



*The Voice of the European  
Fluid Power Industry*

# ***EDUCATION RECOMMENDATIONS***

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

No part of this publication may be photocopied or otherwise reproduced without the prior permission in writing of the Association. Whilst the Association does its best to ensure that any information that it may give is accurate, no liability or responsibility of any kind is accepted in this respect by the Association, its members, its servants or agents.



# **CETOP QUALIFICATIONS APPROVED CENTRES GUIDELINE RELATING TO CETOP OCCUPATIONAL LEVELS RE2021/06.01 – 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 CENTRE REQUIREMENTS**

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) Technical/competent staff, with experience in the field of hydraulic systems, pneumatic systems and control as applicable to the programmes to be delivered as well as good academic qualifications
- c) Experienced staff should through their own work based experiences have a range of skills to carry out both knowledge-based and competence-based assessments to meet the scheme requirements, with reference to assessment and internal verification
- d) An implemented policy covering Health and Safety and Equal Opportunities
- e) 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 sections 4 and 5)
- f) A technical library containing an adequate supply of current:
  - Fluid Power Guidelines
  - Training Manuals
  - Health and Safety Documentation
- g) Suitable lecture rooms with appropriate visual aids to support and present the programmes
- h) Suitable online distance learning for the theory elements of the programme can be considered as an option but the practical assessments and training of candidates should be completed face to face at an agreed suitable venue
- i) Before applying for centre approval, Educational Establishments/Training Organizations must be conversant with:
  - The content of the programme for which they are applying to run.
  - The guideline document outlining the centres specific commitment and requirement to run the scheme.

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

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

## **3. APPLICATION PROCEDURES FOR CENTRE APPROVAL**

- a) On application to the CETOP Member Association for centre approval using the prescribed form, an approval visit will be arranged. A staff member appointed by the CETOP Member Association will carry out an initial 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.
- b) 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

- c) 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 finalize 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.
- d) 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).
- e) During the visit to the centre the EV will provide:
  - f) Advice and guidance to the centre, to help them meet the Qualifying Body's criteria for centre approval.
  - g) Advice and guidance regarding the delivery, management and assessment processes required to effectively run the scheme.
  - h) On completion of the centre approval visit, the EV will notify them whether or not they have met the necessary criteria to become officially approved.
  - i) The EV will officially notify the Qualifying Body through a written report, forwarding all the necessary approval documentation. The Qualifying Body will then award the centre with its Approved Centre Certificate.
  - j) 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.
  - k) 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.
  - l) The Qualifying Body will normally approve a centre for a period of six years, subject to the EV's visit and report.
- m) 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.
- n) In circumstances where it is not possible for an EV to visit the training centre in person the option of online audits can be adopted.

#### 4. EXTERNAL VERIFIER VISITS TO CENTRES ONCE APPROVED

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.
- g) 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.
- h) In circumstances where it is not possible for the EV to visit the training centre in person the option of online audits can be adopted.

*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 Centre's Management Team to meet these requirements.*

## 5. SPECIFIC PROGRAMMES – REQUIREMENTS

- a) Throughout the programme, both Tutor and Candidates are expected to use and apply:
  - Hydraulic or Pneumatic symbols to current issue level ISO standard
  - Electrical/electronic symbols to current issue level ISO/IEC/EN standard
- b) Throughout the delivery of the programme, Tutors will be expected to use a variety of system circuits to support and reinforce the learning process.
- c) 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.
- d) The delivery of these programme/s should include practical “Hands On“-activities throughout to reinforce the learning experience.
- e) 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.

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

- provide support for knowledge based learning
- provide for effective tutor demonstrations
- provide adequate hands on experience during skills development and competence-based assessment

### 5.1 Hydraulics and Control 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, flow and associated control devices covering:
  - Direct acting relief valves
  - Pilot operated relief valves with vent control unloaded systems.
  - Accumulator systems (incl. energy saving systems and variable speed driven pumps)
  - 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 control
  - Remote pressure control (including electrical and proportional control)
- 4) Show the effects of variable speed drive and pump displacement on pump flow rates.
- 5) Carry out testing of Accumulators and safety valves (including provision for charging)
- 6) Investigate the operation of a closed hydro- static system incorporating the basic control functions.
- 7) Carry out pump performance testing and establish the relationship between Q and P under load and non-load conditions.
- 8) Investigate the performance of:
  - priority flow control valves
  - spool flow dividers
  - rotary flow dividers under load and non-load conditions.
- 9) Demonstrate and investigate load holding and motion control via pilot operated check valves and over center counterbalance valves.
- 10) Incorporate and apply both on-off solenoid operated valves and proportional control incl. servo valves (closed loop control).
- 11) Distinguish the difference between mounted valves, screw-in cartridge, slip- in cartridge and pipe mounted arrangements, through practical hands-on experience.
- 12) Operate a variety of multifunction mono block and sectional valves covering:
  - open center applications
  - flow/pressure compensation
  - load sensing control
  - inlet and service port provisions
- 13) Investigate the performance of two-way and three-way pressure reducing valves.
- 14) Investigate the performance of hydraulic cylinders operating in a regenerative mode.
- 15) Investigate hydraulic motor performances associated with displacement, speed and slippage rates.

- 16) Investigate the performance of hydraulic steering systems and associated priority valves.
- 17) Build circuitry involving electronic switches and sensors in electronic control systems.
- 18) Demonstrate the procedures to follow and assess the contamination level of a hydraulic fluid system.

### **5.2 Mobile & Industrial Hydraulics and Control Programmes**

It is also possible for approved centres to have specific programmes at Level 2 and 3 for separate Mobile or Industrial hydraulics and control. These programmes should be aimed at application within the Mobile or Industrial sectors respectively. Approved centres must then in addition to the above have access and ability to:

#### *Mobile Hydraulics and Control:*

- 1) Operate a hydrostatic steering system with and without transducers and associated priority valves.
- 2) Operate a closed loop hydrostatic drive system in a mobile machine, showing the special effects of the drive with a combustion engine:
  - Idling
  - Braking (terrain driving)
  - Using different control systems.

#### *Industrial Hydraulics and Control:*

- 1) Operate a Proportional/Servo valve in closed loop electronic control systems showing the effect in control of:
  - Positioning
  - Speed
  - Pressure
 Using different electronic control systems.

### **5.3 Power Pneumatics and Control Programmes**

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

## **6. EXAMINATIONS/ASSESSMENT PROCEDURES**

- a) Examination papers and marking schemes will be prepared by the Qualifying Body (i.e. CETOP national fluid power association or its associate partner) and dispatched to respective centres or institute.
- b) 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 Qualifying Body on receiving the pack by registered mail.
- c) The Qualifying Body 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.
- d) 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.
- e) 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.
- f) 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 Qualifying Body together with the Examination Report Form. Under no circumstances must this be copied.

- g) Where candidates fail to meet the required pass mark and are planning to re-sit the examination at the next available date, the CETOP national Member Association must be notified by completion of the respective Examination Entry Form.
- h) Where a CETOP national member association in Europe does 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.
- i) The approved centre will be responsible for the administration, invigilation, marking and confidentiality. However, the Qualifying Body must agree the standard, whilst ensuring the content meets the programme and qualifications level.

## **7. SUCCESSFUL CANDIDATES**

- a) 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.
- b) If a person is presented with a competence based qualification, the certificate should state:
  - The level of competence
  - The range of skills covered
  - The specific area covered by these skills
  - The name of the controlling organization (Qualifying Body) and associated signature of authority.

*Candidates certified at Level 3 are automatically approved for Levels 1 and 2.*

