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# Guidance on Practice for Wellhead Control Panels

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**GP 30-66**

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**BP GROUP**  
**ENGINEERING TECHNICAL PRACTICES**

## Foreword

This is the first issue of Engineering Technical Practice (ETP) GP 30-66. This Guidance on Practice (GP) is based on the BP heritage RPSE document GS 130-12.

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## 1. Scope

This GP provides guidance for the selection, design, and installation of wellhead control systems including the wellhead control panel.

The scope of this GP does not include electric wellhead controls.

*Electric wellhead control, including electric failsafe actuation of topside wellhead valves, has been installed on the Andrew facilities (North Sea oil and gas platform). At this point in time the use of these type of systems are still limited. It is expected that at a later time when learnings, issues and problems are captured, they will be incorporated into this document.*

## 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

|          |                                                                                |
|----------|--------------------------------------------------------------------------------|
| GP 12-15 | Guidance on Practice for Wire and Cable.                                       |
| GP 12-60 | Guidance on Practice for Hazardous Area Electrical Installations.              |
| GP 30-25 | Guidance on Practice for Field Instruments - General.                          |
| GP 30-40 | Guidance on Practice for Process Automation Systems.                           |
| GP 30-65 | Guidance on Practice for Control Panels.                                       |
| GP 30-80 | Guidance on Practice for Safety Instrumented Systems - Implementation.         |
| GP 30-90 | Guidance on Practice for Commissioning of Instrumentation and Control Systems. |

### International Electrotechnical Commission (IEC)

|           |                                                         |
|-----------|---------------------------------------------------------|
| IEC 60529 | Degrees of protection provided by enclosures (IP Code). |
|-----------|---------------------------------------------------------|

### National Aerospace Standards (NAS)

|          |                                                              |
|----------|--------------------------------------------------------------|
| NAS 1638 | Cleanliness Requirements of Parts Used in Hydraulic Systems. |
|----------|--------------------------------------------------------------|

### National Electrical Manufacturers Association (NEMA)

|          |                                                           |
|----------|-----------------------------------------------------------|
| NEMA 250 | Enclosures for Electrical Equipment (1000 Volts Maximum). |
|----------|-----------------------------------------------------------|

## 3. Symbols and abbreviations

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

|     |                           |
|-----|---------------------------|
| ESD | Emergency shut down.      |
| I/O | Input/output.             |
| PAS | Process automated system. |



|     |                              |
|-----|------------------------------|
| PCS | Process control system.      |
| PSD | Process shut down.           |
| SIS | Safety instrumented systems. |

#### 4. General

- a. For physical design, wiring and general guidelines the wellhead control panels shall comply with GP 30-65.
- b. Design shall meet requirements of appropriate local regulatory authorities.

*Example of a local requirement is Code of Federal Regulations (CFR) Title 30, Part 250, - Mineral Resources, Chapter II, Minerals Management Service, Subpart H, Oil and Gas Production Safety Systems, Sections 250.800 through 250.807, Requirements for installations in the Gulf of Mexico (GoM).*

*Furthermore, in the GoM for offshore platforms, the following standards shall be complied with as per local regulation:*

- API RP 14B Design, Installation, Repair and Operation of Subsurface Safety Valve Systems.
  - API RP 14C Recommended Practice for Analysis, Design, Installation, and Testing of Basic Surface Safety Systems for Offshore Production Platforms.
  - API RP 14F Recommended Practice for Design, Installation of Electrical Systems for Offshore Production Platforms.
- c. Electrical components and installation in hazardous areas shall be in accordance with GP 12-60.
  - d. Instruments and/or systems that are part of the Safety Instrumented System of the facility shall comply with GP 30-80.
  - e. Process Automation Systems shall be in accordance with GP 30-40.
  - f. Testing for instruments and controls shall be in accordance with GP 30-90.
  - g. Field instruments in general shall comply with GP 12-25.
  - h. Field mounted equipment shall be IEC IP 66 in accordance with IEC 60529 (NEMA 4X in accordance with NEMA 250), as a minimum.
  - i. For topsides located wellhead valves and other duties, excluding subsea, the cleanliness requirement shall be NAS 8. For any subsea valve applications, the cleanliness requirement shall be NAS 6. Refer to National Aerospace Standard 1638.
  - j. Cabling and panel wiring shall be flame retardant to industry standards. Refer to GP 12-15 for general cabling and wiring requirements.
  - k. To enable uniformity of supply with other equipment, compression fittings shall be subject to BP approval.

#### 5. Wellhead control system design

##### 5.1. General

- a. Wellhead control system should include:
  1. Control panels consisting of controls for the hydraulically operated wellhead and down hole valve actuators for control of single or multiple wells, as required.



*These controls are to permit operation and shutdown of wells from a remote control system.*

2. Facilities for partial or total emergency shutdown from a shutdown system, which may either be included as part of the wellhead control panel supply, or be part of a separate system outside the scope of the supplier of the wellhead control panel.

*For example, in GOMDW there are three categories of remote I/O modules: Process Safety System (PSS), Process Control System (PCS), and Emergency Support System (ESS). These three modules are required for interface with the remote control system and are purchased, installed, and wired in the electrical portion of the panel as shown on the project design documents.*

3. Hydraulic power unit package consisting of pumps together with hydraulic oil reservoirs and all necessary controls for multiple pressure levels for operation of the wellhead and downhole valve actuators. The package may also be required to provide hydraulic power for additional users such as process emergency shutdown valves.

*Pumps could be either pneumatic or electrically driven pumps.*

4. Fusible plug loop charge circuitry
  - b. The wellhead control system shall include equipment failure alarms necessary to ensure system integrity.
  - c. Hydraulic supply and control design for multipressure applications shall prevent pressure buildup when hydraulic demand is zero.
  - d. The number of pressure levels used in a system should be minimised.

*A system that uses a common pressure level with pressure letdown for lower-pressure applications can cause problems with pressure buildup and erosion of regulator bleedoff ports. This condition is due to regulator seat leakage when hydraulic demand is zero.*

In the past it was usual to install SSSV hydraulic regulators. Typically reservoir pressures drop and there is a good commercial case to install lower pressure rated components down hole in later field life, maybe during a well work over. This invariably means that control line pressures, and hydrostatic head, to new lower rated SSSV are too high. Solution is to retrofit hydraulic (self relieving) regulator. Consider need for regulator for SSSV control lines on each well control drawer. Alternatively, allow space on drawer either on back or front. Or pipe in a dummy regulator, with tubing fittings to facilitate retrofit later. SSSV regulator is also useful for nursing sick SSSVs, or extending the life of healthy ones as a slowly increasing control line pressure is better than switching on full pressure. The installation of these regulators may increase maintenance problems and bring other issues; hence an assessment of their real need is recommended.

- e. If multiple pressure levels are required, separate pumped circuits are preferred. Overpressure, backregulation, or circulating bleedoff may be considered. Tight shutoff regulators may only be considered as a temporary solution to relieve problems that result from regulator seat leakage.
- f. Pressure-sensing transmitters shall be used in place of pressure switches for alarm and shutdown activation.
- g. Pressure-sensing transmitters shall have test manifolds to facilitate testing.
- h. Wellhead control system should be built on a modular basis to allow independent servicing of individual well controls.
- i. Design shall include capability to modify control function, example from a producer well to a water injection well or vice versa.
- j. Potential expansion to accommodate control of additional wells shall be considered in design.

