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Guidance on Practice for Heating, Ventilation and Air-Conditioning - Offshore

GP 14-03

BP GROUP
ENGINEERING TECHNICAL PRACTICES

Foreword

This is the first issue of Engineering Technical Practice (ETP) BP GP 14-03. This Guidance on Practice (GP) is based on parts of heritage documents from the merged BP companies as follows:

BP

GS 114-9 HVAC Air Handling Units Offshore

Amoco

A ST OFS LQ-E Structural Offshore Living Quarters

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1. Scope

This Guidance on Practice (GP) provides guidance for the design, construction, and operation of Offshore HVAC systems. This document takes into account health, safety and environmental legislation, good design practice, and technical and economic considerations. The design information included in this specification is not intended to cover complete details.

2. Normative references

The following normative documents contain requirements that, through reference in this text, constitute requirements of this technical practice. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this technical practice are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies.

American Bureau of Shipping (ABS)

RP 63 Guide for Building and Classing Facilities on Off-shore Installations

American Petroleum Institute (API)

RP 2A Recommended Practice for Planning, Designing, and Constructing
Fixed Offshore Platforms.

RP 500 Recommended Practice for Classification of Locations for Electrical
Installations at Petroleum Facilities Classified as Class I, Division 1 and
Division 2

American Society of Heating, Refrigerating, and Air-conditioning Engineers Inc. (ASHRAE)

Codes and Standards for HVAC

British Petroleum (BP)

GP 6-60 Onshore and Offshore Paints and Coatings
GP 12-15 Wire & Cable
GP 12-20 Motors
GP 12-25 Earthing Grounding
GP 12-30 Lighting & Small Power
GP 12-60 Hazardous Area Electrical Installations
GP 32-10 Inspection and Testing of New Equipment
GP 32-20 On-site Inspection and Testing
GP 32-48 Inspection and Testing of Off-shore installations
GP 32-50 Inspection and Testing of Electrical Equipment (ANSI)
GP 32-51 Inspecting and Testing of Electrical Equipment (IEC)
GP 40-10 Skid mounted units
GIS 14-021 HVAC Dampers and Fans
GIS 14-022 HVAC Air Filters and Separators
GIS 14-023 HVAC Air Handling Units and Cooling Coils
GIS 14-024 HVAC Electric Air Heater Batteries



GIS 14-025 HVAC Sound Attenuators and Terminal Units

British Standards Institute (BSI)

BS EN ISO 13702 Petroleum and Natural Gas Industries Off-shore Production Installations
Heating, Ventilation and Air-Conditioning.

Chartered Institution of Building Services Engineers (CIBSE)

Guides to HVAC Systems

International Electro-technical Commission (IEC)

61892-6 Mobile and Fixed Offshore Units - Electrical Installations

International Organization for Standardization (ISO)

ISO 15138 Petroleum and Natural Gas Industries Off-shore Production Installations
Heating, Ventilation and Air-Conditioning.

National Electrical Manufacturer Association (NEMA)

Standards for Enclosures

National Fire Protection Association (NFPA)

NFPA 70 National Electrical Code

Sheet Metal & Air Conditioning Contractors National Association (SMACNA)

HVAC Standards

3. Requirements

Design shall be in accordance with international or national standards as appropriate to the specific project. While this GP quotes many standards and practices which will be directly applicable to European and U.K. projects, these shall be replaced with equivalent international or national standards and practices as agreed by BP. Design and construction of offshore HVAC systems shall be in accordance with the following:

1. ABS RP 63
2. API RP 2A
3. API RP 500
4. ASHRAE Codes and Standards
5. BP GP 12-15
6. BP GP 12-20
7. BP GP 12-25
8. BP GP 12-30
9. BP GP 12-60
10. BP GP 40-10
11. BP GIS 14-021
12. BP GIS 14-022
13. BP GIS 14-023



14. BP GIS 14-024
15. BP GIS 14-025
16. BSI BS EN ISO 13702
17. CIBSE Standards
18. IEC 61892-6
19. ISO 15138
20. MMS Safety Standards
21. NFPA 70
22. NEMA Enclosure Standards
23. OSHA Safety Standards
24. SMACNA Standards

4. Design

- a. The design shall consider the following issues:
 1. Safety
 2. Operability
 3. Constructability
 4. Applicable codes
 5. Good engineering practice
 6. Minimum Cost
 7. Efficient systems operation
 8. Suitability for the application
 9. Practical and economic maintenance provisions
- b. The design shall demonstrate that the selected approach is optimal, by means of appropriate capital and operating cost estimates.
- c. The design of the systems shall include specification and selection of unit and equipment items together with all controls and instrumentation associated with the systems.
- d. The design shall ensure that work is fully coordinated with all relevant and associated work whether or not all disciplines are engaged under the same contract.
- e. Air conditioning systems shall be designed to:
 1. Meet daily and annual variations in outdoor temperature, humidity, and solar radiation.
 2. Meet internal load variations due to movement of people and operation of lighting, machinery, and equipment.
 3. Meet maximum heating and cooling loads and potential load conditions including nights and weekends and providing frost protection if required.
 4. Meet sensible and latent load ratios that may be different from those occurring at maximum load condition.
- f. The design shall take into account the following influencing factors:
 1. Climate:



- a) Arctic
 - b) Tropical
 - c) Dry bulb temperatures
 - d) Wet bulb temperatures
 - e) Rainfall
 - f) Wind
 - g) Airborne contaminants
2. Orientation:
- a) Sun path
 - b) Prevailing wind direction
 - c) Prevailing wind speed
3. Safety:
- a) Fire detection
 - b) Fire protection
 - c) Fire / Smoke control
 - d) Gas / Vapour detection
4. Economics:
- a) Type of system
 - b) Control
 - c) Energy conservation
- g. HVAC plant shall comprise a supply plant incorporating a main air filter handling total air and recirculation / discharge air fans.
- h. Plant sparing shall comply with current sparing philosophy.

5. Application

5.1. General.

- a. The air conditioning system shall be a central unit, medium pressure type with the following operating principle:
 - 1. Summer (Hot) Climate - Ventilation, Cooling, Dehumidification.
 - 2. Winter (Cold) Climate - Ventilation, Heating, Humidification.
 - 3. Intermediate - Ventilation, Independent Room Heating.
- b. The system shall be single duct supply with reheating coils (as applicable) in the supply air registers to each room.
- c. Electric preheating coils shall be located in the central unit (as applicable) along with evaporator coils of the air conditioning plant.

5.1.2. Cooling system

- a. System shall use Freon 22 or manufacturer's recommendation
- b. Cooling coils shall be selected for use as specified on data sheets.

