

GENERAL SPECIFICATION

PIPELINES - RISERS

GS EP PLR 001

Documentation requirements

05	10/2012	Update of Datasheet with reference level for pressure and operating conditions associated with freespan allowable lengths
04	01/2012	Update following the EP reorganisation, March 2011. Addition of DataSheet in Appendix 5. Addition of excel datasheets to main file
03	10/2009	General revision
02	10/2008	General revision
00	10/2003	First issue
Rev.	Date	Purpose of the revision

Owning entity: DEV/TEC	Managing entity: DEV/TEC/PLR
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1. Scope

This General Specification represents the minimum requirements for the technical scope and quality management of the documentation related to the design of the pipeline system - further on referenced as the System.

2. Reference documents

The reference documents listed below form an integral part of this General Specification.

External Documents

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published at the effective date of this document.

Reference	Title
Not applicable	

Total General Specifications

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published in the applicable yearly collection.

Reference	Title
GS EP GEO 202	Geophysical Survey for the Installation and/or the Inspection of Offshore Structures and Pipelines

3. Definitions

System	Means the pipeline system, as specified by the Contract and which shall be covered by the Design .
Design	Means the design studies for the System and the associated organisation, in the frame of the Contract.
Third Party	Means the company in charge of independent design appraisal or independent analysis or independent inspection in accordance with the Contract.
Certifying authority	Means the company in charge of the certification of the System and of issuing of the relevant certificates in accordance with the Contract.
Battery Limits	Means the battery limits of the System , as specified in the Contract.
Component	Means any permanent or temporary component directly incorporated in the pipeline or any ancillary component which is needed for the construction, installation, and operation of the System .

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4. Deliverables

4.1 General documents

The **Design** shall commence with the completion of:

- The General Basis of Design document, that shall include:
 - The entire set of data to be used throughout the **Design**, as per Appendices The proposed design methods and criteria.
- The Master Document Register (MDR), covering the entire list of documents that shall be produced in the frame of the **Design**; if the MDR extends beyond the **System** (i.e. in the case of a Project involving the development of other facilities), the section of the MDR related to the **System** shall be clearly identified in the frame of the global MDR.

These documents shall be approved before going further on in the **Design**.

The **Design** shall culminate with a definition of the **System** in line with the required accuracy level.

4.2 Specific documents

The documents shall as a minimum consist of:

- General descriptions
- General arrangements
- Technical specifications
- Drawings
- Material take-offs
- Method statements
- Calculation notes
- Detailed procedures
- Alignment sheets

as necessary for the following phases (as relevant):

- Design
- Fabrication
- Expediting
- Integration
- Installation
- Pre-commissioning
- Operation
- Inspection
- Maintenance
- Repair
- Abandonment

As such, these documents shall cover:

- The description of the System and its Battery Limits
- The criticality, safety, environmental, and functional assessments
- The sustained development assessment
- The interface matrix
- The structural/mechanical strength assessment

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- The integrity management assessment and plan
- The site surveys and the associated results
- The qualification programs and tests
- The quality control and the acceptance procedures (studies, fabrication, installation)
- The as-built dossier.

4.3 Additional documents

In addition, the following documents may be incorporated, depending on the Contract:

- The detailed procedures for commissioning and start-up
- The complete operating manual
- The contingency repair details, including the list of temporary and permanent means and systems.

4.4 Completion file

At the completion of the **Design**:

- An approved Design Report reflecting the requirements and principles stated in further section 9
- An approved Completion File - as outlined in further section 10 - and covering all the documentation used and produced in the course of the **Design**.

5. General requirements

5.1 Crossed references

Each referenced document, design data, analysis method, etc., listed in the General Basis of Design shall receive an index number that shall be used in the frame of the Design, and necessarily without having to duplicate the addressed information.

Therefore, each document produced in the frame of the Design shall commence with the list of the crossed references, as necessary for the understanding of the said document.

In the case of drawings, these crossed references shall appear in the frame of the notes/comment box.

5.2 Electronic files

Each document used and produced in the frame of the **Design** shall be available under an electronic format that shall be readable under PDF format, and in addition:

- Formats used together with electronic output data shall be explained so as to enable their use together with other computer softwares than those used by the provider of these data or used in the course of the **Design**
- Drawings and alignment sheets shall be recorded in the form of independent electronic files that shall be readable under a non-raster editing tool that shall allow any close-up

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views and printings at the required scale for each document, without any loss of accuracy, in the view of further checks and re-uses by Company

- Computer analysis spreadsheets and printouts shall be recorded in the form of independent electronic files that shall allow any extractions in the view of further checks and re-uses by Company. Refer to section 5.4.

5.3 Units and accuracies

All calculations must be made with SI units.

Values not included in this system shall only be tolerated as references.

They shall be converted into SI values and shall not **at any time** be used in the calculations.

Any output data incorporated in the calculation notes and in the design report shall be reported at an accuracy level consistent with the design basis and design methods used for the **Design**.

Stress levels shall be rounded up to the nearest mega Pascal.

End expansions shall be rounded up to the nearest tenths of meter.

Concrete coating thickness shall be rounded up to the nearest millimeter.

The use of inches is allowed for tubular sizes provided they are accompanied with the corresponding value in millimetres and tenths of millimetres.

The use of bars (absolute, gauge) is allowed too.

5.4 Computer modelling

All software packages, programs and sub-programs used shall have been previously tested and known to give fully validated and reliable results.

Any input data resulting from others - such as but not limited to loads and displacements limitations from any interfaced facilities - shall be documented in detail.

Furthermore, as long as such data are not available, the set of tentative values to be used for the purposes of the **Design** shall be proposed.

On doing this, it shall be demonstrated that the degree of conservatism used is consistent with the expectable behaviour of the interfaced facility.

As soon as the outstanding information is available, the model and analyses performed shall be updated accordingly.

For any type of calculation or analysis performed on computer, the complete and detailed computer outputs shall be submitted together with the analysis report.

The computer input and output data shall be accompanied by sketches which shall perfectly match the computer model, especially in terms of joint and node numberings.

The code checking results outputs shall indicate the reference of the code formula for each usage factor printed and summarised code checking results shall also be given in decreasing order.

Any Usage Factors found to exceed **80%** of the maximum allowable values shall be clearly reported.

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At the end of the **Design**, the computer model shall be updated to represent the **approved for tendering**, or the **approved for construction**, or the **as-built** condition of the System, as applicable.

The native model files shall be transmitted in their proprietary format, with a viewer application appropriate for reviewing the proprietary formatted files.

6. Analyses

Each analysis shall:

- Commence with the crossed references and a summary of the main findings, recommendations, and issues
- Include a synthesis of the results in the form of drawings or sketches, with check on determinant conditions
- Include a copy of the drawings showing the modelled components
- Include any hand calculation performed during the structural analysis at data input stage or as complementary verification or code check.

7. Drawings and alignment sheets

7.1 Alignment Sheets

The alignment sheets as well as any detailed drawings shall be prepared on the basis of the General Basis of Design, and of the survey results.

The requirements for **subsea** pipeline alignment sheets are detailed in **GS EP GEO 202**.

The requirements for **onshore** pipeline alignment sheets are detailed below:

- **Key Plan**, which shall locate the section of the pipeline in question along the route.
- **Plan view**, based on the UTM Coordinate System, and shall include:
 - Scale 1/1000, 1/5000, 1/10000 or 1/20000
 - KPs with hectometres subdivision
 - Soil nature
 - Orientation (North)
 - CP measurement points
 - Properties limits/landowners
 - Topographic and bathymetric contours
 - The geographical elements, such as land use, housing, roads, other pipelines etc.
 - Tangent points and curvature radii
 - Any obstacles
 - Pipeline markers

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- Other pipelines, valves, crossings, etc.
- Fences
- Any other points of special interest.

The planar view strip map shall be centralised along the axis of the pipeline and split as necessary to ensure the pipeline remains central within this view.

- **Elevation view**, which shall:
 - Be at vertical scale in between 1/100 and 1/500
 - Clearly relates to the plan view
 - Indicate the natural ground level, the top and bottom lines of the pipeline versus the KP (or the centre line of the pipeline, if too large elevation scale).
- **Cross-section views**:
 - Typical cross-sectional views of the ROW shall be given together with a key plan
 - Individual crossing cross section views (e.g. pipeline, river, cable, road, highway, etc.) shall be given together with a key plan.
- **Pipeline characteristics table**: this shall include the variable characteristics related to the plan view such as the steel thicknesses and grades, the coatings, the burial depth, etc.

7.2 Drawings

For all drawings the **Battery Limits** and any Code Breaks shall be clearly identified and marked-up with assumptions/holds made, as necessary.

Any series of drawings to be prepared in the view of detailed engineering, procurement, fabrication, assembly and installation of specific components, sections, and sub-assemblies, shall be accompanied with:

- A drawing list, including structural weight for each drawing of the list, which shall be updated at each issued revision of any referenced drawings
- A 3D structural general arrangement drawing
- A general note drawing
- Typical welding detail drawings.

8. Material Take Offs (MTOs)

MTOs shall enable to:

- Procure line pipes, coatings, weightings, permanent and temporary components and aids, sub-assemblies, etc.
- Calculate installation, abandonment, and recovery weight loads for regular pipelaying operations, as well as for specific deployment, abandonment and recovery of special components (i.e. bulkheads, PLETs, tapping, branching, incorporated valves, etc.).

Each MTO shall be established drawing by drawing and element by element.

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Summaries shall be made for each sub-assembly.

Lengths and cross-sections taken into account shall be those calculated on the drawings, including those of bends and major fittings.

The weights of components, sub-assemblies, and sub-systems shall be taken into account and the hypothesis made by shall be clearly traceable, until these weights have been confirmed.

Each MTO shall also provide the hypothesis and quantities used for the contingency spares, segregated per destination (NDT, installation, EPRS, etc.).

9. Design report

The Design Report is a fundamental deliverable that shall be initiated at the commencement of the **Design** and that shall be steadily implemented and updated, as necessary.

At the end of the **Design**, the Design Report shall outline the main findings and conclusions.

Any **changes** that may have occurred along the **Design** shall be duly documented, with their chronological sequences.

The Design Report shall as **a minimum** contain the following sections:

Executive summary	Outline of the main hypothesis and findings.
Design Data	The tables as per Appendix 1.
Pipeline Summary	The tables as per Appendix 1.
Reference documents	The list of all Reference documents used, with outline of main amendments, if any.
Process	Outlines of hypothesis, assessment method and findings, with specific flow management and thermal assurance issues, and P&IDs, as necessary.
HSE	Outlines of safety, and environmental design principles, including external risks as well as risks induced by the System .
Routing	Outlines of hypothesis, assessment method and findings, supplemented with A4 and/or A3 formatted maps showing out the overall layout and bathymetry, and enlarged details of terminations, special points, as necessary.
Corrosion	Outlines of corrosion prevention/mitigation design, including coatings, cathodic protection, internal linings, and injection of chemicals.
Line pipe selection	Outlines of hypothesis, assessment method and findings, based on pressure containment, resistance to external pressure, and resistance to installation loads.
In-place stability	Outlines of hypothesis, assessment method and findings in relation with the in-place behaviour of the System , including concrete coating, trenching, burying, free span limitation, expansion, lateral and upheaval buckling, walking, etc.

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Installation	Outlines of pipelaying methods and associated marine vessels, and installation aids, including initiation, termination, abandonment and recovery phases.
Tie-ins	Outlines of terrestrial and subsea tie-ins design, fabrication and site works, with main impact from / consequences to / the interfaced facilities.
Special points	Outlines of design, site preparation works and installation works.
Material Take-Offs	Outlines of the main quantities, lengths, unit weights (in air, submerged) per specified component, item, sub-assembly, etc.
Precommissioning	Outlines of precommissioning activities, such as cleaning, hydrotesting, leak tests, and preservation methods until the commissioning/start-up phase.
Inspection, Monitoring, Maintenance and Repair	Outlines design recommendations in the view of in-service inspection, monitoring, maintenance, and repair including consideration of an Emergency Repair System.

At the completion of the **Design**, the General Basis of Design document can be merged into the Design Report.

10. Completion file

At the end of the **Design**, a completion file shall be provided in both paper and CD-ROM formats, which shall comprise the following types of documents, as applicable:

- The Master Document Register
- The Design Plan and associated QA/QC plan
- The Design Report, which shall comprise the Design Data and the Pipeline Summary
- The General Basis of Design, if not merged into the Design Report
- The HSE dossier, including EBS and ESIA dossiers
- The drawing dossier, with alignment sheets, elevation profiles, P&IDs and PCFs etc.
- The interface documentation (if applicable)
- The Design Review meeting notes
- The Third Party documentation
- The progress reports
- The Project schedules at different levels
- The derogation dossiers
- The pre-survey specifications and procedures, as necessary for the detailed engineering phase

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- The detailed design including the hydraulic and thermal analysis, the in-place and installation strength analyses, with their computer outputs
- The detailed material take-offs, as necessary for the procurement phase
- The procurement, fabrication, and assembly procedures for any components, materials, sub-systems incorporated in the Pipeline System, including their associated data sheets, inspection, quality control, integration tests, site acceptance tests, as-built documentation
- The route maps and elevation profiles, and the associated detail drawings, as necessary for the site preparation works and installation works
- The procedures and associated detailed documentation for the site preparation works
- The installation procedures, including navigation, positioning, anchoring, special points, tie-ins, and their associated contingency procedures
- The precommissioning (and commissioning, if applicable) procedures and associated detailed documentation
- The Operating Manual
- The Inspection Monitoring Maintenance and Repair Manual
- The Emergency Pipeline Repair System (if applicable)
- The as-built dossier/DFI résumé, including the PLR Database.

10.1 PLR Database

At the end of the detailed design, all SYSTEM data shall be transmitted with the pipeline & riser follow-up datasheet to TEC/PLR for completion of the Pipeline & Riser Integrity Management database. Updated data sheets shall be provided at as-built and any subsequent changes to the system.

10.2 Pipebook and tally database

As part of the as-built package a pipebook and tally database shall be provided. The aim of this data base is to enable the correlation of internal and external survey data, to locate defects in the field, to investigate causes of failures and identify patterns of degradation features and to use actual pipe properties when undertaking integrity calculations.

The database shall be in a searchable format, such as an Excel spreadsheet. This database shall relate the xyz and geographical coordinates of the individual as-laid girth welds and other specifically identifiable pipeline components, such as pipe wall thickness changes, bends, tees etc. to the pipe number, weld number, heat number, actual pipe yield stress and other pertinent data, such as welder identification, NDT inspection report reference etc.

Note: Following appendices are available in Excel spreadsheets attached to the general specification main PDF file.

Appendix 1 Follow up datasheet offshore steel pipeline between fixed platforms

	JOB TITLE		
	RFS		

JOB DESCRIPTION & STATUS			
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legend

required numerical data

required text data

computed data (informative)

Country		Nom. Diameter		Length - km	
Field(s)		From		Effluent	
Phase		To		Service life - yr	

SYSTEM SUMMARY DESCRIPTION	
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Comments

Revision nr	1st issue		2nd issue		3rd issue		4th issue	
Date	name	entity	name	entity	name	entity	name	entity
Prepared by								
Checked by								
Approved by								

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Appendix 1

MAIN RESULTS from PIPELINE & RISER MECHANICAL ASSESSMENT

legend

numerical output from TEC/PLR tools

numerical output from formula in this DS

text output (informative)

Indicate for each segment if new or existing

existing segment data shall be sourced from as-built documentation

Applicable Prime Reference (APR) as per GS EP PLR 100

Linepipe		Outer diameter	mm					
		Wall thickness	mm					
		Inner diameter	mm					
		check OD-ID = 2 x WT		ok	ok	ok		
		Wall thickness driving parameter						
		Steel Grade						
		Derated SMYS @ Tmax,design	MPa					
External coating		nature						
		thickness	mm					
		density	kg/cu.m.					
		thermal conductivity	W/m².C					
Internal protection		nature						
		thickness	mm					
		density	kg/cu.m.					
		thermal conductivity	W/m².C					
Concrete weight coating		thickness	mm					
		density	kg/cu.m.					
		thermal conductivity	W/m².C					
Temperature @ outlet riser base		Calculated U-value (OHTC)	W/m².C	#DIV/0!	#DIV/0!	#DIV/0!		
		from simple exponential decay law	°C	#DIV/0!				
		[2] as per process simulation	°C					
In-place behaviour		Expansion at inlet side of pipeline	m					
		Expansion at outlet side of pipeline	m					
		Maximum allowable free span	m					
Unit weights in N/m & Specific Gravities		structural		0	0	0		
		buoyancy		0	0	0		
		empty submerged		0	#DIV/0!	0		
		flooded submerged		0	#DIV/0!	0		
		in-service submerged		0	#DIV/0!	0		
Pipe-soil interface		type of interface		minor self lowering				
		reason for artificial protection - if the case		thermal insulation				
Pipeline-Riser Interfaces	Riser-to-Topsides		quantity of non-weld tie-ins up to pig trap	-				
			nature of tie-ins					
	aerial welds		gasket type/spec	-				
			pressure rating	bar				
			temperature for pressure rating spec.	°C				
	Riser-to-Pipeline		quantity of non-weld subsea tie-ins	-				
			nature of tie-ins					
	flanged couplings		gasket type/spec	-				
			pressure rating	bar				
			temperature for pressure rating spec.	°C				
Pressure ratings all pressures in bar	Minimum rating from APRs (i.e. codes) & process data		linepipe					
			flanges					
			valves					
	As-specified component maximum allowable rating		linepipe					
			flanges					
			valves					
QA/QC P/L & Riser Mechanical Design (DEV/TEC/PLR)				1st issue	2nd issue	3rd issue	4th issue	5th issue
				issued by				
				approved by				
				approval date				

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Appendix 1
ADDITIONAL INFORMATION & COMMENTS

Nature and source of data (disciplinary)	Consequence on design (TEC/PLR)
General & Context (<i>Lead Project</i>)	
Process, Flow Assurance & HIPS (DEV/ED/ECP)	
Geophy, Geotech, Metocean (DEV/TEC/GEO)	
Steel Material & Welding (DEV/TEC/PLR + COR)	
Corrosion Management & Coatings (DEV/TEC/COR)	
Operating Philosophy & Integrity Managt. (OPS/EXP)	

PRESSURE CONTROL and PRESSURE SAFETY SYSTEMS (PFDs)

PCS	PSS
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Appendix 2

INPUT DATA QA/QC

Nature and source of data (disciplinary)

indicate ref. of main documents below each discipline

			1 st issue	2 nd issue	3 rd issue	4 th issue
[1] General & Context	lead project	issued by				
		approved by				
		approval date				
[2] Process, Flow Assurance & HIPS	DEV/ED/ECP	issued by				
		approved by				
		approval date				
[3] Geophy, Geotech, Metocean	DEV/TEC/GEO	issued by				
		approved by				
		approval date				
[4] Steel Material & Welding	DEV/TEC/PLR+COR	issued by				
		approved by				
		approval date				
[5] Corrosion Management & Coatings	DEV/TEC/COR	issued by				
		approved by				
		approval date				
[6] Operating Philosophy & Integrity Managt	OPS/EXP	issued by				
		approved by				
		approval date				

Note: indexes are used to revert lead discipline for each of the compiled data

INPUT DATA for PIPELINE & RISER MECHANICAL ASSESSMENT

legend

required numerical data

required text data

computed data (informative)

[2] Chemistry of effluent - precise units (ppm, mol, ...)

	data	unit		data	unit		data	unit
Water			H2S			CO2		
						Others		

[2] Flow assurance issues

indicate risks of plugging by hydrates and/or paraffins

[2] Flowing at maximum operating inlet temperature and flowrate

optional doc. source for P & T profiles

inlet temperature		°C	flow density		kg/m3	flow heat capacity		J/°C.kg
inlet pressure		bar	flow rate		SCMD	<= select unit for flow rate		
Reference elevation		m			Sm3/s	for information		

[2] Pressure Control and Pressure Safety Systems

doc source

optional PFD in freebox of this FOLLOW-UP DATASHEET

Yes

see PFD on page 4

Data leading to linepipe sizing & material selection

[2] Reference level for pressures		m (< 0 below LAT)	[2] proba. of occurrence		1/year
[2] Extreme/ Incidental pressure		bar	[2] Design pressure, min.		bar
[2] Design pressure, max.		bar	[2] Minimum design temperature		°C
[2] Maximum design temperature		°C	[2] Required cool-down time		hrs
[2] Max. allowed U-value		W/°C/m²	[2] Min. allowed outlet temperature		°C
[5] Req'd Corrosion Allowance		mm	[6] Max. allowance on ID changes		mm or %
[6] Type of dimensioning pig		-	[6] Min. bend radius (Intelligent pig.)		x OD
[3] Water depths	inlet side	m	maximum		m
	outlet side	m	minimum		m
		@ KP 0			@ KP
		@ KP			@ KP

[3] Metocean Report ref. for detailed and summary wave & current data

[3] Ambient temperature	at sea surface		°C	at seabed		°C	midwater		°C	Seawater SG		kg/m3
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[3] Seabed roughness - i.e. flat, uneven, typical features,...

[3] Nature of soils - i.e. sandy, silty, etc ...

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Appendix 2
MAIN RESULTS from PIPELINE & RISER MECHANICAL ASSESSMENT
legend

numerical output from TEC/PLR tools

numerical output from formula in this DS

text output (informative)

Applicable Prime Reference (APR) as per GS EP PLR 100

layer & function	material	layer ID	thickness	layer OD	density	thermal conduct.	weight
skip when N/A	(list)	mm	mm	mm	kg/m3	W/m²/C	N/m
inner pipe inner protection							
inner pipe							
inner pipe outer protection							
thermal insulation							
annular gap							
carrier pipe inner protection							
carrier pipe							
carrier pipe outer protection							
Type of pipe-in-pipe	Non-sw aged segments	distributed centralizers				Contractor, if proprietary	
Type of joints, if non-swaged	annular waterstops	joint length (if non-waged)				m	
Temperature @ pipeline outlet	Calculated U-value (OHTC) from simple exponential decay law [2] as per process simulation	W/m².C °C °C					
Unit weights in N/m & Specific Gravities	structural						
	buoyancy						
	empty submerged						
	flooded submerged						
	in-service submerged						
Pipe-soil interface	type of interface reason for artificial protection - <i>if the case</i>						
In-place behaviour	Expansion at inlet side of pipeline	m			Hydrotest		Operation
	Expansion at outlet side of pipeline	m					
	Maximum allow able free span	m					
Pipeline-Riser Interfaces	Riser-to-Topsides	quantity of non-weld tie-ins up to pig trap	-				
	nature of tie-ins	gasket type/spec	-				
	aerial welds	pressure rating	bar				
		temperature for pressure rating spec.	°C				
	Riser-to-Pipeline	quantity of non-weld subsea tie-ins	-				
	nature of tie-ins	gasket type/spec	-				
	pressure rating	bar					
	temperature for pressure rating spec.	°C					
Pressure ratings all pressures in bar	Minimum rating from APRs (i.e. codes) & process data	linepipe					
		flanges					
		valves					
	As-specified component maximum allowable rating	linepipe					
		flanges					
		valves					
QA/QC P/L & Riser Mechanical Design (DEV/TEC/PLR)			1st issue	2nd issue	3rd issue	4th issue	5th issue
issued by							
approved by							
approval date							

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Appendix 2
ADDITIONAL INFORMATION & COMMENTS

Nature and source of data (disciplinary)	Consequence on design (TEC/PLR)
General & Context (<i>Lead Project</i>)	
Process, Flow Assurance & HIPS (DEV/ED/ECP)	
Geophy, Geotech, Metocean (DEV/TEC/GEO)	
Steel Material & Welding (DEV/TEC/PLR + COR)	
Corrosion Management & Coatings (DEV/TEC/COR)	
Operating Philosophy & Integrity Managt. (OPS/EXP)	

PRESSURE CONTROL and PRESSURE SAFETY SYSTEMS (PFDs)

PCS	PSS
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Appendix 3 Follow up datasheet offshore steel pipeline between fixed platform and PLEM

	JOB TITLE	
	RFS	.

JOB DESCRIPTION & STATUS

legend

required numerical data

required text data

computed data (informative)

Country

Nom. Diameter

Length - km

Field(s)

From

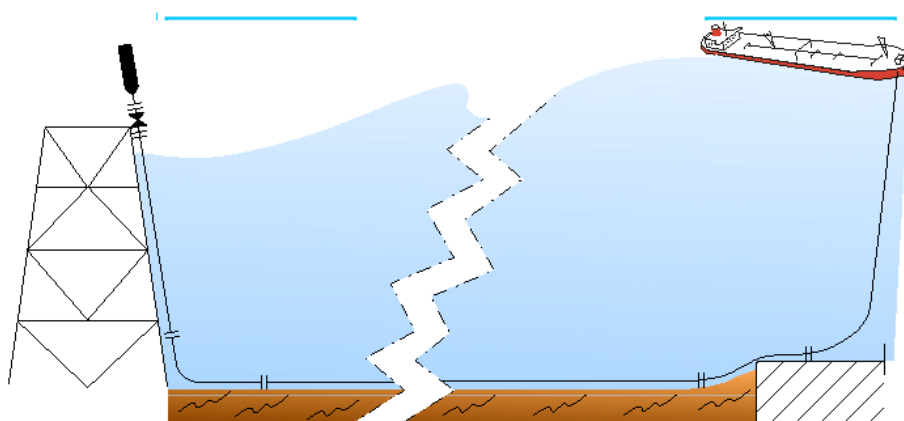
Effluent

Phase

To

Service life - yr

SYSTEM SUMMARY DESCRIPTION



Comments

Revision nr
Date

1st issue

2nd issue

3rd issue

4th issue

name

entity

name

entity

name

entity

name

entity

Prepared by

Checked by

Approved by

Documentation requirements

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Appendix 3
INPUT DATA QAI/QC
Nature and source of data (disciplinary)
indicate ref. of main documents below each discipline

			1 st issue	2 nd issue	3 rd issue	4 th issue
[1] General & Context	<i>lead project</i>	issued by				
		approved by				
		approval date				
[2] Process, Flow Assurance & HPS	<i>DEV/ED/ECP</i>	issued by				
		approved by				
		approval date				
[3] Geophy, Geotech, Metocean	<i>DEV/TEC/GEO</i>	issued by				
		approved by				
		approval date				
[4] Steel Material & Welding	<i>DEV/TEC/PLR+COR</i>	issued by				
		approved by				
		approval date				
[5] Corrosion Management & Coatings	<i>DEV/TEC/COR</i>	issued by				
		approved by				
		approval date				
[6] Operating Philosophy & Integrity Managt	<i>OPS/EXP</i>	issued by				
		approved by				
		approval date				

Note: indexes are used to revert lead discipline for each of the compiled data
INPUT DATA for PIPELINE & RISER MECHANICAL ASSESSMENT
legend

required numerical data

required text data

computed data (informative)

[2] Chemistry of effluent - precise units (ppm, mol, ...)

	data	unit		data	unit		data	unit
Water			H2S			CO2		
Others								

[2] Flow assurance issues
indicate risks of plugging by hydrates and/or paraffins
[2] Flowing at maximum operating inlet temperature and flowrate
optional doc. source for P & T profiles

inlet temperature		°C	flow density		kg/m ³	flow heat capacity		J/°C.kg
inlet pressure		bar	flow rate		SCMD	<= select unit for flow rate		
Reference elevation		m			Sm ³ /s	<i>for information</i>		

[2] Pressure Control and Pressure Safety Systems
doc source
optional PFD in freebox of this FOLLOW-UP DATASHEET
Data leading to linepipe sizing & material selection

[2] Extreme/ Incidental pressure		bar	[2] proba. of occurrence		1/year
[2] Design pressure, max.		bar	[2] Design pressure, min.		bar
[2] Maximum design temperature		°C	[2] Minimum design temperature		°C
[5] Req'd Corrosion Allowance		mm	[6] Max. allowance on ID changes		mm or %
[6] Type of dimensioning pig			[6] Min. bend radius (Intelligent pig.)		x OD

[3] Water depths

inlet side		m	@ KP0	maximum		m	@ KP	
outlet side		m	@ KP	minimum		m	@ KP	

[3] Metocean Report ref. for detailed and summary wave & current data

[3] Ambient temperature	at sea surface		°C	at seabed		°C	midwater		°C	Seawater SG		kg/m ³
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[3] Seabed roughness - i.e. flat, uneven, typical features,...
[3] Nature of soils - i.e. sandy, silty, etc ...

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Appendix 3

MAIN RESULTS from PIPELINE & RISER MECHANICAL ASSESSMENT

legend

numerical output from TEC/PLR tools

numerical output from formula in this DS

text output (informative)

Indicate for each segment if new or existing

existing segment data shall be sourced from as-built documentation

Applicable Prime Reference (APR) as per GS EP PLR 100

Linepipe	Outer diameter	mm					
	Wall thickness	mm					
	Inner diameter	mm					
	check OD-ID = 2 x WT		ok	ok	ok		
	Wall thickness driving parameter						
	Steel Grade						
Derated SMYS @ Tmax,design		MPa					
External coating	nature						
	thickness	mm					
	density	kg/cu.m.					
	thermal conductivity	W/m².C					
Internal protection	nature						
	thickness	mm					
	density	kg/cu.m.					
	thermal conductivity	W/m².C					
Concrete weight coating	thickness	mm					
	density	kg/cu.m.					
	thermal conductivity	W/m².C					
Temperature @ outlet riser base	Calculated U-value (OHTC)	W/m².C	#DIV/0!	#DIV/0!	#DIV/0!		
	from simple exponential decay law	°C	#DIV/0!				
	[2] as per process simulation	°C					
In-place behaviour	Expansion at inlet side of pipeline	m		Hydrotest	Operation		
	Expansion at outlet side of pipeline	m					
	Maximum allow able free span	m					
Unit weights in N/m & Specific Gravities	structural		0	0	0		
	buoyancy		0	0	0		
	empty submerged		0	#DIV/0!	0	#DIV/0!	
	flooded submerged		0	#DIV/0!	0	#DIV/0!	
	in-service submerged		0	#DIV/0!	0	#DIV/0!	
Pipe-soil interface	type of interface		minor self lowering thermal insulation				
	reason for artificial protection - if the case						
Pipeline-Riser Interfaces	Riser-to-Topsides		quantity of non-weld tie-ins up to pig trap	-			
	nature of tie-ins		gasket type/spec	-			
	aerial welds		pressure rating	bar			
			temperature for pressure rating spec.	°C			
	Riser-to-Pipeline		quantity of non-weld subsea tie-ins	-			
	nature of tie-ins		gasket type/spec	-			
	flanged couplings		pressure rating	bar			
		temperature for pressure rating spec.	°C				
Pressure ratings all pressures in bar	Minimum rating from APRs (i.e. codes) & process data		linepipe				
			flanges				
			valves				
	As-specified component maximum allowable rating		linepipe				
			flanges				
			valves				
QA/QC P/L & Riser Mechanical Design (DEV/TEC/PLR)			1st issue	2nd issue	3rd issue	4th issue	5th issue
issued by							
approved by							
approval date							

Documentation requirements

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Appendix 3
ADDITIONAL INFORMATION & COMMENTS

Nature and source of data (disciplinary)	Consequence on design (TEC/PLR)
General & Context (Lead Project)	
Process, Flow Assurance & HIPS (DEV/ED/ECP)	
Geophy, Geotech, Metocean (DEV/TEC/GEO)	
Steel Material & Welding (DEV/TEC/PLR + COR)	
Corrosion Management & Coatings (DEV/TEC/COR)	
Operating Philosophy & Integrity Managt. (OPS/EXP)	

PRESSURE CONTROL and PRESSURE SAFETY SYSTEMS (PFDs)

PCS	PSS
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Appendix 4 Follow up datasheet offshore steel pipeline between fixed platform and landing zone

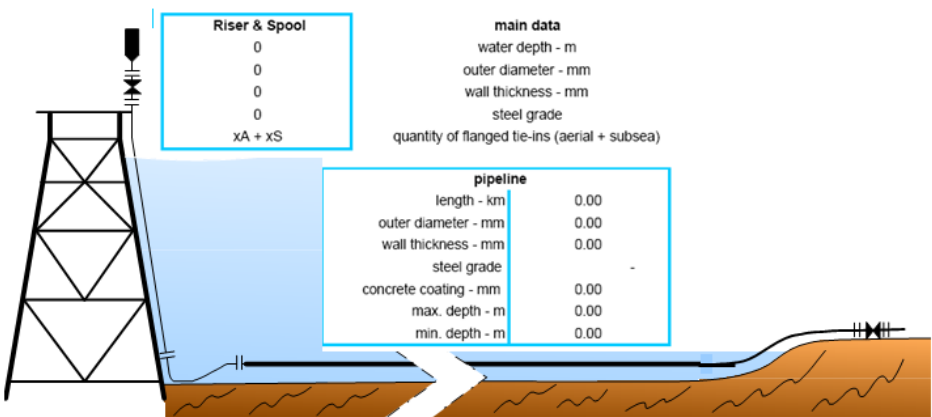
	JOB TITLE		
	RFS		

JOB DESCRIPTION & STATUS			
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legend	required numerical data	required text data	computed data (informative)
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Country		Nom. Diameter		Length - km	
Field(s)		From		Effluent	
Phase		To		Service life - yr	

SYSTEM SUMMARY DESCRIPTION



Riser & Spool 0 0 0 0 xA + xS	main data water depth - m outer diameter - mm wall thickness - mm steel grade quantity of flanged tie-ins (aerial + subsea)
---	---

pipeline	
length - km	0.00
outer diameter - mm	0.00
wall thickness - mm	0.00
steel grade	-
concrete coating - mm	0.00
max. depth - m	0.00
min. depth - m	0.00

Comments

Revision nr	1st issue		2nd issue		3rd issue		4th issue	
Date	name	entity	name	entity	name	entity	name	entity
Prepared by								
Checked by								
Approved by								

Documentation requirements

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Appendix 4

MAIN RESULTS from PIPELINE & RISER MECHANICAL ASSESSMENT

legend

numerical output from TEC/PLR tools

numerical output from formula in this DS

text output (informative)

Indicate for each segment if new or existing

existing segment data shall be sourced from as-built documentation

Applicable Prime Reference (APR) as per GS EP PLR 100

Linepipe		Outer diameter	mm					
		Wall thickness	mm					
		Inner diameter	mm					
		check OD-ID = 2 x WT		ok	ok	ok		
		Wall thickness driving parameter						
		Steel Grade						
		Derated SMYS @ Tmax,design	MPa					
External coating		nature						
		thickness	mm					
		density	kg/cu.m.					
		thermal conductivity	W/m².C					
Internal protection		nature						
		thickness	mm					
		density	kg/cu.m.					
		thermal conductivity	W/m².C					
Concrete weight coating		thickness	mm					
		density	kg/cu.m.					
		thermal conductivity	W/m².C					
Temperature @ outlet riser base		Calculated U-value (OHTC)	W/m².C	#DIV/0!	#DIV/0!	#DIV/0!		
		from simple exponential decay law	°C	#DIV/0!				
		[2] as per process simulation	°C					
In-place behaviour		Expansion at inlet side of pipeline	m					
		Expansion at outlet side of pipeline	m					
		Maximum allow able free span	m					
Unit weights in N/m & Specific Gravities		structural		0	0	0		
		buoyancy		0	0	0		
		empty submerged		0	#DIV/0!	0	#DIV/0!	
		flooded submerged		0	#DIV/0!	0	#DIV/0!	
		in-service submerged		0	#DIV/0!	0	#DIV/0!	
Pipe-soil interface		type of interface		minor self lowering thermal insulation				
		reason for artificial protection - if the case						
Pipeline-Riser Interfaces	Riser-to-Topsides		quantity of non-weld tie-ins up to pig trap	-				
	nature of tie-ins		gasket type/spec	-				
	aerial welds		pressure rating	bar				
			temperature for pressure rating spec.	°C				
	Riser-to-Pipeline		quantity of non-weld subsea tie-ins	-				
	nature of tie-ins		gasket type/spec	-				
	flanged couplings		pressure rating	bar				
			temperature for pressure rating spec.	°C				
Pressure ratings all pressures in bar	Minimum rating from APRs (i.e. codes) & process data		linepipe					
			flanges					
			valves					
	As-specified component maximum allowable rating		linepipe					
			flanges					
			valves					
QA/QC P/L & Riser Mechanical Design (DEV/TEC/PLR)				1st issue	2nd issue	3rd issue	4th issue	5th issue
				issued by				
				approved by				
				approval date				

Documentation requirements

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Appendix 4
ADDITIONAL INFORMATION & COMMENTS

Nature and source of data (disciplinary)	Consequence on design (TEC/PLR)
General & Context (<i>Lead Project</i>)	
Process, Flow Assurance & HIPS (DEV/ED/ECP)	
Geophy, Geotech, Metocean (DEV/TEC/GEO)	
Steel Material & Welding (DEV/TEC/PLR + COR)	
Corrosion Management & Coatings (DEV/TEC/COR)	
Operating Philosophy & Integrity Managt. (OPS/EXP)	

PRESSURE CONTROL and PRESSURE SAFETY SYSTEMS (PFDs)

PCS	PSS
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Appendix 5 Follow up data sheet onshore pipeline

	JOB TITLE	
	RFS	.

JOB DESCRIPTION & STATUS

legend

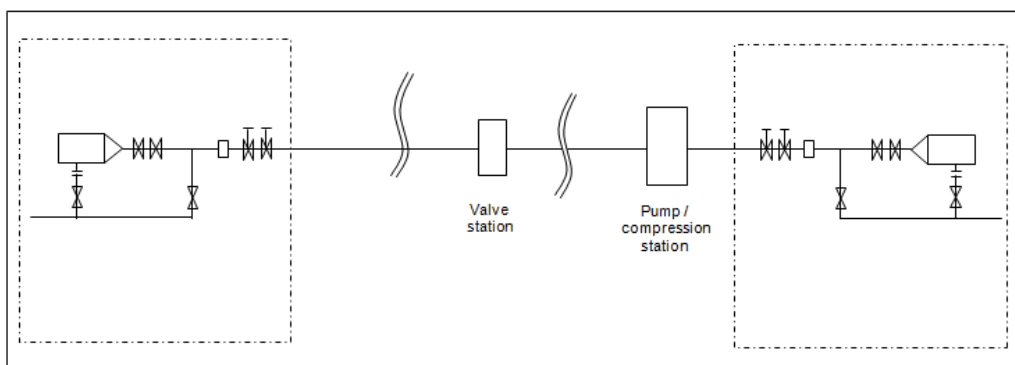
required numerical data

required text data

computed data (informative)

Country		Nom. Diameter		Length - km	
Field(s)		From		Effluent	
Phase		To		Service life - yr	

SYSTEM SUMMARY DESCRIPTION



type of crossings	Number
Road - Highway	
River	
Railway	

Comments

Revision nr	1st issue		2nd issue		3rd issue		4th issue	
Date	name	entity	name	entity	name	entity	name	entity
Prepared by								
Checked by								
Approved by								

Documentation requirements

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Appendix 5

INPUT DATA QA/QC

Nature and source of data (disciplinary)

indicate ref. of main documents below each discipline

			1 st issue	2 nd issue	3 rd issue	4 th issue
[1] General & Context	lead project	issued by				
		approved by				
		approval date				
[2] Process, Flow Assurance & HPS	DEV/ED/ECP	issued by				
		approved by				
		approval date				
[3] Geophy, Geotech, Metocean	DEV/TEC/GEO	issued by				
		approved by				
		approval date				
[4] Steel Material & Welding	DEV/TEC/PLR+COR	issued by				
		approved by				
		approval date				
[5] Corrosion Management & Coatings	DEV/TEC/COR	issued by				
		approved by				
		approval date				
[6] Operating Philosophy & Integrity Managt	EP/OPS/EXP	issued by				
		approved by				
		approval date				

Note: indexes are used to revert lead discipline for each of the compiled data

INPUT DATA for PIPELINE MECHANICAL ASSESSMENT

legend

required numerical data

required text data

computed data (informative)

[2] Chemistry of effluent - precise units (ppm, mol, ...)

	data	unit		data	unit		data	unit
Water			H2S			CO2		
							Others	

[2] Flow assurance issues

indicate risks of plugging by hydrates and/or paraffins

[2] Flowing at maximum operating inlet temperature and flowrate

optional doc. source for P & T profiles

inlet temperature		°C	flow density		kg/m3	flow heat capacity		J/°C.kg
inlet pressure		bar	flow rate		SCMD	<= select unit for flow rate		
Reference elevation		m			Sm3/s	for information		

[2] Pressure Control and Pressure Safety Systems

doc source

optional PFD in freebox of this FOLLOW-UP DATASHEET

Data leading to linepipe sizing & material selection

[2] Extreme/ Incidental pressure		bar	[2] proba. of occurrence		1/year
[2] Test pressure		bar	[2] Test pressure leading item		
[3] Max. pipe route elevation		m	[2] Min. pipe route elevation		m
[2] Design pressure, max.		bar	[2] Design pressure, min.		bar
[2] Maximum design temperature		°C	[2] Minimum design temperature		°C
[5] Req'd Corrosion Allowance		mm	[6] Max. allowance on ID changes		mm or %
[6] Type of dimensioning pig			[6] Min. bend radius (Intelligent pig.)		x OD

[3] Ref. of Environmental data report

[3] Ambient temperature		°C			Back filling SG		kg/m3
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[3] Soil roughness - i.e. flat, uneven, typical features,...

[3] Nature of soils - i.e. sandy, silty, etc ...

Documentation requirements

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Appendix 5

MAIN RESULTS from PIPELINE MECHANICAL ASSESSMENT									
legend		numerical output from TEC/PLR tools		numerical output from formula in this DS		text output (informative)			
				Pipeline		Inlet		Outlet	
Indicate for each segment if new or existing <i>existing segment data shall be sourced from as-built documentation</i>									
Applicable Prime Reference (APR) as per GS EP PLR 104/107									
Location class (If design as per ASME B31.8 / ISO 13623)									
Linepipe	Outer diameter	mm							
	Wall thickness	mm							
	Inner diameter	mm							
	check OD-ID = 2 x WT								
	Wall thickness driving parameter								
External coating	nature								
	thickness	mm							
	density	kg/cu.m.							
Internal protection	nature								
	thickness	mm							
	density	kg/cu.m.							
Concrete weight coating	thickness	mm							
	density	kg/cu.m.							
	thermal conductivity	W/m².C							
Temperature @ outlet	Calculated U-value (OHTC)	W/m².C	#DIV/0!		#DIV/0!		#DIV/0!		
	from simple exponential decay law	°C	#DIV/0!		#DIV/0!		#DIV/0!		
	[2] as per process simulation	°C							
In-place behaviour	Expansion at inlet side of pipeline	m	Empty		Hydrotest		Operation		
	Expansion at outlet side of pipeline	m							
	Maximum allowable free span	m							
	Min. height of cover for upheaval buckling mitigation	m							
Unit weights in N/m & Specific Gravities									
	empty		0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	
	flooded		0	#DIV/0!	0	#DIV/0!	0	#DIV/0!	
Pipe-soil interface	type of interface		trenched & backfilled						
	reason for artificial protection - if any		vertical stability						
Pipeline-Piping Interfaces	Pipeline-to-Piping nature of tie-ins welding	quantity of non-weld tie-ins up to pig trap	-						
		gasket type/spec	-						
		pressure rating	bar						
	Pipeline-to-Piping nature of tie-ins flanged couplings	temperature for pressure rating spec.	°C						
		quantity of non-weld subsea tie-ins	-						
		gasket type/spec	-						
Pressure ratings all pressures in bar	Minimum rating from APRs (i.e. codes) & process data	linepipe							
		flanges							
		valves							
	As-specified component maximum allowable rating	linepipe							
		flanges							
		valves							
QA/QC Pipeline Mechanical Design (DEV/TEC/PLR)			1st issue	2nd issue	3rd issue	4th issue	5th issue		
issued by									
approved by									
approval date									

Documentation requirements

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Appendix 5
ADDITIONAL INFORMATION & COMMENTS

Nature and source of data (disciplinary)	Consequence on design (TEC/PLR)
General & Context (<i>Lead Project</i>)	
Process, Flow Assurance & HIPS (<i>DEV/ED/ECP</i>)	
Geophy, Geotech, Metocean (<i>DEV/TEC/GEO</i>)	
Steel Material & Welding (<i>DEV/TEC/PLR + COR</i>)	
Corrosion Management & Coatings (<i>DEV/TEC/COR</i>)	
Operating Philosophy & Integrity Managt. (<i>OPS/EXP</i>)	

PRESSURE CONTROL and PRESSURE SAFETY SYSTEMS (PFDs)

PCS	PSS
-----	-----