

**BRITISH FLUID POWER  
ASSOCIATION  
QUALIFICATIONS  
PRE-PROGRAMME  
QUESTIONNAIRE – INDUSTRIAL  
HYDRAULICS (IH3)**

NAME:

COMPANY:

DATE:

EMAIL ADDRESS:

The purpose of this questionnaire is to enable you and the staff at the National Fluid Power Centre to:

- (i) Identify your existing knowledge level
- (ii) Provide us with sufficient information to enable us to give you guidance and recommendations towards the best routes of study, enabling you to successfully complete the written examination.
- (iii) Enables us to formulate the content and subject areas for the one-day modules held at the NFPC throughout the year.
- (iv) Choose the option which best fits your workload and lifestyle.

PLEASE RETURN THIS COMPLETED QUESTIONNAIRE TO THE DIRECTOR, NATIONAL FLUID POWER CENTRE 21 DAYS BEFORE THE INDUCTION DATE/S \_\_\_\_\_

**SECTION 1**

- 1) Give a brief outline of your existing qualifications.
  
- 2) Give a brief outline of your practical experience involving the use and application of Fluid Power Systems.
  
- 3) Have you studied the content of the Industrial Hydraulics Programme IH3 (BFPA/Q4)? (Tick accordingly) YES / NO
  
- 4) Have you read the National Fluid Power Centre INFORMATION SHEET BPFPA Industry Standard Qualifications? YES / NO
  
- 5) Do you have access to the Website? A great deal of technical information to support your studies is available through the web. YES / NO
  
- 6) Are you able to commit regular periods for study each week? YES / NO
  
- 7) Are you able to attend the technical 1-day modules provided by the NFPC throughout the year? (Normally 5 or 6 days is required to attend all) YES / NO
  
- 8) Are you aware that you have to attend the NFPC for practical task preparation and competence based assessment? (Normally up to 4 days depending upon your ability but we can be flexible.) YES / NO

## SECTION 2 - Technical Knowledge Personal Assessment

It is important at this stage to give a realistic answer. The Level III programme is quite intense and the examination has a pass mark of 70%. With this in mind please consider your answers carefully and tick the necessary column. Many of the questions are formulated on the basis of “Can you explain” - YES / NO.

### Fundamental Principles

- |  |          |
|--|----------|
| 1) Can you explain the difference between Cavitation and Aeration?   | YES / NO |
| 2) Could you list 6 causes of cavitation?  | YES / NO |
| 3) Do you know the relationship between Motor Torque, Displacement and Pressure?                                 | YES / NO |
| 4) Would you be able to calculate the flow rate from a pump in litres per minute?                                | YES / NO |
| 5) Can you explain the difference between Laminar and Turbulent flow?  | YES / NO |
| 6) Can you explain the term volumetric efficiency associated with a pump?  | YES / NO |
| 7) Can you explain the causes of heat generation in a hydraulic circuit?   | YES / NO |
| 8) Can you explain the term regenerative associated with cylinder operations?                                    | YES / NO |
| 9) Do you know the formula for hydraulic power?  | YES / NO |
| 10) Can you explain why fitting a throttle valve on the head end side of a cylinder can lead to intensification? | YES / NO |

### Pressure Control

- |  |          |
|--|----------|
| 1) Can you explain the meaning of the term cracking pressure?  | YES / NO |
| 2) Can you explain the difference in performance between:<br>a) Direct operating relief valve, or<br>b) Pilot operated two-stage relief valve? | YES / NO |
| 3) Can you explain the meaning of the term VENT associated with a two-stage relief valve?  | YES / NO |
| 4) Can you explain the difference in performance between:<br>a) Two way pressure reducing valve, or<br>b) Three way pressure reducing valve?   | YES / NO |

- 5) Can you explain the difference in performance between a 10:1 area ratio remote pilot counterbalance valve and a 3.5:1 area ratio valve? YES / NO
- 6) Can you explain the performance of a pump unloader valve? YES / NO
- 7) Can you explain the performance of a proportionally controlled relief valve? YES / NO

### Proportional Valves

- 1) Do you know how spool position in a proportional valve is achieved? YES / NO
- 2) Can you explain the terms?  
 a) Gain YES / NO  
 b) Ramp YES / NO  
 c) Dead band compensation YES / NO
- 3) Can you identify the salient points on an amplifier card? YES / NO
- 4) Do you understand the following terms?  
 a) Shielding YES / NO  
 b) Earthing YES / NO  
 c) Enabling signals YES / NO

### Flow Control

- 1) Can you explain the performance of:  
 a) A simple throttle valve YES / NO  
 b) A pressure compensated flow control YES / NO  
 c) A priority flow control valve YES / NO  
 d) A rotary flow divider YES / NO  
 e) A spool flow divider YES / NO

### Direction Control

- 1) Can you explain the difference between a slip in cartridge valve and a screw in cartridge valve? YES / NO
- 2) Can you explain the difference in construction between a NG6 (ISO 3) direction control valve and a NG25 (ISO 8) direction control valve? YES / NO
- 3) Can you explain why the lowering of a load may be erratic when using a pilot operated check valve for control? YES / NO
- 4) Do you know why a 'Y' port is fitted to a sequence valve yet not a relief valve? YES / NO

Hydraulic Fluids

- 1) Can you explain the meaning of the terms:
- a) Viscosity YES / NO
  - b) Viscosity index YES / NO
- 2) Can you explain the difference between a premium grade hydraulic oil and a VI grade hydraulic oil? YES / NO
- 3) Can you explain the causes of:
- a) Oxidation YES / NO
  - b) Dieseling YES / NO
- 4) New oil may have a code of 17/15, could you explain this term? YES / NO

Pumps and Pump Controls

- 1) Can you explain the difference in operation between a gear pump and vane pump? YES / NO
- 2) Can you explain the difference in performance using a Q/P curve for
- a) Pressure compensated (constant pressure pump), against
  - b) Pressure compensated load sensing pump YES / NO
- 3) Can you explain the difference in displacement control between an axial piston swash plate pump and an axial piston bent axis pump. YES / NO

Hydraulic Motor and Actuators (Cylinders)

- 1) Can you identify three methods used to increase the torque from a variable displacement motor? YES / NO
- 2) Can you explain the principle of operation of a two-speed radial piston motor? YES / NO
- 3) Can you explain the principle of cylinder cushioning? YES / NO
- 4) Can you explain the term 140/100 with respect to the configuration of a cylinder? YES / NO

Closed Hydrostatic Transmissions

- 1) Do you know the basic building blocks of all closed hydrostatic systems? YES / NO
- 2) Can you explain the purpose of the:
- a) Charge pump YES / NO
  - b) Hot oil shuttle valve YES / NO
  - c) Hot oil shuttle valve back pressure RV YES / NO

Accumulators

- 1) Can you explain the general construction of a bladder type accumulator? YES / NO
- 2) Do you know the basic layout of an accumulator safety block? YES / NO
- 3) Can you explain the procedures to be followed to pre-charge an accumulator? YES / NO
- 4) Do you know the type of Nitrogen that must be used to charge an accumulator? YES / NO

Contamination Control

- 1) Can you explain the meaning of the term 18/16/14 referring to cleanliness target levels? YES / NO
- 2) Do you know the various locations where filters are likely to be installed on a machine and the benefits of each location? YES / NO
- 3) Can you explain the term Beta Ratio? YES / NO

Installation/Commissioning/Fault Diagnosis

- 1) If asked to install and commission a pressure compensated pump on to a machine that requires fully setting up on site, would you be able to plan and formulate the procedures to do this job? YES / NO
- 2) If confronted with a machine breakdown, are you familiar with the F.C.R. approach to fault diagnosis? YES / NO

Hydraulic Symbols

- 1) Can you read and interpret circuit diagrams?

TICK	POOR					GOOD					
	1	2	3	4	5						

- 2) Would you be able to draw a circuit diagram using current symbols? YES / NO

Hydraulic Reservoirs

- 1) Do you know the basic requirements for a good reservoir design, relating to:
  - a) Size YES / NO
  - b) Internal layout/configuration of flow YES / NO
  - c) Contamination control YES / NO
  - d) Fluid sampling YES / NO
  - e) Fluid filling arrangements YES / NO
  - f) Pipe work layout YES / NO

Hydraulic Pipes and Hoses

- 1) Can you list the points to be considered when selecting a hydraulic hose for a particular job? YES / NO
- 2) Do you know the difference between a BSP adaptor and a JIC adaptor? YES / NO
- 3) Do you know the factors that affect the pressure drop in a pipe? YES / NO

**FOR OFFICIAL USE**

Reviewed by:

Date:

Comments:

Checked by Director:

Date:

Comments:

**National Fluid Power Centre  
Carlton Road  
Worksop  
Nottinghamshire  
S81 7HP**

**Tel: (01909) 504700**

**Fax: (01909) 484571**

**Website: [www.nfpc.co.uk](http://www.nfpc.co.uk)**