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Guidance on Practice for Isolation of Equipment for Maintenance

GP 35-20

BP GROUP
ENGINEERING TECHNICAL PRACTICES

Foreword

This is the first issue of Engineering Technical Practice (ETP) BP GP 35-20. This Guidance on Practice (GP) is based on parts of heritage documents from the merged BP companies as follows:

British Petroleum

RP 44-10

Isolation of equipment for maintenance

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1. Scope

This GP provides guidance on the physical methods of isolation of mechanical, electrical and control equipment.

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.

BP Engineering Technical Practices

GP 12-25	Earthing / Grounding
GP 30-25	Field Instrumentation
GP 42-10	Metallic Piping Systems
GP 62-01	Valve Selection
GIS 12-101	IEC Low Voltage Switchgear
GIS 12-102	NEMA Low Voltage Switchgear
GIS 12-103	IEC High Voltage Switchgear
GIS 12-104	NEMA High Voltage Switchgear

British Standards (BS)

BS 6423	Code of Practice for maintenance of electrical switchgear and control gear for voltages up to and including 1kV.
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Occupational Safety and Health Administration (OSHA)

Part 1910.146	Confined Space Entry
Part 1910.147	Lockout / Tagout

3. Terms and definitions

For the purposes of this GP, the following terms and definitions apply:

Authorised Electrical Person

A person appointed in writing to carry out duties incidental to the generation, conversion, storage, transmission, transformation or utilisation of electricity.

Competent Electrical Person

A person who has sufficient technical knowledge, training, and experience to undertake defined tasks and avoid danger.

High Voltage

A voltage level exceeding 1,000 VAC or 1,500 VDC.

Isolation

The disconnection and separation of equipment from every source of energy.



Low Voltage

A voltage not exceeding 1,000 VAC or 1,500 VDC.

Spades

Spades or blinds made of metal are installed between flanges for use as positive isolation devices.

Specialist Electrical Personnel

A Technician or Engineer employed by a supplier, agent, or specialist company and having detailed knowledge and expertise of specific electrical equipment.

Switching Log Book

A document for recording switching operations of main electrical equipment.

4. Symbols and abbreviations

For the purpose of this GP, the following symbols and abbreviations apply:

CO 2	Carbon Dioxide
DBB	Double Block and Bleed
ESD	Emergency Shutdown
HAZOP	Hazard and Operability Study
I/Os	Input / Outputs
IS	Intrinsically Safe
LNG	Liquefied Natural Gas
MCB	Motor Control Board
MCC	Motor Control Centre
PLC	Programmable Logic Controller
RTJ	Ring Type Joint

5. General

- a. Account must be taken of nationally and locally enacted legislation where it modifies or adds to the provisions of this Practice.

This practice is primarily for use as a guide to the provision of safe methods of isolation for new projects, but is also prepared with due regard to potential limitations of isolating facilities on existing plants.

- b. The use of Control of Hazardous Energy procedures, as described in OSHA 29 CFR Part 1910.147 Lockout / Tagout, shall be applied during all isolation events.



6. Mechanical Isolation

6.1. General

- a. The normal methods of isolation for mechanical equipment may be classified as:
 - 1. Positive isolation.
 - 2. Valve isolation.
 - 3. Isolation by other devices

6.2. Positive isolation

- a. Positive isolation shall be employed where entry into a confined space is to be undertaken or where high risk fluids are to be contained.
- b. Positive Isolation shall be achieved in one of the following ways:
 - 1. Disconnection and plugging or blanking of open ends or disconnection and removal of piping sections or spool-pieces and plugging or blanking (blinding) of open ends.
 - 2. The insertion of a steel spade (blind) between flanges, or replacement of a spacer with a line blind.
- c. Blanks, spades (blinds), bolting, and gaskets shall conform to the piping specification for the line.

In special cases, e.g., during an overhaul, it may be acceptable to use non-pressure rated blanks, if they do not perform a full pressure containment function, i.e., downstream of fully rated isolation blanks, or to seal vessel nozzles from possible fume / vapour ingress. .

- d. Bolting should be of the correct length to accommodate any extra thickness of the spade.
- e. Joint faces should be square and fully bolted (full threads through the nuts) and tightened.
- f. The design shall consider the amount of flange spread necessary to remove and insert spades (blinds), and the orientation of the flanges. Also consideration for the inclusion of spacers at difficult essential spading points should be made.

Because of the difficulty of providing sufficient flange spread for ring-type-joint (RTJ) spades, positive isolation for RTJ systems is usually by removable spool with blanking of the open ends; the designer should consider ease of removal of such spools, e.g., by including a right angle bend.

- g. The design shall also consider line support requirements where a removable spool or spading (blinding) point is provided.
- h. In addition to the requirement for positive isolation for work involving entry to confined spaces, positive isolation should be used in the following cases:
 - 1. Extended duration isolations.
 - 2. Equipment is to be mothballed.
 - 3. When hot work is to be undertaken,
 - 4. For process fluids at or above auto-ignition temperature.

6.3. Valved isolation

- a. Isolation by valves to perform maintenance or inspection work shall follow special procedures to determine that the valves will not allow gas or fluid to pass. The work shall be covered by a specific control procedure, for example, a Permit to Work.

