REFERENCE SYLLABUS

For

International Power Engineer (5th Class)
Introduction

This Syllabus is intended to assist candidates studying for the International Power Engineer (5th Class) Examination.

Recommended Study Program:
It is recommended that, before undertaking this examination, the candidate completes Power Engineering Course of study, offered through a recognized and approved technical institute or training provider which addresses the Syllabus Outline.
Reference Syllabus for International Power Engineer (5th Class) Examination Candidates

Major Topic: Low Pressure Boiler Components and Operation

Unit 1: Boiler Details
Topic 1 Watertube Boilers (Heating, Power, and Tubular)
Topic 2 Cast-Iron Sectional and Modular Boilers
Topic 3 Firetube Boilers (Heating and Power)
Topic 4 Electric Boilers

Unit 2: Boiler Fittings and Controls
Topic 5 Basic Fittings for Steam Boilers
Topic 6 Basic Fittings for Hot Water Boilers
Topic 7 Low Water Fuel Cut-Offs and Feedwater Controls
Topic 8 Heating Boiler Operating Controls
Topic 9 Boiler Combustion Controls
Topic 10 Boiler Programming Controls

Unit 3: Boiler Operation and Maintenance
Topic 11 Basic Boiler Operation
Topic 12 Routine Boiler Maintenance and Inspection

Unit 4: Fuels and Combustion
Topic 13 Combustion and Draft
Topic 14 Burners for Boilers

Unit 5: Piping and Valves
Topic 15 Piping Materials and Connections
Topic 16 Piping Expansion, Support, and Insulation
Topic 17 Steam Traps
Topic 18 Introduction to Valves

Unit 6: Thermoil Systems
Topic 19 Introduction to Thermoil Heaters and Systems
Major Topic: **Elements of Human Comfort in Facility Operation**

Unit 1: Heating Systems and Human Comfort
- **Topic 1 Heat Gains and Losses**
- **Topic 2 Steam Heating Equipment**
- **Topic 3 Steam Heating Systems**
- **Topic 4 Hot Water Heating Systems**
- **Topic 5 Hot Water Heating System Equipment and Operation**
- **Topic 6 Warm Air Heating System Equipment**
- **Topic 7 Warm Air Furnace Components and Maintenance**
- **Topic 8 Ventilation and Air Filters**
- **Topic 9 Infrared and Electric Heating**
- **Topic 10 Humidification**
- **Topic 11 Electric Controls for Heating Systems**

Unit 2: Plumbing and Auxiliaries
- **Topic 12 Building Water Supply Systems**
- **Topic 13 Sanitary Drainage Systems**

Unit 3: Lighting
- **Topic 14 Lighting Systems**

Unit 4: Refrigeration
- **Topic 15 Refrigeration Theory**
- **Topic 16 Refrigerants**
- **Topic 17 Compression Refrigeration Systems**
- **Topic 18 Refrigeration Compressors**
- **Topic 19 Heat Exchangers for Refrigeration Systems**
- **Topic 20 Refrigeration Accessories**
- **Topic 21 Cooling Towers**
- **Topic 22 Air Conditioning Systems**

Unit 5: Refrigeration and AC System Controls
- **Topic 23 Refrigeration Metering Devices and Capacity Controls**
- **Topic 24 Refrigeration Cycle Controls**
- **Topic 25 Compression Refrigeration System Pre-Startup Procedures**
- **Topic 26 Compression Refrigeration System Operations**
Unit 6: Pumps and Air Compressors
Topic 27 Air Compression
Topic 28 Types of Pumps
Topic 29 Pump Operation and Maintenance
Topic 30 Lubrication
Topic 31 Types of Bearing Lubrication

Unit 7: Distributed Generation
Topic 32 Microturbines
Topic 33 Internal Combustion (IC) Engine Gen-Sets

Major Topic: Basic Physical Science, Safety, and Regulation for Facility Operations

Unit 1: Provincial Acts, Regulations, and Adopted Codes
Topic 1 Boiler and Pressure Vessels Act
Topic 2 Introduction to CSA and ASME Codes for Boilers

Unit 2: Basic Math
Topic 3 SI Units
Topic 4 Basic Arithmetic Operations
Topic 5 Transposition
Topic 6 Areas and Volumes of Solids

Unit 3: Applied Science
Topic 7 Application of Basic Mechanics
Topic 8 Introduction to Thermodynamics

Unit 4: Safety
Topic 9 Fire Safety and Site Hazards
Topic 10 Building Safety
Topic 11 Confined Space Entry
Topic 12 Introduction to Occupational Health and Safety Legislation
Topic 13 Introduction to Heating Plant Safety
Topic 14 Handling of Dangerous Materials
Unit 5: Electricity
Topic 15 Introduction to Electricity

Unit 6: Welding
Topic 16 Welding Terms and Inspection

Unit 7: Water Treatment
Topic 17 Water Treatment
Topic 18 Monitoring and Testing

Unit 8: Communications
Topic 19 Technical Communications
Topic 20 Plant Diagrams