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Guidance on Practice for General Issues - Equipment Packages

GP 60-50

**BP GROUP
ENGINEERING TECHNICAL PRACTICES**

Foreword

This is the first issue of Engineering Technical Practice (ETP) BP GP 60-50. This Guidance on Practice (GP) is based on parts of heritage documents from the merged BP companies as follows:

Amoco

A PN-PLT-UTIL-E Plant Utility Engineering Specifications

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1. Scope

This Guidance on Practice (GP) covers general issues to be considered and utilized for the design and construction and safe operation of Utility Packages. This document considers health, safety and environmental legislation, good design practice, and technical and economic factors. 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 Petroleum Institute (API)

RP 686	Machinery Installation
API-570	Maintenance and Inspection

American Society of Mechanical Engineers (ASME)

Section VIII	Pressure Vessels
B 31.1	Power Boiler Piping
B 31.3	Process Piping

BP Group Engineering Technical Practices (ETPs)

GP 4-20	Civil Engineering
GP 6-60	Onshore and Offshore Paints and Coatings
GP 12-45	Guidance on Practice for Electrical for Packaged Systems
GIS 14-011	Noise Control
GP 14-01	Noise Control
GP 18-01	General Requirements for Welded Fabrication
GIS 24-231	Guidance on Industry Standard for Deluge Systems
GP 30-70	Control and Instrumentation on Vendor Packaged Equipment
GIS 30-402	Guidance on Industry Standard for Programmable Logic Controllers (PLC) Procurement
GP 34-00	Rotating and Machinery Equipment
GP 35-10	Maintainability
GP 35-20	Isolation of Equipment for Maintenance
GP 36-10	Engineering Guidance on Materials Selection
GP 40-10	Structural Skids and Skid Mounted Units
GP 42-10	Metallic Piping Systems
GP 44-70	Guidance on Practice for Overpressure Protection Systems
GP 46-01	Pressure Vessels
GIS 46-010	Pressure Vessels Procurement Requirements
GP 52-10	Guidance on Practice for Thermal Insulation
GP 60-20	Inert Gas Systems



GP 60-30	Plant and Instrument Air Systems
GP 62-01	Valve Selection
GIS 62-021	Integral Block and Bleed Valve Manifolds

3. General

- a. All efforts shall be made in the design and construction of equipment packages and utility systems to prevent injury to personnel.
- b. P&IDs of the contractor, vendor, or supplier's scope of supply shall be provided in the quotation. If applicable, PFDs shall also be provided.
- c. Utility connections to process systems shall be clearly identified on the P&IDs.
- d. Approval for tie-ins or alterations to existing utility mains shall be obtained from company and clearly indicated on the P&IDs.
- e. Piping, valves, vessels, structural, instruments, controls, electrical, machinery and other equipment in the vendor or supplier's scope of supply shall comply with the referenced BP Group GP or GIS and any specific additions contained in the company site technical practices, project specifications, vendor or supplier's quotation, or company purchase order.
- f. The most current version of the referenced codes and standards shall be used, unless otherwise authorized by company.

4. Instruments, Control, and Electrical

- a. All instrumentation shall be in accordance with GP 30-70.
- b. If PLC's are used for control, they shall conform to the requirements in GIS 30-402.
- c. Electrical equipment and systems shall conform to the requirements in GP 12-45.
- d. Electrical area classifications shall be as specified on the data sheets.
- e. Separate cable trays and junction boxes shall be used for wiring of 24 VDC and 480 VAC systems.
- f. Contractors, suppliers, or vendors shall provide ISA format specification sheets or equivalent for all instrument devices and obtain BP approval prior to purchase. Instruments shall be selected from a BP provided instrument manufactures list.
- g. All Instrumentation shall be provided and installed in accordance with BP project specifications.
- h. Control system shall be defined by the supplier's quotation and company project specifications or purchase order. The controls shall be clearly indicated on the P&IDs.

5. Mechanical design requirements

5.1. Piping

- a. Piping shall be in accordance with:
 1. GP 42-10 Metallic Piping Systems,
 2. ASME B 31.3,
 3. ASME B 31.1
- b. Over pressure protection shall comply with GP 44-70.



- c. Piping and equipment in the systems may be designed to with stand the MAWP or greater to eliminate relief protection.
- d. Pressure relief for piping is not required if pressure developed will not exceed that allowed in Section 102.2.4 of ASME B31.1 or Section 302.2.4.f of ASME B31.3.
- e. Need for pressure relief for liquid thermal expansion should be determined.
- f. Piping shall be arranged to allow removal of any piece of equipment for maintenance or replacement, without interruption of a system's operation.
- g. Branch lines from steam, condensate, water, air and inert gas headers shall be connected to:
 - 1. Top of horizontal main, if branch size is equal to main size.
 - 2. Top of centreline of side of main, if branch size is at least one size smaller than main size.
- h. Service connections shall be connected to main header upstream of equipment isolation valves.
- i. Piping shall be insulated for heat conservation or personnel protection, as applicable, in accordance with the P&ID and shall conform to the requirements in GP 52-10.
- j. Insulation for freeze protection shall conform to the requirements in GP 52-10.
- k. High points between isolation valves shall have vents.
- l. Vents shall have freeze protection as required.
- m. Principal water line branches shall have a shutoff valve adjacent to main header.
- n. Drains shall be provided for underground piping.

Underground piping should be avoided due to high maintenance costs, accessibility and corrosion problems.

- o. Drain piping shall be piped to the proper drainage system dependent on the fluid being drained.
- p. Underground piping shall be minimized, but if required it shall be installed below frost line.
- q. Outdoor headers and branches containing fluids subject to freezing shall have freeze protection as applicable.
- r. Intermittent service and low flow rate installations shall have freeze protection if the systems are water or water can collect.
- s. Where water piping will be subject to freezing weather, the piping, valves, and equipment shall have proper freeze protection, heat tracing and insulation. Piping may be installed to prevent freezing, and if so, freeze protection may not be required.
- t. Cooling water piping shall be designed in accordance with GP 42-10 and ASME B 31.3.

Cooling water piping is often designed for 125% of normal flow to accommodate variations in cooling water system, if variations are defined, a lower design flow rate may be considered.

- u. Water piping dead ends shall be piped and valved to ensure constant flow to prevent freezing.

5.2. Valves

Valve selection shall be in accordance with:

- 1. GP-62-01,

