



# **cetop**

*The Voice of the European  
Fluid Power Industry*

## ***EDUCATION RECOMMENDATIONS***



★ ***CETOP QUALIFICATIONS APPROVED  
CENTRES GUIDELINE***

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# **CETOP QUALIFICATIONS**

## **APPROVED CENTRES GUIDELINE**

### **RELATING TO CETOP OCCUPATIONAL LEVELS**

#### **RE 2015/06.02 – H/P**

#### **1. INTRODUCTION**

The purpose of this paper is to provide a specific informative guideline to “Approved Centres” and the processes associated with quality assurance and quality control of competence based qualifications.

#### **2. APPROVED CENTRES**

If a person is presented with a competence based qualification, the certificate should clearly state:

- The level of competence
- The range of skills covered
- The specific area covered by these skills
- The Approved Centre at which the qualification was obtained
- The name of the controlling organization (Qualifying Body) and associated signature of authority.

The Approved Centre must be itself assessed by a representative of the Qualifying Body, to guarantee that it can effectively and continuously meet the criteria necessary to develop the knowledge and skills of personnel to a level at which they are deemed competent.

A major concern is that once a person has been certified competent he or she “must be” competent and there must be no doubt placed upon that person’s capability within the range of skills covered by the certificate.

Approved Centres are the responsible body for ensuring quality and consistency of performance and should therefore guarantee these levels of candidate knowledge and competence based skills.

It is the responsibility of the Qualifying Body to establish a guideline document clearly explaining to educational establishments and training organizations their commitment to achieving and maintaining “Approved Centre Status”.

Before applying for Approved Centre status, organizations must fully understand that competence can only be achieved through “real hands on experience”. It is therefore necessary for centres to have, or have access to, an extensive range of fully operational equipment, which clearly represents present day technology and which is able to meet the criteria laid down for knowledge and skills development followed by competence-based assessment.

To ensure candidate performance levels, it is necessary for centres to have technically competent tutors and assessors, with field experience in fluid power and associated engineering technologies as well as good academic qualifications.

To effectively educate, train and carry out competence based assessment, staff themselves should, through their own work-based experiences, have a range of practical skills involving the maintenance and management of fluid power systems.

Other important issues are the centre’s ability to:

- a) Interpret the competence-based programme(s) and effectively integrate the knowledge-based sections with the development of practical skills.
- b) Establish individual candidate “action plans” against prior knowledge and experience.
- c) Maintain candidate progress records, providing evidence of feedback, evaluation and confidentiality.
- d) Establish a series of written assignments to support the knowledge-based sections.
- e) Establish a series of competence-based tasks to meet the evidence criteria - to be carried out on a “one to one” basis or in groups.
- f) Establish a Management Control System, covering all aspects of document control,

including Tutors, Assessors and Internal Verifiers, involving regular documented management review meetings.

- g) Provide quality tuition through an extensive range of visual aids, computer-based presentations, etc. in lecture rooms conducive to learning.
- h) Provide good library facilities, including where possible, access to Internet-based information.

Further to these requirements, centres must have in place, an active Health and Safety and Equal Opportunities Policy. ISO 9000 or ISO Approval 14000 would be seen as most supportive when the Qualifying Body makes the final consideration for Approved Centre Status.

**Note: Centres approved at Level 3 are automatically approved for Levels 1 and 2.**

### **2.1 CETOP Approved Centres' duties**

Approved by the CETOP National Associations, all centres must have in place the following:

- a) A suitable quality control/management system to effectively manage the scheme covering all aspects of registration, induction, review and evaluation of individual needs, continuous assessment, performance monitoring, final assessment, examinations, validation and the provision for effective feedback
- b) A system for maintaining records in a confidential and secure manner
- c) Technical/competent staff, with experience in the field of hydraulic systems, pneumatic systems and control as applicable to the programmes to be delivered
- d) Experienced staff to carry out both knowledge-based and competence-based assessments to meet the scheme requirements, with reference to assessment and internal verification
- e) An implemented policy covering Health and Safety and Equal Opportunities
- f) An equipment base to support the tutor in the presentation of the knowledge-based section, whilst at the same time providing adequate support for candidates to practice and develop their skills for the final competence-based assessment (See 2.6 relating to Centre Equipment Provision)

- g) A technical library containing an adequate supply of current:
  - a. Manufacturers' catalogues and technical data
  - b. Access to the internet as required to provide current technical data
  - c. Fluid power Guidelines
  - d. Training Manuals
  - e. Health and Safety Documentation

**Note: All current issue dates should be recorded and documentation kept at the current level.**

- h) Suitable lecture rooms with appropriate visual aids to support and present the programmes. These should include:
  - a. Computer-aided presentations
  - b. Projection Systems

On application to the CETOP Member Association for centre approval using the prescribed form, an approval visit will be arranged. A member appointed by the CETOP Member Association will carry out a site visit on a mutually agreed date to assess the centre, its staff, its equipment base and overall organizational capability to effectively manage and deliver the programme/s indicated by the application. Both parties will agree all arrangements in writing.

Centres are advised to contact their CETOP National Association for an outline of all current costs and for:

- Centre Approval visit
- CETOP National Association Verification visit
- Candidate examination registration

### **2.2 Centre verification and validation of standards**

Approved Centres will be visited by an external verifier (appointed by their CETOP national association). The verifier will, in conjunction with the centre, agree upon a date and visit time to suit both parties. Centres will be informed, in writing, at least one month before the verifier's visit and all procedures, processes and documentation will be agreed upon prior to the visit.

The verifier will submit a report to the centre within 14 days of the visit, plus a copy to the national fluid power association. The verifier's report will include:

- a) Acceptance of existing systems and continued approval
- b) Recommendations for improvements and agreed action plan and time scale
- c) Date of next meeting
- d) Update on any current changes to the programme and approval/verification processes

### **2.3 Recommendations**

Throughout the programme, both Tutor and Candidates are expected to use and apply:

- a) Hydraulic symbols to current issue level ISO standard
- b) Electrical/electronic symbols to current issue level EN standard

Throughout the delivery of the programme, Tutors will be expected to use a variety of system circuits to support and reinforce the learning process. Candidates should be encouraged to use their own circuitry applicable to the type of machines and systems for which they are currently involved as part of their employment (where applicable). The tutor will in conjunction with individual candidates, review all circuitry and identify its suitability.

### **2.4 Centre programme delivery/methodology**

The delivery of these programme/s should include practical „Hands On“ activities throughout to reinforce the learning experience.

Emphasis must be placed on ensuring candidates receive and achieve a thorough understanding of the core subjects: fundamental principles, the ability to read and interpret circuit diagrams in symbol form, contamination control and the application of safe working practices.

### **2.5 Examination/assessment control procedures**

Examination papers and marking schemes will be prepared by the CETOP national fluid power association and dispatched to respective centres or institute. Dispatch will take place by registered mail at least 2 working days before the designated examination date. They will be dispatched to the designated examinations control officer.

He or she will be responsible for the control of all aspects of confidentiality, administration and invigilation and in turn the dispatch of the

transmittal notice “send back” to the CETOP national Member Association on receiving the pack by registered mail.

The CETOP national Member Association will notify centres of the designated examination in due time, together with any further details considered necessary to ensure effective management and control of the examination process.

On completion of the written examination, candidate’s scripts will be returned to the examinations officer who will then arrange for them to be marked by the nominated person against the supplied marking scheme.

Successful candidates should be reported to the CETOP national Member Association within one month of the examination date using the prescribed form (Examination Report Form) for knowledge-based units.

***Note: Centres will receive one extra copy of the examination paper for reference during invigilation and marking. The Marking Scheme provided must be returned to the CETOP national Member Association together with the Examination Report Form. Under no circumstances must this be copied.***

Where candidates fail to meet the required pass mark and are planning to resit the examination at the next available date, the CETOP national Member Association must be notified by completion of the respective Examination Entry Form.

### **2.6 Information relating to specific programs**

Approved Centres must have or have access to the following equipment to:

- a) provide support for knowledgebased learning
- b) provide for effective tutor demonstrations
- c) provide adequate hands on experience during skills development and competence-based assessment

#### **2.6.1 Mobile Hydraulics Programmes**

Centres must have the ability to:

- 1) Demonstrate cavitation and aeration on the suction side of pump

- 2) Operate a fixed displacement pump system with a variety of pressure and flow control devices covering:
    - single stage relief valves
    - pilot operated relief valves with vent control unloaded valves
    - Electro-Hydraulic pressure switches and transducers
      - accumulators (including provision for charging)
 Flow control should include simple throttle valves and pressure compensated flow control valves, covering meter-in, meter-out and by-pass operations and should be investigated under load and non-load conditions
  - 3) Operate and control a variable displacement pump system incorporating:
    - pressure compensation (constant pressure control)
    - load sensing
    - remote pressure control (including the application of electrical and proportional control)
  - 4) Show the effects of engine speed and pump displacement on pump flow rates
  - 5) Carry out pump performance testing and establish the relationship between Q and P under load and non-load conditions
  - 6) Investigate the performance of:
    - priority flow control valves
    - spool flow dividers
    - rotary flow dividers under load and non-load conditions
  - 7) Distinguish the difference between mounted valves, screw-in cartridge, slip-in cartridge and pipe mounted arrangements, through practical hands on experience
  - 8) Operate a variety of multifunction mobile valves covering:
    - open centre applications
    - flow/pressure compensation
    - inlet and service port provisions (including the operation via manual control, oil pilot joystick and electrical proportional control)
  - 9) Investigate the performance of pilot operated check valves and external piloted counterbalance valves for load holding and motion control involving cylinder systems
  - 10) Investigate the operation of a closed hydrostatic system incorporating the basic control functions
  - 11) Investigate the performance of two-way and three-way pressure reducing valves
  - 12) Demonstrate the procedures to follow to assess the contamination level of hydraulic fluid using a patch test kit
  - 13) Investigate the performance of hydraulic steering systems and associated priority valves
  - 14) Investigate hydraulic motor performances associated with displacement, speed and slippage rates
- 2.6.2 Industrial Hydraulics and Control**  
Centres must have the ability to:
- 1) Demonstrate cavitation and aeration on the suction side of pump
  - 2) Operate a fixed displacement pump system with a variety of pressure, flow and associated control devices covering:
    - single stage relief valves
    - pilot operated relief valves with vent-control
    - unloaded systems
    - Electro-Hydraulic pressure switches and transducers
    - accumulators (including provision for charging)
 Flow control should include simple throttle valves and pressure compensated flow control valves, covering meter-in, meter-out and by-pass operations plus the application of flow divider and should be investigated under load and non-load conditions
  - 3) Operate and control a variable displacement pump system incorporating:
    - pressure compensation (constant pressure control)
    - load sensing
    - remote pressure control (including the application of electrical and proportional control)
  - 4) Demonstrate and investigate load holding and motion control via pilot operated check valves and over-centre counterbalance valves

- 5) Incorporate and apply both on-off solenoid operated valves and proportional control
- 6) Build circuitry involving switches, relays and amplifier card systems
- 7) Carry out pump performance testing and establish the relationship between Q and P under load and non-load conditions
- 8) Demonstrate the procedures to follow to assess the contamination level of hydraulic fluid using a patch test kit
- 9) Investigate the performance of hydraulic cylinders operating in a regenerative mode
- 10) Investigate hydraulic motor performances associated with displacement, speed and slippage rates
- 11) Investigate the performance of two-way and three-way pressure reducing valves
- 12) Distinguish the difference between mounted valves, screw-in cartridge, slip- in cartridge and pipe mounted arrangements, through practical hands-on experience

### **2.6.3 Power Pneumatics and Control**

Centres must have the ability to:

- 1) Build a range of pneumatic circuitry from simple to complex involving air pilot and solenoid pilot control
- 2) Build Electro-Pneumatic circuits incorporating relays and a variety of switching devices
- 3) Incorporate the application of PLC's to initiate control of pneumatic circuitry
- 4) Demonstrate the performance of cylinders with and without cushioning
- 5) Incorporate into circuitry, safety systems, interlocks, two hand starts and emergency stops
- 6) Investigate the operation of air compressors and ancillary equipment, receivers, coolers and dryers
- 7) Investigate the performance of a variety and combinations of FRL units
- 8) Investigate different pipe-work and sealing systems in current use

### **3. EDUCATIONAL ESTABLISHMENTS/ TRAINING ORGANISATIONS**

Before applying for centre approval, Educational Establishments/Training Organization must be conversant with:

- a) The content of the programme for which they are applying to run.
- b) The guideline document outlining the center's specific commitment and requirement to run the scheme.

*Note: The Guideline Document will contain the necessary forms for application for centre approval, candidate registration and examination entry.*

### **4. QUALIFYING BODY/EXTERNAL VERIFIERS**

On receiving the application form for centre approval, the Qualifying Body will arrange a centre visit by one of its elected "External Verifiers"(EV). The EV will communicate with the centre and finalise a date and time for the visit. The EV will notify the centre in writing of all the necessary arrangements for the visit, clearly outlining all areas to be checked and discussed as part of the approval process and the necessary personnel to be present.

Centres would be advised to forward to the EV, current copies of CV's for all personnel involved in the scheme, prior to the visit.

The EV will normally work from a checklist system and a copy of this can be forwarded to the respective centre prior to the approval visit (See appendix RE 2015/06.01 - H/P).

During the visit to the centre the EV will provide:

- a) Advice and guidance to the centre, to help them meet the Qualifying Body's criteria for centre approval.
- b) Advice and guidance regarding the delivery, management and assessment processes required to effectively run the scheme.

On completion of the centre approval visit, the EV will notify there whether or not they have met the necessary criteria to become officially approved.

If so, the EV will officially notify the Qualifying Body, forwarding all the necessary approval documentation. The Qualifying Body will then award the centre with its Approved Centre Certificate.

Should a centre fail to meet the approval criteria, the EV will discuss a timescale with the centre and the necessary remedial actions to be taken.

The Qualifying Body may grant conditional approval, for a period of up to six months. At this stage, full approval will be granted if the centre can present the necessary evidence showing that it has clearly met the criteria. This may involve a re-visit by the EV and this will incur additional costs.

The Qualifying Body will normally approve a centre for a period of six years, subject to the EV's visit and report.

The EV, on behalf of the Qualifying Body, will be responsible for developing a close communication link with the centre. It will be the responsibility of the Qualifying Body to provide specimen practical competence based tasks, including respective marking schemes, ensuring that Approved Centres adopt a style and content acceptable to the qualification level.

The Qualifying Body will be responsible for setting examinations and establishing the necessary marking schemes, on an agreed time-scale. The approved centre will be responsible for the administration, invigilation, marking and confidentiality.

*Note: Where Qualifying Bodies in Europe do not have the resources to set and administer examination papers, etc., the alternative is to establish an acceptable set of examination papers and marking schemes, through the various education and training establishments, allowing them to administer and control them accordingly. However, the Qualifying Body must agree the standard, whilst ensuring the content meets the programme and qualifications level.*

## 5. EXTERNAL VERIFIER/VERIFICATION VISITS TO APPROVED CENTRES

During such visits, the EV will:

- a) Verify the centre against its original centre approval documentation, systems and management control.

- b) Review candidate records of achievement.
- c) Observe competence based practical task assessments, where possible.
- d) Discuss with Centre Tutors, Assessors and Internal Verifiers, any problems associated with the management and daily running of the scheme.
- e) Receive from centre staff any objective feedback regarding the scheme and proposed improvements.
- f) Provide the centre with any updated information from the Qualifying Body, which they may not yet have received.

*Note: It is the responsibility of the Qualifying Body to have in place a programme for scheme/ qualification review and improvements. This will normally be a three year process.*

*The Qualifying Body will notify Approved Centres in writing through established "Information Updates". These will include recommendations to Approved Centres and dates for implementation where necessary. It will be the responsibility of the Approved Center's Management Team to meet these requirements.*

On completion of the centre visit by the EV, a full report will be submitted to the Qualifying Body and a copy sent to the respective centre, outlining any agreed improvements, actions or observations, which need attention. The EV will discuss the outline of his or her report with the centre at the end of the visit.

## 6. SUCCESSFUL CANDIDATES

On successful completion of the scheme, the approved centre will, through the necessary documented systems, inform the Qualifying Body of the candidates' success.

It will be the responsibility of the Qualifying Body to award the respective certificate, showing the competence base level of achievement signed by an authorized representative of the Qualifying Body.



