De-aerator
4.7 Describe methods of controlling feed water and their relative benefits and disadvantages:
a) on-off pumps
b) variable speed pumps
c) modulating control valves
d) Individual pumps
e) Pump farms
4.8 Outline different methods of dosing, and location of dosing systems and injectors

5 - Know the methods used to check the condition of boiler water. Know the actions needed to maintain an optimum condition of the boiler water. Interpret the results of water tests and state conclusions

Operator requirements
5.1 Describe the system for chemical dosing employed at the candidate’s own plant.
5.2 Describe methods for taking water samples from steam boilers such that it is:
a) safe
b) accurate
5.3 Describe the actions to be taken if the permitted levels of impurities are exceeded.
Manager additional requirements
5.4 State the basic water testing regimes that are available and how to interpret results.
5.5 State the allowable levels of TDS in different types of boiler

Operator requirements
6.1 Indicate manual and intermittent/continuous blowdown valves and the manner of operating these.

Operator requirements
6.2 Describe the reasons for blowdown operations and the associated risks.
6.3 Describe the operation of blowdown valves, both manual and automatic.
6.4 Describe the potential hazards associated with blowdown systems and pipework.
6.5 State the legal maximum effluent discharge temperature.
6.6 Explain the consequences of inaccurate calibration of TDS control systems.
   a) too high
   b) too low

Manager additional requirements
6.7 Discuss manual and automatic blowdown techniques and the comparison between them in terms of effectiveness and efficiency.
6.8 Explain the application of a ‘discharge consent’ for the boiler house.
6.9 Show an awareness of the effect of temperature on uncompensated TDS control systems.
6.10 Understand the risks and control measures with regard to blowdown keys.

Operator requirements
7.1 State the reasons for carry over from steam boilers and how to avoid it:
   a) foaming
   b) water level instability
   c) hunting of water level controls
7.2 State the effects and hazards of carry over on the boiler plant and the distribution system.

Manager additional requirements
None

Operator requirements
8.1 State the reasons for scale formation in steam boilers and how to avoid it.
8.2 State the hazards and negative consequences associated with scale formation in steam boilers.

Manager additional requirements
None
Section 4 - Draught and Combustion

1 - Be able to state the elementary principles of combustion and the basic chemical reactions in combustion of fuel

Operator requirements
1.1 State the basic requirements for combustion; fuel, oxidant and source of ignition

Manager additional requirements
1.2 State the meaning and importance of ignition temperature of different fuel/air mixtures

2 - Be able to explain the function of air in the combustion process and how air affects combustion efficiency

Operator requirements
2.1 Describe the composition of air in simple terms
2.2 Give a simple explanation of induced draught, forced draught and balanced draught systems
2.3 Explain the consequences of too much air (lean combustion), and its effect on combustion and heat transfer
2.4 Explain the consequences of deficiency of air (rich combustion), and its effect on combustion and heat transfer
2.5 Describe the factors which affect the exhaust temperature of a steam boiler
2.6 Discuss the reasons for adequate ventilation of boiler houses

Manager additional requirements
2.7 Describe the principles of primary, secondary and tertiary air
2.8 Discuss the principles and advantages of preheated combustion air
2.9 Interpretation of CO₂ or O₂ as a measure of excess air

3 - Describe the various products of combustion and pollutants that can be produced by gas and oil fired boilers.

Operator requirements
3.1 List the main products of combustion from different fuels and the significant pollutants produced by each:
   a) Carbon dioxide
   b) Water
   c) Carbon monoxide
   d) Oxides of nitrogen
   e) Oxides of sulphur
   f) Particulates
   g) Persistent organic pollutants
3.2 Discuss the effect of pollutants produced by combustion processes:
   a) Poor health
   b) Corrosion
   c) Acid rain
   d) Smog
   e) Climate change
   f) Greenhouse gases
3.3 Describe typical levels of oxygen and carbon dioxide in a boiler exhaust for their own installation
   a) Describe indicators of poor combustion (measurements and visual)
3.4 Explain the causes and effects of fouling of the combustion side of a boiler
3.5 Explain the reasons for and consequences of flame impingement.
3.6 Discuss the importance of flame stability and change in flame pattern with turndown.
3.7 Discuss the necessity for regular flame inspection
3.8 Describe the precautions to be taken when inspecting the flame

Manager additional requirements
3.9 Discuss the benefits of dual fuel burners
3.10 Discuss the frequency of testing secondary fuels

4 - Be able to explain how chimneys work.

Operator requirements
4.1 Explain the importance of visual inspection of the chimney exhaust especially smoke and the significance of 'pluming' during normal operation

Manager additional requirements
4.2 Describe different types of chimney and their materials of construction
4.3 Explain the functions of a chimney, the conditions affecting draught and the control of draught
4.4 Explain how draught is affected by chimney dimensions and temperature of gases
4.5 Explain how the products of combustion may adversely affect a chimney

5 - Understand the principles of operation of different burner types

Operator requirements
5.1 Explain the potential consequences of inadequate ventilation
5.2 Explain the importance of pre-purge and post purge
5.3 Explain the hazards associated with unqualified operation and adjustment of burners
5.4 Explain the actions to be taken when a burner fails to fire

Manager additional requirements
5.5 Explain the principles of operation of pressure jet and rotary cup burner
5.6 Explain what is meant by cycling, modulation and turndown, and how these affect efficiency
5.7 Explain in simple terms different burner control systems and features which enhance fuel efficiency
5.8 Describe different forced ventilation systems and the consequences of failure of these systems

6 - Be able to state the significant safety hazards relating to combustion

Operator requirements
6.1 Describe the risks associated with:
   a) effects of carbon monoxide poisoning
   b) effects of exhaust gas poisoning
6.2 Discuss the provision and uses of safety devices and techniques such as:

a) flame failure devices
b) safety interlocks for fuel and ventilation
c) slam-shut valves
d) fusible links
e) fire detectors
f) smoke alarms
g) carbon monoxide detectors
h) flammable gas detectors
i) air purge (post & pre firing)
j) fuel proving
k) air proving

Manager additional requirements
None

7 - Be able to describe the combustion system in use at their own plant and the main features of this system.

Operator requirements
7.1 Describe the combustion equipment at their plant
7.2 Describe the main products of combustion and pollutants arising from their plant
7.3 Describe the safety systems in place to prevent incidents relating to combustion issues at their plant

Manager additional requirements
7.4 Describe the typical readings they get from combustion analysis at their plant, and how those readings are obtained

8 - Be able to discuss dew point and acid dew point

Operator requirements
8.1 Be able to explain the term dew point in relation to a steam boiler
8.2 Be able to explain the term acid dew point in relation to a steam boiler
8.3 Explain the effect of dew point on corrosion in exhausts and chimneys
8.4 Explain the effect of acid dew point on corrosion in exhausts and chimneys
8.5 Explain the effect of acid dew point on economisers

Manager additional requirements
None
Section 5 - Energy Efficiency

1 - Understand the fundamental concepts of boiler house efficiency and the efficient generation and use of steam

Operator requirements
None

Manager additional requirements
1.1 Describe what is meant by:
   a) combustion efficiency
   b) thermal efficiency
   c) plant efficiency
   d) Direct and indirect efficiency calculations
1.2 State what indications there may be of a reduction in boiler efficiency
1.3 State what indications there may be of a reduction in plant efficiency
1.4 Describe what checks may be undertaken to improve boiler plant efficiency

2 - Understand the principles of measuring boiler house efficiency

Operator requirements
2.1 Describe how visual observations can be employed to ensure that plant is being operated efficiently

Manager additional requirements
2.2 Show how installed instruments can be used to maintain efficient operation
2.3 Describe the instruments provided at the place of work which may be used to determine overall boiler house efficiency

3 - Be able to calculate boiler house efficiency in simple terms

Operator requirements
None

Manager additional requirements
3.1 Take the measurements required to calculate a figure for direct and indirect efficiencies for steam boilers
3.2 Demonstrate an understanding of the importance of evaluation of trends in boiler house measurements

4 - Know a variety of techniques that can be used to improve boiler house and steam generation efficiency

Operator requirements
4.1 Point out possible sources in the boiler house of a potential reduction in efficiency
4.2 Describe measures which can be taken to maintain (or improve) efficiency
Manager additional requirements
Describe some common energy recovery and energy saving features and techniques found in steam boiler houses:

a) Economisers
b) Condensing Economisers
c) Air preheaters
d) Maintenance of hot well temperature
e) maximisation of condensate recovery
f) flash steam recovery
g) improved blowdown routines
h) turndown ratios
i) flue dampers
j) correct chemical dosing

Section 6 - Environment

1 - Be able to identify relevant emissions legislation for steam boiler houses

Operator requirements
None

Manager additional requirements
1.1 State the major legislation in the UK and EU for managing and controlling emissions from steam boiler plant:

a) Clean Air Act
b) Integrated Pollution Prevention and Control (IPPC) (2008/1/EC)
c) The Environmental Permitting (England and Wales) Regulations 2010
d) Pollution Prevention and Control (Scotland), Regulations 2000
e) The Pollution Prevention and Control Regulations (Northern Ireland) 2003
f) Sulphur Content of Fuels Regulations
g) The Industrial Emissions Directive (2010/75/EU)
h) Large Combustion Plant Directive (LCPD, 2001/80/EC)

2 - Be able to describe the causes and effects of air pollution from steam boiler houses

Operator requirements
2.1 Explain the fundamental dangers to human health of each of these major pollutants

a) NOx
b) SOx
c) Dust / smoke
d) POP's
e) CO
f) CO₂

Manager additional requirements
2.2 Describe the source of major pollutants arising from combustion of different fuels

a) NOx
b) SOx
2.3 Explain the fundamental dangers to the environment of each of the major pollutants above and the reasons for limiting emissions

c) Dust / smoke
d) POP’s
e) CO 
f) CO₂

3 - Be able to show how emissions to air from steam boiler houses are measured and controlled

Operator requirements
3.1 Describe the importance of calibration routines and consistent measurement techniques
3.2 Explain the definition of dark smoke

Manager additional requirements
3.3 Identify suitable equipment for taking a range of typical emissions measurements
3.4 Explain the fundamental concepts of Low NOx burners
3.5 Explain how sulphur in oil is controlled by the Sulphur Content of Liquid Fuels Regulations
3.6 Explain the use of a Ringelmann chart and list the allowable exceptions for the emission of dark smoke

4 - Know the main sources of other emissions from boiler houses and how they are managed

Operator requirements
None

Manager additional requirements
4.1 Describe other sources of emissions from boiler houses:
a) Noise
b) Odours
c) Light pollution
d) Smoke
e) Fugitive emissions
4.2 Describe means for minimising or eliminating these sources of emissions
4.3 Describe means for minimising or eliminating sources of these emissions from their plant

5 - Know the main sources of waste arising from boiler houses and how they are managed

Operator requirements
None

Manager additional requirements
5.1 Describe the sources of waste arising from a boiler house
a) Waste water, regen and blowdown
b) Waste chemicals
c) Waste fuels
d) Maintenance items (including WEEE)
e) General Rubbish

5.2 Describe means for minimising or eliminating these sources of waste
5.3 Describe means for minimising or eliminating sources of waste from their plant
5.4 Explain the alternatives to blowdown pits

Section 7 - Fuel Concepts

1 - Know the relevant legislation relating to fuels used in steam boilers

Operator requirements
None

Manager additional requirements
1.1 State the legislation relating to fuels and combustion:
   a) Natural Gas (Gas Safety Installation and Use Regs)
   b) Fuel oils (Sulphur Content of Liquid Fuels Regs)
   c) Clean Air Act
   d) Industrial Emissions Directive (Large and Medium Combustion Plants)
1.2 Explain where other legislation and guidance may be found

2 - Be able to list the principal characteristics of each fuel

Operator requirements
None

Manager additional requirements
2.1 Explain the fundamental principles of fuel characterisation:
   a) Calorific Value, nett and gross
   b) Flammable Limits
   c) Density in relation to air
   d) Ignition temperature point
   e) limits of flammability of fuel/air mixtures
2.2 Relate specific characteristics to certain fuels:
   a) Density of natural gas
   b) Density of LPG
   c) Flammable limits of Natural gas

3 - Be able to describe the methods required for storing fuels

Operator requirements
3.1 Describe how common fuels are safely delivered and stored:
   a) Gas networks and regulators
   b) Oil storage and bunding
   c) Gas tanks and gas cylinders (safe separation)
3.2 Safe storage and handling of biomass
   a) CO poisoning
   b) Auto ignition

Manager additional requirements
None

4 - Be able to explain the principal dangers to be guarded against when storing and using fuels, and the safe handling procedures necessary for a particular fuel

Operator requirements
4.1 Explain the environmental and safety risks associated with storing fuels on site:
   a) Provision of leak detection and alarm systems
   b) Location of oil tanks on a site
   c) Location of gas cylinders at a boiler house
4.2 Discuss safe handling techniques for fuels used on their sites

Manager additional requirements
None

5 - Be able to describe fuel measurement techniques

Operator requirements
None

Manager additional requirements
5.1 Describe how different fuels are measured in order to provide accurate data for efficiency calculations:
   a) Natural gas metering, temperature and pressure correction
   b) Oil deliveries and metering, strapping and ‘dipping’ tanks
   c) Solid fuel deliveries

Section 8 - Boilers and Auxiliaries

1 - Be able to identify different steam boiler types and methods of construction

Operator requirements
1.1 Identify different types of steam boilers
   a) shell boilers
   b) once through/coil boilers
   c) waste heat boilers
   d) combination boilers
1.2 Describe the specific type of boiler on their site and how it works
1.3 Explain the following terms
   a) wet back
   b) dry back
c) convective passes
d) reversal cell
e) turbulator / retarder
f) stay bars
g) tell tale

1.4 Explain the hazards associated with waterside failure of different types of boilers:

Manager additional requirements
1.5 Compare and contrast different types of boilers
a) shell boilers
b) once through/coil boilers
c) waste heat boilers
d) combination boilers

2 - Know the main auxiliary items, fittings and mountings provided with a steam boiler

Operator requirements
2.1 Identify and describe auxiliary plant items in common use and describe their function:
a) Fans
b) Air heaters
c) Economisers
d) superheaters
e) feed tanks and feed pumps
f) steam injectors
g) Feed water modulation
h) Blowdown vessels

2.2 Identify and describe features, fittings and mountings in common use on steam boilers and describe their function and consequence of failure:
a) Safety Valve
b) Crown valves
c) Gauge glasses
d) Air cocks
e) Vacuum relief
f) Pressure gauges
g) Blowdown valves
h) Sparge lines
i) Dosing lines
j) Feed water connections
k) Spill back lines protecting feed pumps and economisers
l) sample coolers

Manager additional requirements
None

3 - Be able to describe typical boiler house arrangements

Operator requirements
3.1 Describe the main safety features of the boiler house at the site
a) Fire/smoke alarms
b) Gas alarms and control valves

c) Ventilation interlocks

d) Fuel shut off valves

3.2 Show awareness of boiler house construction requirements

a) Location

b) Access and egress

c) Emergency 'stop' location

Manager additional requirements

None

Section 9 - Operation

1 - Know the procedures for starting and stopping steam boilers and bringing them on line

Operator requirements

1.1 Demonstrate the procedure for cold start and explain the factors affecting it:

a) pre-filling checks

b) system inspection

c) use of drains and air vents

d) filling and venting

e) Warming-up procedure for boilers including gauge glass drills

f) Thermal expansion during cold start

g) Change of water level with temperature

h) Importance of minimising temperature differentials across the pressure parts during cold start

i) precautions to be observed

1.2 Demonstrate how to raise pressure in the boiler:

a) initial checks

b) Stratification and the use of manual blow-down to assist circulation

c) Rate of temperature / pressure rise

d) Checking for leaks and defects

e) Gauge glass checks

f) Explain the need for manned operation during cold start

1.3 Explain how water level controls are proved (the evaporation test) and explain any additional requirements / tests needed for level controls mounted in external chambers and tests for direct mounted controls

1.4 Explain the procedure for starting a warm boiler with residual heat following a short lay-up

1.5 Explain the procedure for stopping and shutting down a steam boiler

Manager additional requirements

1.6 Discuss special precautions to be observed with boilers fitted with superheaters or economisers (use of drains for purging or water flushing for cooling of elements, by-pass damper control etc.)

1.7 Describe a system of logging tests and the procedure for initiating action as a result of a test

2 - Know the procedures for letting steam into the distribution system and the associated hazards

Operator requirements

2.1 Demonstrate bringing a boiler on load:

a) Valve opening procedures and sequence
2.2 Explain precautions to be taken in draining the system down-stream of the crown valve, checking of traps and drains, and warming-up of piping system

2.3 Explain the causes and effects of line erosion and corrosion leading to line rupture

2.4 Discuss load control and inter-action between multiple units when operating boilers in parallel

2.5 Explain the cause and effect of priming

Manager additional requirements
None

3 - Be able to demonstrate normal and abnormal operations and actions when steaming

Operator requirements
3.1 Describe normal operations:
   a) Inspection of plant during operation
   b) reporting of defects and faults
   c) Checking for fuel and combustion gas leaks
   d) Testing of safety equipment and devices
   e) Checking water level gauges, water alarms and flame failure equipment
   f) Blowdown procedures and precautions to be taken

3.2 Describe the actions to be taken for common abnormal conditions:
   a) activation of a safety related control system or alarm
   b) Loss of fuel
   c) Loss of electrical supply
   d) Failure of ID or FD fans or auto flue damper
   e) Failure of auto blowdown system

3.3 Explain the hazards and actions relating to responding to alarms:
   a) Procedure for investigating abnormal occurrences
   b) time to approach a dangerous condition following an alarm
   c) Response to fuel leaks (liquid or gaseous fuels)
   d) checks and monitoring to confirm that automatic controls have responded as intended

3.4 Discuss poor operating regimes which may impact upon safety and efficient operation.

Manager additional requirements
None

4 - Be able to explain the procedures for inspections, maintenance and lay up of steam boilers

Operator requirements
4.1 Describe arrangements for short term and long term laying up of plant:
   a) Water wedging
   b) Nitrogen blankets
   c) Draining down
d) water treatment chemicals management

4.2 Describe procedures used during banking up and factory shutdown periods
4.3 Describe the precautions required for entry into a confined space
4.4 Identify potential confined spaces at the candidate's place of work

Manager additional requirements
4.5 Show a working knowledge of the requirements for liaison with Regulators and inspectors
4.6 Explain the procedures for safe isolation prior to carrying out repairs, modifications, or examinations

5 - Understand the importance of record keeping and following manufacturer's instructions

Operator requirements
5.1 Describe the record keeping arrangements at the site
5.2 Explain where to find information relating to the operation of the plant
5.3 Explain the importance of good record keeping and accurate recording of operational tasks
5.4 Discuss the procedures applicable at the site

Manager additional requirements
5.5 Show a good understanding of a boiler house technical risk assessment

Section 10 - Controls and Instrumentation

1 - Know the main legal requirements for steam boiler controls and instruments

Operator requirements
1.1 State the legal requirements for boiler instrumentation
   a) Pressure gauge
   b) Gauge glass
   c) Pressure relief valve(s)
   d) Level limiters
   e) Pressure limiters
1.2 State the requirements for operation with respect to the law and guidance for:
   a) Low water lockout
   b) Gauge glass blowdown
   c) Evaporation test

Manager additional requirements
None
2 - Know the types of control devices and control systems required on steam boilers, and how and why they operate

**Operator requirements**

2.1 Identify and explain the control and measuring devices in common use on steam boilers and describe their function and problems that may occur with them:

a) Pressure gauges
b) Pressure transducers
c) Exhaust Temperature gauges
d) Water level gauges
e) Flame failure devices
f) Fan failure devices
g) Fuel failure devices
h) Water Level controls, including 2- and 3-element systems
i) Auto blowdown valves
j) Steam, feed water and fuel meters
k) Differential pressure for draught
l) Exhaust gas analysers
m) Oxygen trim

2.2 Identify and describe the specific controls and instruments fitted on their steam boiler

**Manager additional requirements**

2.3 Describe checks for proving instruments and controls and the procedure for reporting defects
Notes for Trainers and Assessors:

The primary aim of the BOAS course is to bring candidates’ knowledge and experience to the point whereby they are professionally recognised as being able to operate their boilers safely, efficiently and effectively. Thus they may be deemed to have attained a degree of professional competence through attending the course and attaining the CertIBO qualification.

Access to a fully operational water tube steam boiler plant is required as an essential part of the training and assessment process for this Category of BOAS.

Whilst it is recognised that by attaining the CertIBO qualification the candidate has demonstrated a measure of professional competence, the qualification should be viewed only as part of the candidate’s overall training and development programme. Candidates should be encouraged to develop their skills, knowledge and competencies further during their career, in partnership with their employer.

There is no current specific guidance on the safe operation of water tube boilers. The Training Provider must take this into account when delivering the course but should also refer the candidates to the legislation that governs the operation of water tube boilers.

This syllabus specifically excludes solid fuels - coal, biomass etc. as these are dealt with in a separate course. Trainers are however, free to refer to them as they see fit if it is considered beneficial to their teaching.

Candidates may work with boilers that utilise liquid or gaseous bio-fuels which possessing specific characteristics not shared with the more common hydrocarbon fuels. The Training Provider should seek to identify any Operators to whom this applies and adjust their teaching accordingly whilst otherwise covering the topic in an appropriate manner. It is expected that the oral examination rather than the written papers will cover this aspect of operation for applicable candidates.

In instances where the BOAS course is taught and examined in locations outside the United Kingdom it is recognised that certain parts of the syllabus as written, such as applicable United Kingdom legislation, may be inappropriate. In these instances the Training Provider shall offer IBOAS as an alternative. Any resulting changes must then be approved in writing and in advance of the training by the examining body to ensure consistency of the taught material, examinations and examination standards; the examining body cannot modify the papers or the marking scheme on an ad hoc basis. The CEA shall be kept informed, in writing and in advance, of all changes and agreements. The CEA will have final approval of any changes, taking into account the recommendation(s) of the examining body. The Assessors shall be adequately briefed of any changes and it is the responsibility of the examining body to ensure that this is performed. Any associated charges to be levied by the examining body, oral examiner(s) and the CEA for the preparation of such courses, together with payment terms, shall also be agreed in advance and in writing between the candidate’s employer, the Training Provider, the Assessment body, and the CEA.

Examination objectives: candidates are expected to be able to answer both written and oral questions based on the syllabus. The key objectives for each module are stated in this document and it is expected that they will form the core of the examination papers; although questions may be drawn from any part of the syllabus. Candidates are additionally expected to be able to relate the course to the plant at which they are working during the oral examination; it is not expected that this element will form part of the written questions.
1) FUNDAMENTAL TERMS AND CONCEPTS

A) Principles covered

1. **Terms:** temperature, gauge pressure, absolute pressure, differential pressure, enthalpy, specific enthalpy, specific heat capacity, specific volume and density.

2. **Units:** SI and Imperial, use of conversion tables.

3. **Terminology related to steam:** sensible heat, latent heat, superheat, sub-cooling, boiling point, saturation temperature and pressure, two phase fluids (liquid-vapour mixture), flash steam, wet steam, dry steam and dryness fraction.

4. **Steam tables:** use of and standard notation.

5. **Functions of a boiler:** energy converter, heat exchanger and a store of energy. Over-pressure, low water condition, tube failure, catastrophic failure. From and At rating. Reasons for using steam.

6. **Steam generation inside a boiler:** application of the above terminology, change in density with pressure, two phase nature of water when the burner is firing. Effect of operation on the water level. Priming and carry over.

7. **Steam distribution:** how steam moves around a distribution system, effect of this movement on the steam. Heat loss from steam and condensate lines, the effect of insulating lines. Principles of steam line design: pressure rating and maximum bulk velocity. Line sizing for velocity limits. Effect of pressure changes on line velocities. Use of pressure reducing equipment. Effect of sudden high demand on the boiler (demand surge). An overview of equipment used on steam distribution lines. Safe practice when opening and closing manual valves on steam lines (hot and cold).


9. **Steam system hazards:** steam hammer, plug flow water hammer, condensate induced water hammer, column closure water hammer. Line erosion and corrosion leading to line rupture.

B) Examination Objectives

a. Understand and explain the terms and concepts in 1A.

b. Relate the terms and concepts to steam generation and distribution under normal operation.

c. Understand and explain how and when undesirable outcomes may result in steam generation and distribution. Emphasised: flash steam, over-pressure, low water condition, tube failure, catastrophic failure, demand surge, priming, carry-over, and steam hammer, types of water hammer, line erosion / corrosion and line rupture.

d. Read and understand a set of steam tables and simple heat calculations. The ability to perform complex calculations is not required.

e. Understand and explain the outline functions of a boiler and why steam is used.

f. Explain the changes that occur in the boiler when the burner is firing as opposed to when the burner is not firing. Emphasised: the effects of changes in density and of steam bubbles below the free surface of the water when the burner is firing; Explain the way water circulates through the tubes and the necessity to ensure that circulation is achieved especially on cold start up.

g. Understand and explain how and why steam moves around a distribution system and what happens as it does. Understand the functions of basic distribution system equipment such as a trap.

2) TYPES OF FUEL, COMBUSTION AND DRAUGHT

A) Principles Covered


9. Ventilation: reasons for, consequences of inadequate ventilation. Forced ventilation systems and consequences of failure of these systems.

10. Burners: principles of the major types of burner, modulation and turndown. Control systems and features which enhance fuel efficiency.

11. Safety features: air purge (post & pre firing), safety interlocks, slam-shut valves, fusible links, fire detectors, smoke alarms, carbon monoxide detectors, gas detectors. Periodic testing, testing after maintenance or repair. Systems of oversight for workers and contractors. Required qualifications for workers or contractors with specific relation to fuel systems.


B) Examination Objectives

a. Relate the terms and concepts in 2A to operation under normal and abnormal conditions.

b. Emphasised: the ability to identify hazards, unsafe conditions and the importance of testing safety systems and systems of oversight.

c. Describe the fuel system fitted to their boiler plant. State the factors which might give reason to suspect a fuel leak, and the actions which should be taken. Describe the hazards associated with a fuel leak that might occur on the candidate’s plant.

C. Describe the methods of safe start-up and shut-down of the burner, and the procedures to be followed if a burner does not ignite properly at start-up. Describe the procedure for changing fuel.

e. Understand and explain required regular checks and tests; when & how they should be performed.

f. Explain the procedures for service and maintenance of the burner equipment at the candidate’s own plant. Describe the ventilation system(s) fitted to the candidate’s own plant.

g. Understand what would be considered typical levels of oxygen and carbon dioxide in a boiler exhaust for common fuel types and relate these to candidate’s own plant.

h. Understand emissions levels of carbon monoxide and oxides of nitrogen in general and relate these to the candidate’s own plant.

NB: It is not intended that a boiler Operator or Manager should perform work on a fuel system; such work is the duty of an appropriately trained and competent person. The intended scope of this training syllabus is to ensure that the trained boiler Operator or Manager has a basic understanding of fuel safety, and recognises the need to engage appropriately qualified persons to perform any work necessary on the fuel systems within their boiler plant.
3) FEED WATER

A) Principles Covered


4. Pumps and controls: on-off, methods of modulation, control systems, Relationship of boiler size and feed water temperature to feed water pump and control systems.

5. Chemical dosing: reasons for. Methods of dosing, location of dosing systems. Typical chemicals which are dosed. Safe handling (PPE) and storage - COSHH regulations and use of Material Safety Data Sheets (MSDS). Hazards associated with common chemicals. Fault identification, reporting and remedial action.

6. TDS blowdown systems: intermittent and continuous, comparison between in terms of effectiveness and efficiency. Allowable levels of TDS in different types of boiler. Systems of oversight with respect to TDS blowdown. Fault identification, reporting and remedial action.


8. Sampling: location of sample points. Typical checks and tests and their frequency. Types of instrument used for testing.

9. Level controls: types of level control. Importance of testing level controls, frequency and methods of testing. Hazards which may affect the operation of level controls. Potential effects of poor water treatment. Fault identification, reporting and remedial action.

10. Carry-over: causes and hazards that arise. Foaming, priming. Hunting of water level controls. Steam and possible modes of water hammer which may arise from improperly maintained or operated boilers.


B) Examination Objectives

a. State the common impurities in raw water.
b. State the effect of impurities on boilers and boiler operation.
c. Describe a method used for treating raw water. Describe the water treatment system and testing procedure at the candidate’s own plant. Relate the terms and concepts in 3A to operation under normal and abnormal conditions.
d. Explain methods for chemical dosing of boiler water.
e. Describe the methods used to check the condition of boiler water. Describe the system for chemical dosing employed at the candidate’s own plant.
f. Explain the action(s) needed to maintain an optimum condition of the boiler water. Interpret the results of water tests and state conclusions. Describe the actions to be taken if the permitted levels of impurities are exceeded.
g. Indicate manual and intermittent/continuous blowdown valves and the manner of operating these.
h. List possible hazards due to carry-over.
i. List possible hazards due to scale formation within the boiler.
4) BOILERS, CONTROLS AND INSTRUMENTATION

A) Principles Covered

1. Water tube and sectional boilers: description and use including construction features of different types of water tube boilers.

2. Other types of boiler: shell boilers, once through / coil boilers, waste heat boilers, combination boilers. Simple descriptions of. Comparison between. Construction features. Note: these are included in the syllabus for awareness. It is not intended that they are subjects for examination.


5. Boiler house arrangements and alarms: systems of alarms, boiler house arrangements.

6. Fittings: list of fittings required by law. Purpose of these fittings.


B) Examination Objectives (Written)

a. Identify the different types of boilers commercially available and describe their basic construction. Describe type of boiler in use at the candidate’s place of work. Note: where a candidate operates equipment fitted with air-preheaters or superheaters it is intended that the oral examination should cover these areas.

b. State the fittings and mountings required to comply with established safety standards and legal requirements.

c. Describe and explain the type and function of the level and pressure control systems fitted to the candidate’s boiler(s). Describe the associated alarms and required response to these alarms.

d. Describe checks for proving instruments and controls and the procedure for reporting defects. Explain when safety controls should be tested - routine and ad hoc.

e. Explain the function and application of instruments for monitoring and troubleshooting. State the principal measurements relevant to a boiler house. Identify and explain any measurements taken at the candidate’s own plant.

f. Indicate the circumstances which would cause instrument inaccuracy to be suspected.

Note: many instruments which are used for monitoring and troubleshooting may also be used to determine efficiency. These functions have been separated within the syllabus for clarity.

5) OPERATION

A) Principles Covered

1. Preparation: basic general procedure for cold start: pre-filling checks, inspection, drains and air cocks, filling and venting, and precautions to be observed. Procedure for laying up a boiler for a short period. General procedure for starting a boiler with residual heat following a short lay-up.

2. Raising pressure: initial checks, ignition procedure stabilization of combustion/flame, action to be taken in the event of failure to stabilize flame. Equalization of boiler temperature incorporating start up curves. Use of manual blow-down and air cocks to assist circulation, rate of pressure rise. Warming-up procedure for boiler and steam distribution systems. Thermal expansion during cold start.

2. Special precautions: to be observed with boilers fitted with superheaters or economisers i.e. use of drains for purging or water flushing, for cooling of elements, by-pass damper control.

4. On-load operations: Inspection of plant during operation, reporting of defects and faults. Checking for fuel or combustion gas leaks. Testing of safety equipment and devices (on boilers with more than one safety valve is there a specific order of operation i.e. with superheater safety valve). Water level gauges, water alarms and flame failure equipment. Blowdown procedures and precautions to be taken. Arrangements for short term and long term laying up of plant. Procedures during banking up and shutdown periods. Inspection on plant whilst not in operation. Liaison with those in authority. Safe isolation prior to carrying out repairs, modifications, or examinations.

5. 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. Tube failure. Awareness of the time to enter a dangerous condition following an alarm. Actions to be taken following the activation of a safety-related control system, and the checks and monitoring to confirm that the automatic controls have responded appropriately. Impact of abnormal conditions on a boiler.

6. Routine checking: of special automatic controls for the boilers subject to limited supervision.

7. Preparation and use of log sheets: as a record of boiler operation and the information that should be logged. Recording of Operators’ own observations. Target figures as an indication of boiler thermal losses and overall plant performance. Importance of noting trends in logged instrument readings as an aid in diagnosing problems. The need to report problems and to secure corrective action.

B) Examination Objectives

a. Explain the procedure for starting a boiler when cold and bringing a boiler back online after a short lay-up. Identify all drains and air-vents relevant to start-up and shut-down procedures. Explain the procedure for coupling to the steam main.

b. Demonstrate gauge glass drill. Explain how water level controls are proved (the evaporation test). Explain any additional requirements / tests needed for level controls mounted in external chambers. Demonstrate how flame failure protection equipment is proved.

c. Explain the procedure for on-load control.

d. Explain the procedure for isolation and shutting down.

e. Identify the principal operating hazards to plant and life.

f. Describe the inspection procedure for plant during operation.

g. Describe methods of identifying and recording defects.

h. Explain the procedure for initiating defect repair.

i. Demonstrate the appropriate responses to alarms and abnormal (but foreseeable) events such as a safety valve acting. Demonstrate how to deal with an abnormal operating condition.

j. Describe a system of logging tests and the procedure for initiating action as a result of a test.

k. State the action required when an abnormal condition occurs.

l. Describe the procedures in preparing plant for short and long term lay-up and statutory inspection.

6) SAFETY AND LEGAL REQUIREMENTS

A) Principles Covered

1. Basic need for safety:; attitudes to safety. Principal causes of accidents and legal implications. Importance of recording events. Consequences of action or omission of action in response to a an observed hazard, dangerous occurrence or accident

2000 (as amended). Reporting of Industrial Diseases, Accidents and Dangerous Occurrences Regulations (RIDDOR), Provision and Use of Work Equipment Regulations (PUWER). Duties of employers and employees in respect of these regulations. Practical application. Sources of information and advice.

3. Legal requirements: written scheme of examination, statutory examination by a competent person.

4. Codes of Practice and guidance: ACoP to the PSSR, HSG253, Difference between an Approved Code of Practice and Advice.

5. Safety rules and practices, the meaning of ‘a safe system of work’ incorporating, as best practice and where appropriate a risk assessment, method statement and a Permit-to-Work system. The legal requirements pertaining to risk assessments. Personal protective equipment appropriate to the working environment / task. Dangers of asphyxia, carbon monoxide poisoning. Explosion hazards. Good practice with respect to escape routes and location of emergency stops / fuel isolation valves. The need to prove that vessels or lines normally are under pressure are at atmospheric pressure and safe temperature before commencing works with the intention of gaining access to the pressure side. The need for safe isolation prior to carrying out maintenance and examination. Methods of isolation compliant with the ACoP to the PSSR and HSG253. The specific hazards and risks associated with confined space entry. Actual or suspected occurrence of asbestos: reporting. Asbestos surveys.

6. Requirement for special training and competence prior to working on asbestos containing materials.

7. Basic safety precautions to be taken with industrial gas installations, safe sampling procedures, safe blowdown practices, confined space precautions.

8. Good and bad practices: procedures on commencing and concluding shifts. Precautions to be observed before, during and after work on a boiler. Good housekeeping and cleanliness.

9. Permit to work: awareness of the need for a permit to work, with special reference to work such as inspections being performed within an operating boiler house.

B) Examination Objectives

a. Define the principal responsibilities of employers and employees. Explain the health and safety reporting procedure for the boiler house being operated and compare to best practice.

b. Explain the principal hazards associated with steam boilers and their operation. Explain action(s) to be taken in the event of a dangerous occurrence or accident. Explain the hazard associated with asbestos, the need to report it and the need for special training for persons working with asbestos.

c. Outline the principal basic safety procedures and the consequences of failing to follow procedures. Relate risk assessments, method statements and permits to work to the candidate's own plant.

d. Relate the concepts underpinning applicable legislation and regulations to the candidate's work activities. (This should be appropriate to the candidate's role and responsibility). Describe how HSE guidance documents and Approved Codes of Practice may be used.

e. Explain briefly the method of preparing a boiler for statutory examination and the reasons for such examinations. Managers: state the actions to be taken in response to the recommendations from the examination report.

f. Explain importance of logging observations, particularly defects, and understanding the legal significance of omission of action with regard to safety related faults.

g. Describe the alarm systems installed at the candidate's place of work, how frequently they are tested, and the test methods.

h. Describe the procedures to be followed in response to an alarm. (Both alarms fitted to the boiler and other alarms at the candidate's site (e.g. fire alarm)).

i. Describe the supervision arrangement at the candidate's own plant. Describe the procedures to be followed in the event of the manning levels being changed.
7) EFFICIENCY AND ENVIRONMENT

A) Principles Covered

1. **Terms:** combustion efficiency, thermal efficiency, plant efficiency. Direct and indirect efficiency. Practices to maximise efficiency.

2. **Installed instruments:** temperature measurements, pressure measurement, flow measurement steam, water and fuel. Exhaust gas analysis: typical levels of oxygen, carbon monoxide and carbon dioxide. Use of installed instruments to maintain efficient operation.


4. **Discharges to drain:** applicable legislation, maximum discharge temperature, discharge consent. Emissions from blowdown vessels.

5. Waste disposal: need for appropriate, safe disposal of waste or chemicals. Methods of achievement.


B) Examination Objectives

a. State the methods commonly used to establish boiler efficiency. Describe the instruments provided at the candidate’s place of work which may be used to determine overall boiler house efficiency.

b. State the factors which affect boiler efficiency. Point out possible sources in the boiler house of a potential reduction in efficiency.

c. State possible causes for a decrease in boiler efficiency. Suggest possible measures which may be taken to improve boiler house efficiency.

d. State what indications there may be of a reduction in efficiency.

e. Describe systems which may be used to improve plant efficiency.

f. Identify the primary emissions associated with liquid and gaseous fuelled plants.

**g.** Describe the effects of emissions. For candidates operating large plant: state the legislation applicable to large boiler plant regarding emissions. Point out the location of any permanent instruments to measure emissions. State the permitted emission limits for the plant in use, readings to be taken and frequency of testing.

h. Point out the location of access

8) SOLID FUELS

A) Principles covered


2. Delivery, handling and storage: precautions to be observed during delivery and unloading. Types of bunkers and receivers for different types of solid fuel. Special handling requirements for friable bio-mass fuels. Risk of dust explosion due to fuel degradation or over-handling. Risk of fire due to poor storage. Special considerations for long term storage. Potential for digestion
of stored bio-mass fuels – contingent risk of uncontrolled releases of carbon monoxide, carbon dioxide and methane.


4. Safety systems: fuel isolation systems, fire detection systems (boiler house and fuel handling systems). Sprinkler systems. Carbon monoxide and carbon dioxide detection systems in the boiler house and fuel storage areas. Considerations with respect to fuel stores which may constitute an enclosed space.


6. Emissions to air: emissions which are of special significance with respect to solid fuel boilers: smoke, soot, PM1 - PM10 particulates, heavy metals, Persistent Organic Pollutants (POP's), typical levels of carbon monoxide in the exhaust. Changes in emissions due to change in fuel grade / type. Legal considerations with respect to burning “waste” as defined by the Waste Incineration Directive. Impact of smoke control zones (Clean Air Act), Local Authority Air Quality Management Areas (AQMA).

7. Sources of guidance and information: Health and safety in biomass systems, design and operation guide (CEA and the Carbon Trust). HSE bulletin OPSTD 3-2012, risk of carbon monoxide release during the storage of wood pellets.

B) Examination Objectives

a. For the candidate’s place of work, describe the type of fuel used, fuel handling systems, boiler plant (including combustion system) and ash removal systems. Identify specific hazards associated with solid fuels and methods of mitigation. Note: a general appreciation and understanding of alternate solid fuel plant and associated systems is also required of the candidate.

b. Identify and describe the properties of solids fuels. Describe how poor handling / storage may cause hazards and / or operational problems with solid fuels.

c. Identify and describe the special operating characteristics of solid fuel fired boilers e.g. ignition delay, sinking time, load following. Describe any safety systems particular to the operation of solid fuel fired boilers and action(s) to be taken in the event of their deployment.

d. Compare the characteristics of solid fuel fired boilers to those of conventionally fuelled boilers.

e. Identify and describe the emissions of solid fuel boilers and any special testing regimes/safety procedures to be observed. Describe the legal constraints attached to solid fuel fired boilers with respect to emissions.

f. Identify sources of guidance associated with solid fuel fired boilers. Describe the required manning levels in relation to solid fuel boilers (for the candidate’s place of work).

g. An awareness of the risks posed by carbon.

9) MANAGEMENT

A) Principles covered


3. Legislation and advice: requirements placed on management by legislation identified in Module 6. Use of advice as an aid to design and specification. Limitations of use of advice for design and specification. Benefits of written procedures. Writing procedures, involvement of boiler Operators in writing procedures. Understanding the Written Scheme of Examination - the process, the report and implementation of any required or recommended repairs / changes. Role of third parties (i.e. boiler inspectors) when managing safety.


8. Environmental: conversion of cost / fuel consumption into CO₂ output. Benefit of economical operation to carbon dioxide emissions. Effects and benefits of economical, effective operation on other emissions (NOx, SOx etc.). Dispersal of emissions via the chimney. Greenhouse effect, acid rain, local pollution.

Note: it is not intended that candidates are instructed in depth in the formulation of complex risk assessments or management techniques. It is sufficient to identify different types and explain good / bad practice in relation to them.

B) Examination Objectives

a. Interpret and explain legal requirements from a management perspective. Explain candidate’s own responsibilities under applicable legislation. For their place of work: explain how aspects of responsibility which are not within their remit are covered.

b. Explain the importance of risk assessments, identify aspects of boiler operation where they should be employed. Understand that different types of assessment may be required depending on the situation. Explain the risk assessments and procedures in place at the candidate's plant. Identify any areas for improvement.

c. Explain the use and benefits of instrumentation for monitoring and how it may aid fulfilment of legal requirements / demonstration of record keeping risk reduction, cost reduction.

d. Demonstrate understanding of the pollutants emitted on site and their effect on the environment.

e. Demonstrate understanding of the impact of poor operation on the running of safe, effective and efficient plant. Explain the procedures to be followed at the candidate's plant in the event of an alarm and following an accident.

f. Calculate a simplistic specific cost of steam based on a fuel price and efficiency.

g. Demonstrate an understanding of how poor specification may result in poor operation.
Appendix 6 – Assessor’s Guide

BOAS Assessors will work to the current version of the Assessment Manual published by Kiwa. The current issue of the manual takes precedence over details described in this Appendix.

App 6.1 - Assessor Pre-requisites

6.1.1 Any individual who wishes to be registered with the CEA as an Assessor of BOAS candidates must meet the following pre-requisites and be approved by a suitably experienced panel of CEA Officers and Members:

A. The Assessor or their employing Independent Assessment Body must be a member of the CEA and ascribe to its values. The appointment of an Assessor is for the named individual person only and substitution is not permitted. Assessors will be appointed for one or more of the BOAS Categories (Cat 1, 2 or 3) as appropriate.

B. The potential Assessor must provide their CV for review in the first instance. This should provide evidence of their suitability, past experience and knowledge of boilers and steam raising plant.

C. The potential Assessor must attend an evaluation interview to demonstrate they have the required competence and credibility to be able to effectively assess BOAS Accreditation candidates. Should there be a shortfall in the potential Assessor’s knowledge this must be addressed within 6 months of the first interview.

D. The potential Assessor must be willing to contribute 1 day per year towards the development of the BOAS scheme including to the syllabus, handbook and its governance, and 1 day for the regular Assessors CPD meeting organised by the Assessment Body.

E. A Trainer is not restricted from making an application for registration as an Assessor. Once licenced any individual can train or assess any candidate providing they do not assess the candidates they train.

F. Any suitably experienced Assessment Body employee or CEA Officer has the right to conduct an ‘on-the-spot’ assessment of any Assessor without warning, to ensure confidence and consistency in the way candidates are being assessed.

G. The CEA has the right to revoke the licence of any Assessor at any time.

App 6.2 - Assessor Responsibilities

6.2.1 Assessors should have a proven in depth knowledge of boiler plant operation. They will have been interviewed and accepted by the CEA.

6.2.2 Assessors are responsible for:
   A. ensuring that each candidate is aware of the Assessor’s role and responsibility in the collection and presentation of evidence.
   B. following assessment guidance provided by the CEA.
   C. demonstrating commitment to anti-discriminatory practice and equal opportunities.
D. checking the candidate's identity through photo, signature and home address checks of acceptable documents.

E. observing candidates’ performance in real or simulated conditions and/or conducting other forms of assessment in accordance with the requirements of the certification body.

F. ensuring health, safety and environmental protection procedures are applied during the assessment process to include:
   i. being familiar with the location and operation of emergency isolation controls in the assessment area;
   ii. stopping assessment activity where a candidate undertakes the activity in a manner that is likely to endanger themselves or others;
   iii. knowing the procedures to summon emergency help if required.

G. recording all questions used and answers given for the purposes of meeting the evidence requirements (see form below).

H. judging the evidence and making assessment decisions against the relevant the CEA requirements.

I. ensuring validity, authenticity, currency and sufficiency of evidence produced by candidates.

J. discussing potentially deferred candidates with the Training Provider to ensure all factors have been taken into account.

K. maintaining accurate records of assessment activity and candidates’ achievement.

L. confirming that candidates have demonstrated competence/knowledge and fully complete the required documentation including Evidence Packs and Work Experience.

M. keeping themselves up to date with CEA requirements relating to the quality control of the qualification(s).

N. agreeing new assessment plans with candidates where further evidence is required.

O. making themselves available for discussion with the internal verifier and/or the CEA external auditor.

P. maintaining confidentiality for sensitive information.

Q. confirming and countersigning the assessment decisions made by new assessors and assessors who are working towards being accepted into an assessor role.

R. preparing and submitting in a timely manner assessment decision documentation.

S. maintaining their CPD (Continuing Professional Development) in their assessor role.

T. supplying brief written comments regarding the quality of the Training Provider’s courses after each programme using the form in App 6.

U. observing the examination process to check that the arrangements will ensure the integrity of the BOAS scheme, and completing a course feedback form for each training course where they assess (see form below).

6.2.3 Assessors may undertake other roles and duties within and for the CEA but assessment of candidates must be conducted by persons who were not involved in training the candidate. The CEA recognises and acknowledges that in some cases this may be difficult; however, the CEA requires that assessors seek to find ways of achieving this.

6.2.4 Assessors who also undertake internal verifier duties must not internally verify their own assessment practice and decisions.

6.2.5 Regular Assessor meetings held by the Assessment Body provide a forum for discussion of any issues identified by Assessors, and Assessors should make every effort to attend and not miss two meetings in succession.
6.3.1 The Assessor will be interviewed by a suitable panel of CEA Officers and Members to determine that he has a sufficient and broad knowledge of the type of boiler plant that he is assessing, and that he has a suitable personality to enable him effectively to engage with the Candidates.

6.3.2 Prior to the assessment interview, the Assessor must review:

1. The candidate’s Application Form, and establish the candidate’s identity.
2. The supporting documents as required for the category of the application, including Evidence Packs.
3. Examination Papers relevant to the class and Category of the proposed award.

6.3.3 In reviewing the supporting documents, the Assessor may find that there are certain items which do not comply with recognised best practice. These should be discussed with the candidate, but so long as he demonstrates awareness of such shortcomings and any resolution, this should not be used to mark-down the candidate in the assessment; one of the purposes of the BOAS course is to enable candidates to identify better working practices for their organisations. The Assessor may state that the candidate has not yet provided enough evidence to demonstrate competence in boiler operation and will defer completion of the assessment until the appropriate documentation is received. In cases of imminent danger the candidate will be advised to discuss the matter with his Manager immediately on return to work.

6.3.4 When discussing Papers with the candidate, the Assessor should not only focus on “wrong” answers. It must be borne in mind that some of the correct answers given against multiple-choice questions could have been guessed. Equally, in order to evaluate the candidate’s complete understanding of an issue it may be good practice to ask them to explain some of their “right” answers.

6.3.5 It must be recognised that not all candidates will be able to produce the full set of supporting documents for their Evidence Pack. This in itself does not constitute grounds for failure of the candidate as long as he shows sufficient awareness of what ought to be implemented at his workplace. However, where candidates do not provide sufficient site information to enable the Assessor to form a considered view of the candidate’s knowledge and experience, the Assessor may record a ‘deferred pass’ and require the candidate to submit the missing information for later review and a decision when sufficient evidence is available.

6.3.6 The assessment interview should be conducted so as to put the candidate at ease; there is no desire to intimidate or cause confusion by generating trick questions. It may be necessary to inform the candidate that the exam papers are not a test of English grammar or spelling: the ultimate purpose is to assess an Operator’s or Manager’s ability to work safely with a boiler and the Assessor must be able to understand what is written.

6.3.7 The purpose of the interview is to enable the Assessor to determine that the candidate has sufficient knowledge of the subjects covered by the BOAS syllabus that he may be relied upon to operate or manage that plant in a manner which is consistent with recommended safe practice and in an efficient manner in accordance with sound practices.

6.3.8 The assessment is not a judgment of the candidate’s particular site or the plant with which he works. It is to ensure that he is fully aware of how that site and plant should operate. However, if the Assessor uncovers an issue which he considers is dangerous, unsafe, or potentially illegal he should inform the candidate, ask for the candidate’s view on the matter, and seek some reassurance that the
matter will be raised to management level when the candidate returns to work. A record of any such issues shall be made.

6.3.9 Whilst discussion of technical issues that a candidate may have on their plant may occur during the assessment, it is not part of the Assessor’s role to offer formal guidance on plant operation. Any such guidance would be provided outwith their contract with the Assessment Body and must be transmitted via the Training Provider.

6.3.10 The Assessor will complete a Candidate Assessment Report for each candidate (see format below). For candidates who are to be recommended for a ‘pass’ the form shall be fully completed and signed by the Assessor and sent to the Training Provider so that they can attach all the candidate’s evidence and other documentation and forward the completed candidate pack to the Assessment Body. For candidates who are deferred, the form shall be retained by the Training Provider for later completion when the deferred items are complete, and the Training Provider will advise the candidate of the items still to be completed.

6.3.11 The limit of the Assessor’s role is to either recommend a ‘pass’ for the candidate under the aforementioned criteria, or to determine that he is not yet competent. In exceptional circumstances where a ‘sound reason’ can be given the completion of the assessment may be ‘deferred’ for a maximum of six months. The Training Provider must be informed of all deferred passes, the reasons for the deferral, and the Assessor’s plan for the candidate to achieve a pass. The training provider is responsible for transmitting this detailed information to the candidate and arranging for the necessary remedies.

6.3.12 Examples of sound reasons for deferral of the completion of the assessment are:

* The candidate was unable to provide evidence that he has the minimum required experience required by BOAS. In this case a plan must be agreed with the Assessor of how the experience will be gained and demonstrated within a set timeframe of no more than six months. Suitable evidence in such a case would be a letter from the Employer, supported, for example, by copies of boiler house records.

* The candidate has provided insufficient (or incorrect) documentation to satisfy the Assessor that they met the requirements of BOAS. In this case a plan must be agreed with the Assessor to provide the necessary, validated documentation within a set timeframe of no more than six months.

* The candidate has not got access to a fully operational plant because it is still under construction. In this case a plan must be agreed with the Assessor to provide the necessary, validated documentation within a set timeframe of no more than six months after completion or handover of the plant.

6.3.13 It is anticipated that the interview will typically last between 30 and 60 minutes, but additional time should be made available to those candidates who are having difficulty with the examination and/or interview process.

6.3.14 When candidates fail to reach the required minimum score on exams the Assessor should inform the Training Provider immediately and allow the candidate to re-sit one exam on the following day. The interview will then be scheduled for later in the day if time and facilities allow. In every case, regardless of the actual score on exams, Assessors must interview candidates and discuss with them the options for re-sitting exams and further interviews if necessary.
### Candidate Assessment Report v7

**Candidate name:**

<table>
<thead>
<tr>
<th>Date of assessment</th>
<th>Training Provider</th>
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</tbody>
</table>

**Candidate’s photo ID** (record type of document only)

**Candidate’s address** (record type of document only)

**Candidate’s signature verified** | YES/NO | **Evidence Complete** | YES/NO |

**Assessment class** *(for dual award tick both)*

- **Boiler operative**
- **Boiler manager**

**Assessment type**

- Initial assessment
- 5 year renewal

**Previous BOAS Certificate no. for renewals**

**Plant type – tick all that apply**

- Category 1: Hot Water Boilers
- Category 2: Shell type (Fire tube) Steam Boilers
- Category 3: Water tube Steam Boilers

### PART 1 - ASSESSOR’S REPORT

(select one and fill in relevant spaces)

**Has met the requirements of the assessment** | **Has NOT met the requirements of the assessment**

**IF CANDIDATE HAS NOT MET REQUIREMENTS – PLAN FOR ACHIEVING CERTIFICATION**

- **Re-sit papers:** [within 90 days] by date
- **Submit evidence or experience by** date
- **Be re-interviewed:** [within 6 months] by date

**Re-sit entire assessment**

**Sign-off**

<table>
<thead>
<tr>
<th>Name</th>
<th>Date</th>
<th>Signature</th>
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**Assessor**

<table>
<thead>
<tr>
<th>Oral examination duration</th>
<th>minutes</th>
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**SUMMARY OF ASSESSMENT AND ANY MINOR DEFICIENCIES DISCUSSED**

(continue on another sheet if required)
### PART 2A - EXAMINATION RESULTS FOR CATEGORY 2 ONLY

<table>
<thead>
<tr>
<th>Examination dates</th>
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<tbody>
<tr>
<td>Paper 1 Operator</td>
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<tr>
<td>Paper 2 Operator</td>
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<tr>
<td>Paper 3 Operator</td>
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<td></td>
<td></td>
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<tr>
<td>Paper 4 Manager</td>
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<tr>
<td>Paper 5 Operator Renewal</td>
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<tr>
<td>Paper 6 Manager Renewal</td>
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<tr>
<th></th>
<th>Actual mark</th>
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<tr>
<td>Paper 2 Operator</td>
<td>70%</td>
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<td>70%</td>
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</tr>
<tr>
<td>Paper 3 Operator</td>
<td>70%</td>
<td></td>
<td>70%</td>
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<tr>
<td>Paper 4 Manager</td>
<td>70%</td>
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<tr>
<td>Paper 5 Operator Renewal</td>
<td>70%</td>
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<td>70%</td>
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<tr>
<td>Paper 6 Manager Renewal</td>
<td>70%</td>
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<td>70%</td>
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</tbody>
</table>

< 50% = re-sit; 50% - 70% - oral review of incorrect answers (oral review may lead to pass or re-sit); >70% = pass

### PART 2B - EXAMINATION RESULTS FOR CATEGORY 1, CATEGORY 3 AND IBOAS ONLY

<table>
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<tr>
<td>Paper 1</td>
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<tr>
<td>Paper 2A Operator additional category</td>
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<tr>
<td>Paper 2B Manager</td>
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<tr>
<td>Paper 2B Manager additional category</td>
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<td>Paper 3</td>
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<td>Paper 4</td>
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<td>Paper 5B</td>
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<td>80%</td>
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<tr>
<td>Paper 2B Manager additional category</td>
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<td>80%</td>
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<tr>
<td>Paper 3</td>
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<td>min 50%</td>
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<tr>
<td>Paper 4</td>
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<td>min 50%</td>
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<td>Paper 5A</td>
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<td>Paper 5B</td>
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<td>80%</td>
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</table>

Av 3&4 Target 70%

### ASSESSOR COMMENTS ON EXAM SCORES


### PART 3 – ORAL EXAMINATION – REVIEW OF EXAM PAPER QUESTIONS

<table>
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<th>BOAS paper No</th>
<th>Question No.</th>
<th>Comment</th>
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Please continue on an additional sheet if necessary.
Candidate name: 

### PART 4 - DEFERRED CANDIDATE INSTRUCTIONS FOR NEXT ASSESSMENT

<table>
<thead>
<tr>
<th>Deferred Candidate - Additional Evidence Requirements &amp; Timescale</th>
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<table>
<thead>
<tr>
<th>Deferred Candidate - Topics to be Covered in Re-Assessment (With Reasons)</th>
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<table>
<thead>
<tr>
<th>Deferred Candidate – Additional Information</th>
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Assessor’s “course feedback” form v7

<table>
<thead>
<tr>
<th>Training Provider:</th>
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<tbody>
<tr>
<td>Trainer name (1):</td>
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<tr>
<td>Trainer name (2):</td>
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<td>Trainer name (3):</td>
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</table>

<table>
<thead>
<tr>
<th>Operators Managers</th>
<th>Category</th>
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<tbody>
<tr>
<td>Course dates:</td>
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<tr>
<td>Course location:</td>
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<tr>
<td>Assessor name:</td>
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</tbody>
</table>

| Code of exam papers used | No of candidates |

GUIDANCE NOTES

The boxes provided are for recording of observations. One form per course is sufficient. Assessors are not required to investigate or assess TPs or trainers. This form is to be returned directly to Kiwa on completion of each course.

Where Candidate Performance for each paper is mentioned, the objective is to identify if there are common knowledge gaps evident in answers to questions on general or specific topic areas etc. It is feedback on the observed outcome of training rather than the training per-se. Issues with clarity and accuracy of questions should also be highlighted.

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Comments</th>
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<tbody>
<tr>
<td>Facilities:</td>
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<tr>
<td>Were these such as to enable robust assessments of the candidates?</td>
<td></td>
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<tr>
<td>Was there anything that might compromise the integrity of the assessment process?</td>
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<tr>
<td>Aspect</td>
<td>Comments</td>
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<td>-----------------------------</td>
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<tr>
<td>Candidate Performance:</td>
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<td>Paper</td>
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<td>Paper</td>
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<tr>
<td>General Comments</td>
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</table>
Appendix 7 – Accountability flow chart

The BOAS training scheme comprises of four distinct stages which include the application process, training, assessment and registration. This flow chart outlines who is accountable for the different steps within each stage.

1. **CEA Produce Candidate Application Form as per Appendix 1 of current BOAS Handbook**
2. **CEA Authorise Training Providers/Trainers**
3. **CEA authorise syllabus and Learning Outcomes**
4. **CEA authorise examination Papers in accordance with approved syllabus/LOs**

**Complete Application Form and Evidence Pack/Experience record**
- **Candidate**
- **CEA**

**Select Training Provider**
- **Training Provider**
- **Assessment Body**

**Submit Form and full payment to Training Provider**

Training Provider receives Application Form and checks the validity of the application (i.e. completeness, prior experience, details of the candidate’s boiler plant and original qualification for renewing candidates)

Training Provider to train candidates for the BOAS qualification, covering the content defined in the authorised syllabus

**Allocate Assessors to Training Provider’s or candidate’s site**

Distribute Authorised examination Papers to Assessors

Assessment Process which includes written examinations and an oral interview at Training Provider’s or candidate’s site

Check all documentation suitable for registration at CEA

FOR DEFERRED RESULTS ONLY: Submit required information to the Training Provider

Training Provider checks evidence for deferred results

1. Check application form and evidence pack meets entry criteria
2. Check candidate’s marks on each paper exceed authorised Assessment Process thresholds
3. Check application form details align to question papers, evidence pack and Assessor reports
4. For renewing candidates, check original qualification

**Send all documentation to CEA**

CEA Certification Officer samples final paperwork and reports anomalies.

CEA Office issues certificate to successful candidate

Inform Training Provider and Assessment Body

CEA remind candidate to submit themselves for renewal before 5 years have elapsed to keep their registration current

Training Provider remind candidate to submit themselves for renewal before 5 years have elapsed to keep their registration current

CEA Office
Appendix 8 – Partner Protocols

The delivery of the BOAS scheme is by a partnership between the CEA, its appointed Assessment Body for the scheme (Kiwa Training), Assessors who are managed by the Assessment Body, and Training Providers/Trainers.

This Appendix defines the Protocols under which each partner operates with regards to the scheme and sets out the areas of responsibility and the processes to be followed by each of them.

8.1 - CEA Protocol

8.1.1 CEA Responsibilities

The CEA owns the scheme and training syllabuses and Learning Outcomes that it creates, and all certificates and ID cards issued in relation to successful completion of the assessment procedure.

The CEA is responsible, in conjunction with its Partners, for devising appropriate Learning Outcomes and issuing these to the Training providers. The CEA is responsible, in conjunction with its Partners, for devising appropriate Examination Papers and issuing these to the Assessment Body for use on relevant assessments.

The CEA is responsible for the final decision on issuing certificates. They make this decision based on the information pack submitted by the Assessment Body to the CEA Certification Officer.

The CEA is responsible for the selection, approval and ongoing monitoring and auditing of Training Providers, Trainers, and Assessors, and ongoing liaison with the Assessment Body.

8.1.2 CEA Processes

1 Training Syllabus and Learning Outcomes

The training syllabuses and Learning Outcomes for the scheme are defined by the CEA in consultation with its delivery partners; the Assessment Body, the scheme Assessors and the Training Providers/Trainers.

The syllabuses are based around industry recognised standards, HSE and other publications, ACoPs etc.

2 Training

The CEA will approve training materials produced by Training Providers to ensure courses are based on the content of the syllabuses and Learning Outcomes.

The CEA will interview potential Training Providers and inform the Assessment Body of all new Training Providers appointed and changes to scope of existing Training Providers.

The CEA will periodically audit the provision of Training Courses and the performance of Trainers and Training Providers. ‘Yellow cards’ may be issued as a reminder to Training Providers who routinely do not follow the scheme requirements or consistently report low KPI scores.

3 Assessors

The CEA will interview potential Assessors and inform the Assessment Body of all new Assessors appointed and changes to scope of existing Assessors.

The CEA will periodically audit the performance of Assessors.

4 Certification

The CEA Certification Officer makes the final decision on the certification of all candidates with respect to satisfactory completion of the BOAS assessment process. The decision is final and supersedes any recommendation by an Assessor or by the Assessment Body.

Their decisions are based on a candidate’s certification information pack which is supplied to the CEA by the Assessment Body immediately following the assessment.
8.2 - Assessment Body’s Protocol

8.2.1 Assessment Body Responsibilities
The CEA has contracted an organisation as the Assessment Body for the delivery of the scheme and to provide technical input to the operation of the scheme. This is currently Kiwa Training.

The Assessment Body records all candidates and information related to them including their performance during the assessment process and any supporting documentation which they submit.

The Assessment Body collates the assessment findings for each candidate and provides this to the CEA for the Certification process.

8.2.2 Assessment Body Processes
1. Receive notification from Training Providers/Trainers of courses that are arranged, the number of candidates that the course is planned to accommodate.
2. Engage an appropriate number of Assessors for examination of candidates for each course of which they correctly are notified.
3. Inform Training Providers/Trainers/Assessors of the appropriate examination papers to be used for each course.
4. Receive Assessment reports and fees from Training provider.
5. Verify content and in particular confirm that exam results have been correctly entered.
6. Submit a candidate information pack to CEA. This comprises:
   - Application form with photograph;
   - Results summary sheet – for notification of candidates;
   - Assessment summary – including exam marks and a summary of the outcome of the oral examination.

NOTE: Assessments will not be processed (including internal verification) or submitted to the CEA Certification Officer until the relevant fees for Assessment and CEA Administration have been received from the Training Provider by the Assessment Body.

4. Provide Candidates with the Assessor’s recommendation, noting that this is subject to final approval by the CEA and that Candidates are not permitted to adopt the relevant designations until they have received the necessary notification from the CEA Certification Officer.

5. Pay to the CEA on demand the CEA Administration fees for each candidate collected by the Training Provider and passed to the Assessment Body at the time the candidate is assessed.

8.3 - Training Provider / Trainer’s Protocol

8.3.1 Training Provider Requirements
A. Plan courses and notify the Assessment Body well in advance of the number of candidates that are expected to undertake each course at the start of each course, using the form provided by the Assessment Body for that purpose.

B. Collect all the required information and fees from the candidates in advance of the course starting, and record the receipt of candidate evidence and other supporting information on the form provided for that purpose.

C. Within each course, deliver training which covers the full content of the relevant syllabus and Learning Outcomes and addresses the specific needs of the candidates.

D. Adhere to all guidance and directions from the CEA or the Assessment Body including but not limited to the
use of the set of examination papers identified for each course.

E. Submit all required information to the Assessment Body.

8.3.2 Training Provider Processes

1 Arrange course including identification of dates, location(s) and number of candidates.

2 To facilitate the engagement of the required number of assessors of the appropriate qualification, at least 1 month prior to the course, inform the Assessment Body of the number of candidates and the categories and grades for which each is seeking certification.

NOTE: Training Providers/Trainers are not permitted to select Assessors for their courses. Only assessments made by Assessors engaged by the Assessment Body will be accepted for verification and submission to the CEA for certification.

3 Collect all required candidate information and fees, and promptly pass to the Assessment Body the Assessment fees and the CEA Administration fees collected by the Training Provider from each candidate.

4 Execute training as planned.

5 Invigilate all written examinations. Training Providers are to ensure that candidates do not have the opportunity to share examination questions amongst themselves during the examinations; this particularly applies if the examinations are carried out at different times for different groups of candidates for administrative reasons, and every effort must be made to segregate candidates in these situations. Assessors are tasked with observing the examination process to ensure the integrity of the BOAS scheme. It may be necessary to inform the Candidate that the examination papers are not a test of English grammar or spelling: the ultimate purpose is to assess an Operator’s ability to work safely with a boiler.

6 Submit Candidate assessment reports, application forms, evidence packs AND fees to the Assessment Body.

8.4 - Assessor’s Protocol

NOTE: Nothing stated within this Protocol may be taken in and of itself to imply any Assessors eligibility for reimbursement with respect to fulfilling a CEA requirement such as submitting to internal or external verification actions.

8.4.1 Assessor Registration

Registration and revocation of registration of Assessors is at the sole discretion of the CEA and their decision is final.

Any individual who wishes to be registered with the CEA as an Assessor of BOAS candidates must:

• be approved by the CEA, and
• be or become a CEA member (either as an individual or on a corporate basis), and
• meet the requirements (A to D) set out below.

A. Provide evidence of their suitability, past experience and knowledge of boilers and steam raising plant. This must be in the form of a CV and will be reviewed by the CEA.

B. Pass an evaluation interview to demonstrate they have the required competence and credibility to be able to assess effectively BOAS Accreditation candidates in the appropriate BOAS Categories.

The CEA interview panel will also assess the potential Assessor’s temperamental suitability for the role and in particular their aptitude for engagement with Candidates. Successful attendance at a training course for Assessor Skills would be a distinct advantage.
If the potential Assessor cannot demonstrate at interview the **breadth and depth of knowledge** necessary to pass the interview they may present themselves for a repeat assessment within 6 months of their first interview.

C. Be willing to commit to contributing 1 day per year towards the development of the BOAS scheme including to the syllabus, handbook and its governance.

D. Be willing to accept the terms of engagement as a BOAS assessor which include:
   i. The prohibition of Assessors from assessing candidates that they have trained (should they also be registered as a BOAS Trainer).
   ii. The prohibition of Assessors carrying out internal verification of their own work.
   iii. The possibility of unannounced assessment by the CEA or one of their appointees (including CEA officers and the Assessment Body’s employees) of the quality and consistency of their assessments.
   iv. Making themselves available for discussion with the internal verifier and/or the CEA external auditor as required.
   v. Adherence to all guidance and requirements defined by the CEA as and when provided and in particular with regards to the quality control of the qualification(s).
   vi. Committing to continue to develop their knowledge and skills relative to their Assessor role.
   vii. Maintaining confidentiality for sensitive information.
   viii. The right reserved by the CEA to revoke Assessor registration at their sole discretion.

**NOTE:** The annual Assessor meeting held by the Assessment Body provides a forum for discussion of any issues identified by Assessors. It is a useful opportunity for Assessors to check that they are up to date with guidance and other matters relating to the scheme, and attendance is highly recommended.

**8.4.2 Assessor Responsibilities**

A. Adhere to all assessment guidance provided by the CEA.

B. Make each and every candidate aware of the Assessor’s role and responsibility in the collection and presentation of evidence within the BOAS assessment process.

C. Assess the validity, authenticity, currency and sufficiency of evidence produced by candidates to demonstrate that they have acquired the required minimum level of experience as set out in the BOAS requirements, and check the candidate’s identity against two separate pieces of documentation.

D. Assess candidates solely on the basis of the knowledge, understanding, skills and experience demonstrated; by the information submitted with their application, and by their performance within the written and oral examination process (including any observation of a candidates’ performance in real or simulated conditions and/or conducting other forms of assessment in accordance with the requirements of the assessor).

E. Ensure health, safety and environmental protection procedures are applied during the assessment process including:
   i. familiarity with the site safety procedures at all assessment locations including procedures to summon emergency help;
   ii. familiarity with the location and operation of emergency isolation controls in the assessment area;
   iii. prevention of candidates from undertaking any assessment activity in a manner that is likely to endanger themselves or others which may include terminating the assessment.

F. Recording all questions used in the oral examination and answers given such as to provide evidence of the candidate’s performance relative to the BOAS requirements. This also includes provision of a summary of each candidate’s performance in the oral examination in the assessment report which will be used by the CEA Certification Officer in making his certification decision.

G. Making an overall assessment of each candidate’s performance against the BOAS requirements checking that they have demonstrated the necessary competence/knowledge. Note that the BOAS assessment process requires proficiency in both written and spoken English, and in particular familiarity with the English words for
boiler specific terms. Lack of proficiency in English may result in candidates failing the assessment regardless of their technical capabilities and knowledge.

H. Agreeing new assessment plans with candidates and their Training Provider where further evidence or experience is required.

I. Providing a brief report on the administration of the training and examination process at the training location.

J. Assisting in the training of new assessors including confirming and countersigning the assessment decisions made by new assessors and assessors who are working towards being accepted into an assessor role.

8.4.3 Assessor Processes

A. Preparation
Prior to the assessment interview, the Assessor must review:
   1. The candidate’s Application Form and two separate forms of ID;
   2. The supporting documents as required for the category of the application
   3. Examination Papers relevant to the category and class (O or M, initial or renewal) of the candidate;

Based on this review the Assessor will identify areas of potential weakness in the candidate’s knowledge and understanding. They will also identify any knowledge areas that were not fully tested in the written examinations, for example some of the correct answers given to multiple-choice questions could have resulted from a guess. Equally, in order to evaluate the candidate’s complete understanding of an issue it is appropriate to ask them to explain some of their “correct” answers.

The review may identify responses from candidates that indicate that the recognised best practice is not being followed in their workplace. The existence of such discrepancies should not be assumed by the Assessor as in itself evidence of lack of knowledge on the part of the candidate. The Assessor should probe such instances to determine whether the candidate is aware of such discrepancies and understands their significance.

NOTE: Instances of such discrepancies in practice provide learning opportunities for candidates and help to promote awareness and adoption of better working practices for their organisations.

Where candidates have not been able to produce the full set of supporting information and documents for their Evidence Pack the Assessor will identify what areas of information are missing with a view to investigating their awareness of them including of what ought to be implemented at their workplace. The Assessor shall not pass the candidate if the Evidence Pack is incomplete, but report on the deficiencies and advise the Training Provider that they need to be corrected before accreditation can be given.

Overall this review provides the basis for questions to be asked during the oral examination of the candidate.

B. Oral Examination of candidates

The purpose of the interview to determine whether the candidate has sufficient knowledge of the subjects covered by the BOAS syllabus to enable them to operate or manage a boiler plant of the category for which they are seeking Accreditation in a manner which is:

- consistent with recommended safe practice;
- efficient;
- in accordance with sound operating practices.

It is anticipated that the interview will typically last between 30 and 60 minutes, but additional time should be made available to those candidates who are having difficulty with the examination and/or interview process. The BOAS assessment process requires proficiency in both written and spoken English, and in particular familiarity with the English words for boiler specific terms. Lack of proficiency in English may result in candidates failing the assessment regardless of their technical capabilities and knowledge – the Assessor must be able to understand the responses to his questions.

1. The Assessor will conduct all interviews in a manner that will place the candidate at ease.
2. The Assessor will base the interview around the areas identified during the Preparation stage but depending on how the interview develops they will not consider themselves confined to such topics.

3 The Assessor will present questions of sufficient complexity to appropriately test the candidate’s relevant knowledge and understanding.

4 The Assessor will avoid intimidating, confusing or tricking the candidate. Such actions would hinder the fair and accurate assessment of the Candidate’s knowledge and understanding.

5 The Assessor will not seek to assess and pass judgement on the site or the plant where a candidate carried out boiler operation or boiler management functions. The assessment is of the candidate and their knowledge, not the way their employer operates or manages their installations.

NOTE: If the Assessor identifies an issue which he considers is or may be hazardous and/or illegal he must inform the candidate. If necessary it should be emphasised to the candidate that reporting of such situations to his company management is required. The Assessor will record any such issues which will be submitted to the Assessment Body with the Assessment report.

C. Assessment Report for candidates

The Assessment report must include:

- the questions put to the candidate
- the responses given by the Candidate
- a summary of the key points of the interview
- the assessment of whether the Candidate has passed or not passed the Oral Examination part of the BOAS assessment (in arriving at this judgement the Assessor will consider in particular whether the candidate has demonstrated the level of knowledge and understanding required in the areas of the syllabus covered by written examination papers)
- any general comments.

1 The Assessor will complete each candidate’s Assessment based on information in their application documents, their written examinations and the oral examination.

2 The Assessor will identify which elements the candidate has passed and which they have not passed.

3 The Assessor will determine whether the candidate has sufficient validated boiler operation experience to meet the scheme requirements.

4 The Assessor will determine the overall status of the candidate with regards to the assessment process and record this as:

- PASS – Candidate passed ALL elements including the experience requirement;
- DEFERRED DECISION – NOT YET COMPETENT - Candidate has not passed one or more of the examination elements or Candidate passed ALL examination elements BUT could not provide evidence of sufficient validated boiler operations experience in the relevant category of boiler plant.

NOTE: Deferral process

If the Assessor determines that the candidate has not yet demonstrated competence in regards to validated experience the Assessor must defer their decision. This is should be an exceptional occurrence and only permitted where the Assessor is convinced that the Candidate can gain the necessary validated experience within a period of no more than 6 months. In such cases the Assessor must:

i. record the reason for a DEFERRED DECISION in the report form, and
ii. agree a plan to address the shortfall in verified boiler operations experience – the requirements remain as for a candidate presenting such evidence with their application and evidence presented.

iii send a copy of the Candidate report form to the Training Provider to inform them of the items that candidate needs to complete.

If a candidate submits validated experience records within six months, these must be reviewed by an Assessor and the Assessment Report revised and re-issued.

5 The Assessor passes the Assessment Report to the Training Provider and they send it to the Assessment Body for verification.
NOTE: Should the Assessor identify recommendations for a candidate for example with regards to operation of the plant they operate, the Assessor must communicate this to the candidate either:
- directly during their interactions, OR,
- via the Training Provider.

They must make it clear to the candidate that such communications form no part of the Assessment process. The Assessor should exercise caution in making recommendations with regards to any plant that they have not seen personally. No recommendations by Assessors can be considered to be under the aegis of the CEA or its partners in the operation of the BOAS scheme.

D Assessment Report for Training Provider/Trainer
The Assessor will provide a short Assessment of the course provided based on their interactions with the candidates, using the form provided. This should give a balanced view including both identification of good and less good practice, facilities, exam questions etc. based on the effectiveness of the training observed during oral assessments, not actual observations of the training course itself.

The assessor is responsible for observing that the arrangements made by Training Providers for candidates to take examinations will ensure the integrity of the BOAS scheme.
Appendix 9 – Syllabus and Examination development and implementation procedures

The credibility of the BOAS scheme depends critically on the appropriateness of the syllabus and learning Outcomes, and the robustness of the examination process.

This Appendix sets out the procedures whereby the Learning Outcomes and written examination papers are developed, controlled and issued.

The responsibilities of the various parties involved including the scheme owner (the CEA), its Officers, the Assessors and the scheme Assessment Body in regards to these are set out below.

The training syllabuses for the scheme are defined by the CEA in consultation with its delivery partners, the Assessment Body, the scheme Assessors and the Training Providers/Trainers.

Step by step procedures are defined which are designed to ensure that the quality and integrity of the scheme are maintained.

The CEA makes the final decision on approval for issue and use of all Learning Outcomes and examination papers.

9.1 - Learning Outcomes

The Learning Outcomes are based around industry recognised standards, COPs etc.

Syllabuses and Learning Outcomes exist for three categories of boiler system. These are defined in the main text of the BOAS handbook and these are identified as:

- Cat 1
- Cat 2
- Cat 3

Each syllabus or set of Learning Outcomes defines the range of knowledge and skills that are needed by a candidate in order for them to demonstrate competency at the level set by the BOAS for the relevant category of boiler system.

9.1.1 Responsibilities

The CEA owns the Learning Outcomes.

The Assessors and Training Providers/Trainers are committed to supporting the development of BOAS including the Learning Outcomes.

The CEA and the Assessment Body monitor technical and regulatory developments that may impact on the best practice for the operation of boiler systems covered by the BOAS scheme.

The CEA and the Assessment Body jointly decide when development of Learning Outcomes is required and initiate the process.

9.1.2 Development Process

1. To lead a Learning Outcomes development project the CEA will appoint a suitably qualified and experienced member as the Learning Outcomes Developer (LOD). The LOD will be responsible for ensuring that all the steps in the development procedure occur.

2. The LOD will review the existing scope of the relevant Learning Outcomes and the current versions of industry recognised standards, COPs etc.

3. The LOD will consult with other suitably qualified and experienced CEA members and relevant bodies such as the HSE.

4. Based on this review the LOD will identify areas for inclusion or adjustment (in the case of existing Learning Outcomes).

5. The LOD will prepare a draft of the new or revised Learning Outcomes and submit this to the CEA.
6. The CEA will arrange for a technical review to be carried out by one or more of their members who have not been involved in the development of the Learning Outcomes.

7. The CEA will either approve the Learning Outcomes for use or return them to the LOD for revisions and to deal with any issues found during a review.

NOTE: The CEA will repeat the review/revision steps until they are satisfied to approve the Learning Outcomes for use.

8. At the time of approval of Learning Outcomes the CEA will also set a date from which their use will be mandatory. In setting this date the CEA will give due consideration to such factors as: the urgency of reflecting changes in best practice, the time required for examination papers to be reviewed and revised, and the time required for Trainers/Training Providers to adjust training course content and training materials.

9.1.3 Implementation Process

New Learning Outcomes will be incorporated into the BOAS handbook as soon as practicable after final CEA approval. Training providers will be consulted in order to set a realistic date for any changes required to training materials, and the CEA will announce a date from which time all CEA approved BOAS training courses will use the new or revised Learning Outcomes.

Copies of old Learning Outcomes will be kept by the Assessment Body for 5 years.

9.2 - Examination Papers

There are two aspects to maintaining the credibility of the BOAS with regards to its written examinations:

1. They must test the range of knowledge defined by the relevant Learning Outcomes so they must neither be too narrow in their focus nor stray beyond the defined scope.
2. They must not be seen as predictable and although it may be unlikely that a candidate will remember the details of question papers between their initial assessment and any subsequent 5 yearly renewal but there is a clear risk that, where papers must be re-sat by a candidate in order to pass an assessment, they will aim to learn to a specific exam paper.

The target number of sets of papers has been set at three and the CEA is responsible for ensuring that there are sufficient alternative sets of examination papers for each and every category.

Periodically, usually in coincidence with the adoption of new Learning Outcomes, new sets of examination papers will be required. The CEA is responsible for commissioning the development of sets of examination papers as and when required.

9.2.1 Responsibilities

The CEA and the Assessment Body jointly own the examination papers.

The CEA and the Assessment Body jointly decide when development of examination papers is required and initiate the process. Development of examination papers may be triggered by:

- the need to maintain a level of three alternative sets of examination papers per category, or
- the issue of new or revised Learning Outcomes.

The CEA is responsible for the final approval of all examination papers prior to their adoption.

The Assessment Body will maintain a register and master copy of current approved examination papers with full revision control. The Assessment Body will ensure that only the current approved examination papers are used by Training Providers.

9.2.2 Development Process

1. To lead the development process the CEA and the Assessment Body will appoint a suitably qualified and experienced member (Examination Developer - ED).

2. The ED will review the scope of the relevant Learning Outcomes and any existing examination papers and the associated ‘model answers’.

3. Based on this review they will identify areas to be examined in questions and that will enable a candidate’s
breadth and depth of knowledge of the Learning Outcomes content to be determined.

4. The number of questions of each type in each paper within a set is defined by the structure of sets of examination papers. The ED will create and outline of each examination paper defining the area(s) of knowledge to be tested in each question.

5. The ED will liaise with the Assessment Body and other suitably experienced and qualified CEA members and with their assistance develop wording for each question and in parallel a 'rationale' for each question setting out the expected response(s) and model answers.

6. A draft of each examination paper developed will be submitted to the CEA along with a marking schedule and the proposed model answers.

7. The CEA will arrange for a technical review to be carried out by one or more of their members not involved in the development of the paper. This will result in either a request for revisions or approval to trial the paper.

8. Each examination paper will be trialled with candidates who have completed a training course in the relevant category. This enables the accessibility and clarity of wording to be assessed. It also enables the practicality of completion of the examination within the allotted time span to be assessed; Assessors will take account of this in carrying out assessments in this situation.

9. The findings of a trial will be reported to the CEA.

10. The CEA will either approve an examination paper for use or return it to the ED for revisions to deal with any issues found during a trial. After any revisions the CEA will determine whether a further trial is required prior to their approval of the paper for use.

9.2.3 Implementation Process

New examination papers will be incorporated into the Assessment process as soon as practicable after final CEA approval.

The CEA will announce a date from which time all new examination papers will be used. The Assessment Body will request all Trainers to destroy all old examination papers and will supply copies of the new papers in good time for the first training course following the implementation date for the new examination papers.

Copies of old examination papers and the associated 'model answers' will be kept by the Assessment Body for 5 years.
Appendix 10 – International BOAS – Accreditation for candidates in non-UK jurisdictions

10.1 Introduction

BOAS has been designed based on legislation, regulations and practices applicable with in the UK and is recognised by the UK Health & Safety Executive and other UK engineering bodies as an appropriate training and accreditation scheme for safe operation and management of steam and hot water boilers (see BG01 Section 6). Candidates from other jurisdictions may find significant differences between the requirements for BOAS and those with which they are familiar, primarily due to different legislative requirements.

The CEA is, however, very keen to promote and encourage the best possible training and development of steam and hot water boiler operators and managers wherever they may be in the world, and the International BOAS (IBOAS) Accreditation is promoted as a means for those operators and managers in other countries to benefit from the high standards that BOAS aims to achieve. All BOAS partners must ensure that the scope of IBOAS is clearly specified to the customer so that he fully understands what he is getting, and then make sure that that is what is delivered to him.

In order to allow for the differences that exist in the way that engineering standards are drafted and legislation is made in other countries, IBOAS is not focussed on the specific legal requirements that are in force in any one country.

It does, however, still require the candidate to demonstrate:

- Technical knowledge and experience in operating or managing boilers;
- Documentary evidence of the boilers and other plant being operated safely by the candidate (drawings, log sheets, work instructions etc.);
- Knowledge of fuels, combustion, basic thermodynamics, water quality and all other elements in the Learning Outcomes (see App 3, 4 & 5);
- An understanding of the principles of BG01, particularly sections 7 & 8;
- Ability to answer examination questions (but see 10.3 below for rules relating to candidates for whom English is not their first language);
- Ability to discuss with an Assessor the detailed operation of their plant and answer the Assessor’s specific questions.

Candidates who are successful in the IBOAS examinations and who satisfy the Assessor that they fully understand the safe and efficient operation or management of their boilers or boiler house will be eligible for the award of IBOAS Operator or IBOAS Manager as appropriate.

Note, however, that IBOAS and BOAS awarded in the UK are not interchangeable; this is primarily due to the exclusion in IBOAS of UK specific Learning Outcomes and examination questions relating to UK Health & Safety and environmental law. Future iterations of IBOAS may be delivered and awarded with specific reference to the laws applicable in one specific jurisdiction.

The BOAS training syllabuses, assessment processes and accreditation procedures are all copyright of the Combustion Engineering Association and all applications for Training Provider or Trainer status, Assessor status or any other use of the BOAS material or logo must be made to the Director of the CEA. All matters relating to the provision and use of the BOAS material and processes are covered by English Law.
10.2 Administration of IBOAS

IBOAS will be assessed as Cat 4 and administered as closely as possible to BOAS, with the following adjustments and exceptions. All other parts of the current edition of the BOAS Handbook shall be followed in full.

10.2.1 Applications

Training Providers must establish the level of understanding of English amongst proposed candidates as early as possible. Some candidates may be able to provide some form of evidence of skills in English language. Translators may be required (see 10.3.1 below).

Early discussions with the candidates or their line management should establish the level of training likely to be required since it may not initially be clear that IBOAS is a high level of qualification that can be onerous for competent UK personnel, let alone candidates who have a lesser command of written or spoken English and are working to different rules and on different fuels, systems etc.

Training providers must take care to ensure that applications from overseas candidates adhere as closely as possible to the requirements of the BOAS application form. Names, addresses and other personal details must be clearly stated to avoid any later confusion. A form of local unique identifier should be obtained e.g. from residency or work permits, or from passports.

Comprehensive Evidence Packs must be strongly encouraged, since this may be a key part of the Assessor’s understanding of the installation and the way it is designed to operate.

10.2.2 Training

Training Providers will manage their own affairs in respect of course length and other administrative details, but the whole syllabus must be covered for the relevant Category with the exception of details that directly relate to UK legislation (although the concepts of such things as boiler design/fabrication standards and regular pressure vessel inspections may well be common and are certainly valid for discussion).

Practical exercises on appropriate boiler installations must still be provided.

BG01 is the main reference document, primarily sections 7 & 8, and Training Providers may consider including this in their training material handouts. However, IBOAS remains a ‘closed book’ examination process.

It is highly recommended that additional time is taken during the training course to thoroughly explain the whole examination and assessment process to all the candidates so that they approach the exams and assessment with a full understanding of what is expected of them.

10.2.3 Examinations and marking

The examinations for IBOAS will follow the same format as for BOAS but the following additional rules apply:

- Papers will have any questions that refer directly to UK laws (PSSR, HASAW etc.) removed or changed and the papers will have additional relevant questions added to retain a similar level of challenge for the candidate. This can be done by the Assessment Body deleting the questions and adjusting the marking schedule to suit before the papers are sent to the Trainer for the course, or by substituting unsuitable questions.
- The papers will be marked in the same way as for BOAS; the pass marks for IBOAS examinations remain as for BOAS.

<table>
<thead>
<tr>
<th>IBOAS Paper</th>
<th>Topic</th>
<th>Examination Format</th>
<th>Pass Mark</th>
<th>Breakdown of Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Health and Safety - Legislation and Best Practice</td>
<td>Multi-choice</td>
<td>100%</td>
<td>Min. 80% marks plus 20% awarded at the Assessor’s discretion.</td>
</tr>
<tr>
<td>2A</td>
<td>Boiler Room Equipment and Boiler Operation</td>
<td>Multi-choice and descriptive</td>
<td>80%</td>
<td>Min. 70% marks plus 10% awarded at the Assessor’s discretion.</td>
</tr>
<tr>
<td>2B</td>
<td>Boiler House Management</td>
<td>Multi-choice and descriptive</td>
<td>80%</td>
<td>Min. 70% marks plus 10% awarded at the Assessor’s discretion.</td>
</tr>
<tr>
<td>3</td>
<td>Principles of Combustion, Heat and Heat Transfer</td>
<td>Multi-choice and descriptive</td>
<td>70%</td>
<td>Min. 50% marks on each paper and average over 70% for both papers added together</td>
</tr>
<tr>
<td>4</td>
<td>Boiler Efficiency and Environment</td>
<td>Multi-choice and descriptive</td>
<td>70%</td>
<td></td>
</tr>
</tbody>
</table>
• 4 papers (as appropriate) will be taken by all candidates. It is suggested that the Assessor might choose to mark all 4 papers before the Assessment in order to gain a full appreciation of the candidate’s performance prior to the interview.
• Additional time may be allowed for non-English speakers to complete the papers (see 10.3 below).

10.2.4 Assessment

The Assessor is to closely follow the proposed examination marking scheme above, but should take extra time where necessary to properly establish the candidate’s knowledge and try to raise the examination marks if appropriate and necessary.

The Assessor may use his discretion as to the length of the assessment interview, but it may be necessary to allow up to twice the usual time in some cases.

All discretionary decisions for each candidate shall be documented on the Assessor’s report.

10.2.5 Certification

IBOAS is designated Cat 4 to avoid any misunderstanding with UK based BOAS qualifications. The CEA Certification Officer shall take into account the additional or changed requirements of this appendix when checking IBOAS accreditations for final approval, and recognise the Assessor may need to make certain allowances which will be documented in his report on each candidate.

CEA will issue IBOAS Cat 4 certificates and ID cards to all successful IBOAS candidates and keep a separate register.
10.3 Candidates with limited English language skills

Normally for IBOAS, all elements of the assessment are carried out in English. For candidates without a sufficient grasp of the English language, and in particular of boiler related terminology, it may be difficult for them to demonstrate their competence to the satisfaction of a BOAS Assessor.

To facilitate the successful accreditation of candidates whose command of written and/or spoken English is not considered sufficient for the process, the following options are suggested:

1. The Training Provider should assess the candidate’s needs in advance and alert their customer and the Assessment Body for the requirement for translators to be present during the assessment process. These translators will need to have sufficient grasp of technical terms and boiler technology.

   *Note: Using another candidate or co-worker as a translator for his colleagues is not acceptable – the translator must be independent.*

2. The Assessor may allow additional time for the exams to be undertaken, up to but not longer than 30 minutes extra per exam. All concessions shall be documented. Such concessions should be announced and made available to all who need them in any one assessed group.

3. It may be necessary for the Trainer to read out the exam questions to the group of candidates, or to explain or re-word any questions that are causing concern or confusion to individuals. This should be done with the Assessor present, and the same facility shall be allowed to all candidates in that group. The timing of the exams will therefore need to be adjusted. The trainer shall not read out examples of possible answers except in the case of multiple choice questions.

4. The Assessor may allow additional time for the assessment interview to be undertaken, up to but generally not longer than 45 minutes extra per interview. All concessions shall be documented.

It is highly recommended that additional time is taken to thoroughly explain the whole examination and assessment process to all the candidates so that they approach the exams and assessment with a full understanding of what is expected of them.

These additional rules for candidates who have limited English language skills may, in exceptional circumstances, be applied to UK BOAS candidates if the need arises. Prior approval of the Assessment Body and CEA is required in these circumstances.
## Appendix 11– Document checklist

**BOILER OPERATION ACCREDITATION SCHEME TRAINING PROVIDER DOCUMENT CHECKLIST**

<table>
<thead>
<tr>
<th>CANDIDATE NAME</th>
<th>COURSE DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRAINING PROVIDER NAME</td>
<td>CATEGORY plus NEW OR RENEWAL</td>
</tr>
<tr>
<td>ASSESSOR NAME</td>
<td>OPERATOR (O) OR MANAGER (M)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>REQUIREMENT for Operator (O) or Manager (M) or both (O&amp;M)</th>
<th>TICK</th>
<th>TRAINING PROVIDER INITIAL WHEN COMPLETE</th>
</tr>
</thead>
<tbody>
<tr>
<td>O&amp;M CANDIDATE APPLICATION FORM FULLY COMPLETED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O&amp;M TWO PASSPORT SIZED PHOTOGRAPHS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O&amp;M EVIDENCE OF IDENTITY <em>(DO NOT RECORD DOCUMENT NUMBERS)</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O&amp;M EVIDENCE OF ADDRESS – separate document to that above</td>
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<tr>
<td>O&amp;M CV (brief outline)</td>
<td></td>
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<tr>
<td>O&amp;M ORGANISATION CHART clearly showing candidate’s position</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O&amp;M PLANT DIAGRAM – hand drawn ideally</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O Records of functional tests of limiters &amp; controls carried out by the Operator at all specified frequencies and in the specified manner. Records of the Operator carrying out the recommended water quality tests and routine water treatment activities, with records of making adjustments where necessary.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O Records of daily boiler house and equipment checks undertaken by and signed by the Operator.</td>
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<td></td>
</tr>
<tr>
<td>O Written start-up procedure/shut-down procedure for boilers, with evidence of this being carried out by the Operator. Procedures for and records of the Operator responding to alarms and taking appropriate action.</td>
<td></td>
<td>At least ANY THREE OF THESE</td>
</tr>
<tr>
<td>O Completed boiler house safety check carried out by the Operator.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O Service report or maintenance report for work personally carried out on the boiler.</td>
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<td></td>
</tr>
<tr>
<td>M Validated records of functional tests of limiters &amp; controls and daily boiler house and equipment checks carried out by their Operators at all specified frequencies and in the specified manner.</td>
<td></td>
<td>At least ANY THREE OF THESE</td>
</tr>
<tr>
<td>M Validated records of their Operators carrying out the recommended water quality tests and routine water treatment activities, with records of making adjustments where necessary. Written start-up procedure/shut-down procedure for boilers written by the manager, with validated evidence of this being carried out by their Operators.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M Procedures for, and records of, their Operators responding to alarms and taking appropriate action.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M Completed boiler house safety check or audit carried out by the Manager</td>
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<td></td>
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<tr>
<td>M Boiler house risk assessments written by the manager with actions taken</td>
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<td></td>
</tr>
<tr>
<td>M Evidence of compliance with environmental permits and relevant legislation such as PSSR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Requirement for Operator (O) or Manager (M) or both (O&amp;M)</td>
<td>Tick</td>
<td>Training Provider Initial When Complete</td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
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<td>----------------------------------------</td>
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<tr>
<td>O&amp;M alternative documents offered as evidence</td>
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<tr>
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<td>O&amp;M alternative documents offered as evidence</td>
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- **Paperwork Completed by the Assessor**

| O&M completed assessor report for candidate            |      |                                        |
| O&M marked exam paper no ____                          |      |                                        |
| O&M marked exam paper no ____                          |      |                                        |
| O&M marked exam paper no ____                          |      |                                        |
| O&M marked exam paper no ____                          |      |                                        |
| O&M marked exam paper no ____                          |      |                                        |
| O&M marked exam paper no ____                          |      |                                        |
| O&M marked exam paper no ____                          |      |                                        |

- **Training Provider Signature**

| Training Provider Signature when fully completed | Date |

**This form to be returned promptly to Kiwa with candidate exams and evidence**

Rev 4 – 2/12/16
Version Control

Main changes from version 6 to version 7:

Due to the significant revisions undertaken in the summer/autumn of 2016 the whole document has been changed and readers are encouraged to review all sections and appendices for the latest information.