



Exploration & Production

GENERAL SPECIFICATION

PROCESS

GS EP ECP 105

Process documents to be prepared during engineering phase

04	01/2012	Additional definition section 3 and additional section 20.19 and update following the EP reorganisation, March 2011
03	11/2005	Updated to include "EP" in nomenclature
02	10/2003	Change of Group name and logo
01	09/2002	Replaces GS EXP 305
00	01/2002	First issue
Rev.	Date	Notes

Owner: OPS/EXP

Managing entity: DEV/ED/ECP



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1. Scope

This general specification is intended to define the minimum requirements applicable to Process related documents which are to be produced by engineering and/or licensor and/or vendor at either basic or detailed engineering phase.

This general specification is intended for use for facilities such as oil and gas production plants, gas plants, LNG plants, LNG import terminals.

2. Reference documents

The reference documents listed below form an integral part of this General Specification. Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published at the EFFECTIVE DATE of the CONTRACT.

Standards

Reference	Title
Not applicable	

Professional Documents

Reference	Title
Not applicable	

Regulations

Reference	Title
Not applicable	

Codes

Reference	Title
Not applicable	

Other documents

Reference	Title
Not applicable	



Total General Specifications

Reference	Title
GS EP ECI 002	Drawings and symbols -Principles of presentation at project definition phase
GS EP ECP 103	Process sizing criteria
GS EP SAF 261	Emergency Shut-Down and Emergency De-Pressurisation (ESD & EDP)

3. General

3.1 Documents prepared

As a minimum, the following documents shall be prepared:

- Process design procedure
- Process block flow diagram
- Process heat and material balances
- Process Flow Diagrams (PFD's)
- Utilities balances
- Utilities Flow diagrams (UFD's)
- Piping and Instrumentation Diagrams (P&ID's)
- Process data sheets
- Process instrument data sheets
- Fluids list
- Lines list
- Emergency Shut-Down (ESD) diagram
- Emergency Shut-Down (ESD) matrix
- Process and Safety Diagrams (PSD's)
- Process, utilities and offsites description
- Process operating philosophy
- Calculation notes:
- Vessels sizing
- Columns sizing
- Pumps
- Compressors
- Heat exchangers



- Lines sizing
- Monophasic lines
- Multiphasic lines
- Hydrate inhibition
- Tank heating
- Storage tank blanketing, venting
- Depressurisation
- Relief devices
- Flare(s)/cold vent(s) loads summary
- Flare(s)/cold vent(s) network(s) sizing
- Flare(s)/cold vent(s) radiations
- High integrity protective system (HIPS)
- Flow measuring system sizing
- Energy efficiency indicators

3.2 Terminology and definition

The following term as defined below has been used through out this specification.

Process: Discipline(s) in charge to study the oil and gas production plants, gas plants, LNG plants, terminals, etc., but also all associated off sites and utility fluids.

3.3 Drawing symbolisation

GS EP ECI 002 shall be followed.

The vendor and sub-supplier drawings shall also follow the drawing symbolisation defined for the concerned Project.

The modifications performed on a drawing between two revisions shall be clearly indicated with clouds. For other all documents (lists, data sheets, calculation notes, etc.), the modifications performed between two issues shall be easily visible.

3.4 Abbreviations

BDV	Blowdown Valve
BWG	Birmingham Wire Gage
DCS	Distributed Control System
ESD	Emergency Shut-Down
ESDV	Emergency Shut-Down Valve
HIPS	High Integrity Protective System
LMTD	Log Mean Temperature Differential



LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
NPSH	Net Positive Suction Head
PFD	Process Flow Diagram
P&ID	Piping and Instrumentation Diagram
PLC	Programmable Logic Controller
PSD	Process Safety Diagram
PSDV	Process Shut-Down Valve
PSV	Pressure Safety Valve
SDV	Shut-Down Valve
TL	Tangent Line
TSV	Thermal Safety Valve
UFD	Utility Flow Diagram

4. Process design procedure

This document shall include at least:

- The purpose of the project
- Brief description
- Codes, standards and specifications
- Softwares packages to be used and a brief description for those not listed in **GS EP ECP 103**
- System of unit
- Process design basis
- Utilities design basis
- Products specifications
- Environmental conditions
- Process sizing criteria
- Plant units list and itemisation
- Equipment abbreviation and tagging philosophy
- Sparing philosophy
- Isolation philosophy
- Standard process hook-ups.

5. Process block flow diagram

A general diagram showing the number of treatment trains and the successive process treatment facilities for a quick understanding. Each unit is represented in a box with its reference item and functionality. The main fluids to and from each box are shown.

6. Process heat and material balances

Process heat and material balance for each process case identified in the design basis shall be issued with the compositions, thermodynamic and physical properties for all streams.

The thermodynamic model, equation of state, correlation's for calculation of liquid and vapour enthalpy, density, entropy, etc. used for the preparation of the heat and material balances shall be clearly indicated.

A stream shall be defined when it is used for sizing calculation and every time that one condition (pressure, temperature, flow rate, etc.) changes.

The computer outputs with all streams well identified shall be provided.

A complete scheme showing the location of the streams is required, it could be either an output sketch from the thermodynamic software simulation if it is easily readable or on the process flow diagrams.

The pressure drops, rotating equipment efficiencies, heat losses and heat inleak, etc. when relevant shall be clearly indicated.

7. Process Flow Diagrams (PFD's)

It presents the succession of the operations in the fluid(s) processing to reach the required products specifications set in the objectives of the plant processing.

The succession of operations are pictorially represented by equipment symbols and lines for a good understanding.

When equipment is duplicated or if it is spared, only one equipment item is shown on the PFD.

The controls are indicated by a simplified symbolic representation of control loops.

The equipment reference is given close to the symbolic representation.

In the upper part of the sheet, the equipment reference is repeated to indicate the function of each equipment item.

A process flow diagram for each process case shall be issued and at least the pressure, temperature, flow rate, power and heat duty values are indicated in appropriated "square" shape.

A number inside a diamond, included in main lines, refers to the stream number of the heat and material balance table of the unit, sometimes integrated in the bottom part of the PFD sheet.

8. Utilities balances

Utility balances for each utility with the list of the consumers shall be issued for all operating modes and/or process cases (e.g. loading mode, non loading mode for LNG plant; normal, essential and emergency for electrical balance; etc.).

The margin factor shall be clearly stated.