

DEP SPECIFICATION

INSTRUMENTATION FOR PACKAGED EQUIPMENT

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DESIGN AND ENGINEERING PRACTICE



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1. INTRODUCTION

1.1 SCOPE

This DEP specifies requirements and gives recommendations for instrumentation and control systems that are provided as part of equipment packages. It gives guidance and examples for the instrumentation and control systems scope of supply from Package Equipment (PEQ) Manufacturers.

This DEP is aimed at the Contractor and is not intended to be sent to the PEQ Manufacturer.

The primary audience and actionable party of this DEP is the Engineering Contractor, as it is intended for use by the Contractor and Principal when preparing a specification for equipment packages to be provided by a PEQ Manufacturer.

This is a revision of the DEP of the same number dated February 2017; see (1.5) regarding the changes.

1.2 DISTRIBUTION, INTENDED USE AND REGULATORY CONSIDERATIONS

Unless otherwise authorised by Shell GSI, the distribution of this DEP is confined to Shell companies and, where necessary, to Contractors and Manufacturers/Suppliers nominated by them. Any authorised access to DEPs does not for that reason constitute an authorisation to any documents, data or information to which the DEPs may refer.

This DEP is intended for use in facilities related to oil and gas production, gas handling, oil refining, chemical processing, gasification, distribution and supply/marketing. This DEP may also be applied in other similar facilities.

When DEPs are applied, a Management of Change (MOC) process shall be implemented; this is of particular importance when existing facilities are to be modified.

If national and/or local regulations exist in which some of the requirements could be more stringent than in this DEP, the Contractor shall determine by careful scrutiny which of the requirements are the more stringent and which combination of requirements will be acceptable with regards to the safety, environmental, economic and legal aspects. In all cases the Contractor shall inform the Principal of any deviation from the requirements of this DEP which is considered to be necessary in order to comply with national and/or local regulations. The Principal may then negotiate with the Authorities concerned, the objective being to obtain agreement to follow this DEP as closely as possible.

1.3 DEFINITIONS

1.3.1 General definitions

The **Contractor** is the party that carries out all or part of the design, engineering, procurement, construction, commissioning or management of a project or operation of a facility. The Principal may undertake all or part of the duties of the Contractor.

The **PEQ Manufacturer** is the party that manufactures or supplies equipment and services to perform the duties specified by the Contractor.

The **Principal** is the party that initiates the project and ultimately pays for it. The Principal may also include an agent or consultant authorised to act for, and on behalf of, the Principal.

The word **shall** indicates a requirement.

The word **should** indicates a recommendation.

The word **may** indicates a permitted option.

1.3.2 Specific definitions

Term	Definition
Basic Process Control System (BPCS)	A general term to describe the processing hardware and functionality that monitors, alarms and controls a process unit or PEQ. This is typically performed by a host DCS or PLC remote from the PEQ, but may be implemented in a PLC or simple logic system, installed on the PEQ - if approved by the Principal. The term BPCS is specifically used to exclude any Trip System or Safety System, which would be a secondary system to the BPCS.
Distributed Control System (DCS)	A configurable microprocessor based control system that typically has its controllers distributed away from the main Human-Machine Interface (HMI).
Field Auxiliary Room (FAR)	Building/Room containing BPCS and SIS controllers and I/O equipment. Typically located near the battery limits of a process unit in a non-hazardous environment. The field junction box home run cables typically route to the FAR. Also historically referred to as a Remote Instrument Enclosure (RIE) or Local Equipment Room (LER).
Functional tests	Tests carried out by simulating a process condition on the input side of the instrument to check the corresponding output 'function'.
Integrated Control and Safety System (ICSS)	A general term to describe the processing hardware and functionality that monitors, alarms, controls and/or shuts down a process unit or PEQ. This is typically performed by a host DCS and SIS, or PLC remote from the PEQ, but may be implemented in a PLC or simple logic system, installed on the PEQ - if approved by the Principal.
Packaged Equipment (PEQ)	Single or combined units of equipment supplied by a Manufacturer which include instrumentation and possible Control and Safety Instrumented System or to which instrument requirements may apply. Formerly called Equipment Package and sometimes referred to as a Package Unit (PU) in industry documents.
Safety Instrumented Function (SIF)	A function comprising one or more sensors, a Logic Solver and one or more Final Elements whose purpose is to prevent or mitigate hazardous situations. A SIF is intended to achieve or maintain a safe state for the process, in respect of a specific hazardous event. A SIF is designed to achieve a required SIL which is determined in relationship with the other protection layers participating in the reduction of the same risk. Previously referred to as an Instrumented Protective Function (IPF).

Term	Definition
Safety Instrumented System (SIS)	Instrumented system used to implement one or more SIFs. (Ref. IEC 61511) A SIS is composed of any combination of sensors, logic solvers, and final elements. It also includes communication and ancillary equipment (e.g., cables, tubing, power supply, impulse lines, heat tracing). A SIS can include software. A SIS can include human action as part of a SIF (see ISA TR84.00.04:2015, part 1).

1.3.3 Abbreviations

Term	Definition
BPCS	Basic Process Control System
DC	Direct Current
DCS	Distributed Control System. Also referred to as BPCS (Basic Process Control System)
DEM1	Design Engineering Manual 1
DET	De Energise to Trip
EFA	Enterprise Framework Agreements
EMI	Electro Magnetic Interference
ETT	Energise to Trip
F&G	Fire & Gas
FAR	Field Auxiliary Room
FAT	Factory Acceptance Test
HFE	Human Factors Engineering
HMI	Human-Machine Interface
ICSS	Integrated Control and Safety System
JB	Junction Box
MIV	Main Instrument Vendor
MOC	Management of Change
MTR	Minimum Technical Requirements
PACO	Process Automation, Control and Optimisation
PEQ	Packaged Equipment