

**THE HONG KONG INSTITUTION OF ENGINEERS
ENGINEERING GRADUATE TRAINING SCHEME “A”**

MODEL TRAINING GUIDE

GAS ENGINEERING

Model Training Guide (MTG)

The Model Training Guide is a guide to Companies on the practical experiences considered relevant in the formal training of potential Professional Engineers.

Training Programme (TP)

The Training Programme is the plan prepared by a Company which is designed to meet the experiences listed in the MTG and to meet the objectives set out in the Record of Objectives. This ‘plan’ is presented for approval on Form TD1 Part 2 as a part of the Assessment/Reassessment procedures.

Training Period - Nominally 2 years

The length of the training is based on meeting the objectives and not determined by time. The times shown below are indicators only of the time that a trainee would normally take to meet the relevant objectives.

Training Aim

It is important to note that the Scheme “A” Graduate Training is designed to be a fast track by which a graduate can obtain full professional status. The training therefore covers both Technical and Professional matters.

Continuing Professional Development (CPD)

An implicit part of the Scheme “A” training is related to CPD which should be an integral and relevant part of the development of the graduate trainee.

Training Programme Content

1. Common Core Objectives

- 1.1 Introduction to the Company and to the Company’s Scheme “A” requirements (1 week)
 - (a) Size, history, subsidiaries (if applicable)
 - (b) Relationships with government departments and other organisations
 - (c) Management structure and functions
 - (d) Office manuals, procedures and practices
 - (e) Communication systems
 - (f) Training programmes and career development paths

1.2 Professional & General Requirements (Continuous development throughout the programme)

- (a) HKIE Activities
 - (i) History, role and organization
 - (ii) Development links with HKIE
- (b) Professionalism
- (c) General Personal Development
- (d) Personal Qualities/Demonstrating
- (e) Occupational Safety & Health (S&H)
- (f) Environment
- (g) Communication
 - (i) Orally
 - (ii) Written
- (h) Human Resources
 - (i) Leadership & Management
 - (j) Own Organisation
- (k) Technology/Business

Notes: In the course of this broad coverage, arrangement should be made to provide the trainee with opportunities to acquire the knowledge and competency in the Professional and General Common Core Objectives as laid down in the HKIE's Training-by-Objectives Guidelines. The trainee should also take self-initiatives to acquire the necessary knowledge.

2. Core Objectives in Gas Engineering (77 weeks)

2.1 Workshop Training (5 - 8 weeks)

Basic engineering practice, knowledge of engineering training, welding, machining, fabrication, properties of engineering materials, use of hand tools and relevant instruments.

Notes: The total duration of workshop training including workshop training during degree course should not be less than 8 weeks. Normally the training duration during Scheme "A" shall not be less than 5 weeks.

2.2 Gas Production Engineering (8 weeks)

- (a) Gas production processes
- (b) Gas analysis techniques
- (c) Production plant instrumentation & control
- (d) Safety management system
- (e) Project planning and management
- (f) Risk and environmental assessment
- (g) Legislation, codes and procedures

2.3 Gas Transmission and Distribution Engineering (19 weeks)

- (a) Design of gas supply system
- (b) Installation, testing and commissioning of transmission and distribution system
- (c) Transmission and Distribution instrumentation
- (d) Gas pressure control system installation, testing and commissioning
- (e) Project planning and management
- (f) Risk and environmental assessment
- (g) Legislation, codes and procedures

2.4 Gas Utilisation Engineering (42 - 45 weeks)

- (a) Gas properties and combustion characteristics
- (b) Gas applications
- (c) Gas measurement and metering systems
- (d) Installation, testing and commissioning of service pipes, installation pipes and appliances
- (e) Marketing and sales
- (f) Customer service
- (g) Project planning and management
- (h) Legislation, codes and procedures

3. Consolidating Stage (26 weeks)

This forms part of the training in the selected stream outlined in (2) above which will lead to an appointment as an engineer. One of the three streams of gas engineering viz. Production, Transmission and Distribution, and Utilisation could be selected for the trainee to proceed with at this stage. The training shall involve project work handled by the trainee plus in-depth study of the activities laid down below for the selected stream. The programme should aim to develop skills and knowledge needed to make an effective start. Special training on particular technology having a bearing on future work may be necessary. Where appropriate, computer applications should also be considered.

3.1 Gas Production Engineering

- (a) Gas plant siting and layout proposals
- (b) Gas plant design, construction, testing and commissioning
- (c) Gas plant operation and maintenance
- (d) Gas production processes
- (e) Gas quality analysis
- (f) Plant instrumentation and control
- (g) Electrical supply systems for plants
- (h) Plant protection systems and testing
- (i) Plant safety management and environmental protection systems

3.2 Gas Transmission and Distribution Engineering

- (a) Network design
- (b) Installation, testing, commissioning, operation, maintenance and control of transmission and / or distribution systems

- (c) Design, installation, testing and commissioning and maintenance of pressure control systems
- (d) Knowledge, application and up keeping of Supervisory Control and Data Acquisition (SCADA) Systems*
- (e) Knowledge, application and up keeping of pipeline automated mapping / facilities management systems*
- (f) Gas measurement and metering systems design, installation and maintenance*
- (g) Siting and layout proposals of Pressure Reduction Stations and Pigging Stations*
- (h) Design, construction, testing, commissioning and operation of Pressure Reduction Stations and Pigging Stations*
- (i) Gas leakage survey, repairs and maintenance of pipelines
- (j) Emergency handling and crisis management
- (k) Design, construction and testing of pressure vessels for local distribution*
- (l) Design, construction and testing of gas transportation vehicles*
- (m) Handling and transportation of compressed gases and liquefied gases*
- (n) Siting and layout proposals of storage / distribution systems of liquefied gases*
- (o) Design, construction, testing, commissioning and operation of storage / distribution systems of liquefied gases*

* Only applicable to companies with these types of applications

3.3 Gas Utilisation

- (a) Gas appliance design, application and testing
- (b) Gas equipment and control system design, construction and testing
- (c) Installation, commissioning and testing of gas appliances, equipment and control systems
- (d) Gas flue system design, installation and testing
- (e) Gas measurement and metering system design and installation
- (f) Appliance and control system fault diagnosis, repair and maintenance
- (g) Emergency handling
- (h) Quality customer service

N.B.

1. The minimum training period must not be less than 24 months.
2. The programme set out is for guidance only but substantial departure should not be made. Employers should endeavour to provide training to their trainees in as many areas as possible as is appropriate to the sector of employment.
3. This guide should be read in conjunction with Section 3 of the Membership Admission Requirements booklet.
4. During their training, each trainee is required to maintain a Graduate Training Log Book, CPD Logbook and Record of Objectives.