

GENERAL SPECIFICATION

ROTATING MACHINERY

GS EP MEC 901

Technical Information Analysis Form: Centrifugal Pump
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00	10/2012	First issue
Rev.	Date	Purpose of the revision

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

This General Specification defines Company practices and tools to use to perform technical assessment of Centrifugal Pump Suppliers.

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
API Std 610	Centrifugal Pumps for Petroleum, Petrochemical and Natural Gas Industries
API Std 613	Special Purpose Gear Units for Petroleum, Chemical and Gas Industry Services
API Std 614 / ISO 10438	Lubrication, Shaft-sealing and Oil-control Systems and Auxiliaries
API Std 682	Pumps - Shaft Sealing Systems for Centrifugal and Rotary Pumps
API Std 671	Special Purpose Couplings for Petroleum, Chemical and Gas Industry Services
ISO 5199	Industrial Pumps - Technical Specification for Centrifugal Pumps - Class II

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 MEC 021	Rotating Machine Package Specification - Motopump
GS EP MEC 026	Rotating Machine Package Specification - Motopump < 500 kW (to be released in 2014)
GS EP MEC 271	Centrifugal Pumps for the Petroleum, Chemical and Gas Industry Services according to API Standard 610
GS EP MEC 273	Supply of Centrifugal Pump class II according to ISO 5199

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3. Technical assessment process of Centrifugal Pump Suppliers

The technical assessment process of a Centrifugal Pump Supplier is part of the global assessment process of a Supplier, lead by the E&P Purchasing Division.

3.1 Step 1: Gathering of information

To start the technical assessment process, Appendix 1 of this document (Technical Information Analysis Form) shall be sent to the Centrifugal Pump Supplier, by the Company.

The Centrifugal Pump Supplier shall fill and send back this Form, to the Company, with all the others necessary documents requested.

3.2 Step 2: Data Analysis of Appendix 1 and following actions

After data analysis of Appendix 1, the MTH discipline of E&P Technology Division, shall take a decision to proceed or not to the next step of the Supplier technical assessment process.

3.2.1 Case 1: Negative result given by the data analysis of Appendix 1

In case of negative result given by the data analysis of Appendix 1, the technical assessment process shall stop at this step. The technical assessment result of the Supplier is negative.

3.2.2 Case 2: Positive result given by the data Analysis of Appendix 1 - Audit of Supplier production site mandatory

Following positive result of Appendix 1 data analysis, an audit of the Supplier production site is deemed mandatory by the MTH discipline of E&P Technology Division.

This audit shall be performed by the MTH discipline of E&P Technology Division, or by its representative, and will give final result of the Supplier technical assessment.

3.2.3 Case 3: Positive result given by the data Analysis of Appendix 1 - Audit of Supplier production site not necessary

Following positive result of Appendix 1 data analysis, an audit of the Supplier production site, is not deemed necessary, by the MTH discipline of E&P Technology Division, to complete the technical assessment process. The technical assessment result of the Supplier is positive.

3.3 Step 3: Assessment notification to the Supplier

The outcome of step 2 analysis (negative, positive...) is consolidated by the authorized Company entity, together with others parameters (financial, contractual and social responsibility, quality, HSE...) for final decision.

Then, the authorized Company entity will notify the Supplier of the outcome of global.



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Appendix 1 Technical Information Analysis Form: Centrifugal Pump Supplier - EXCEL spreadsheet



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Quick guidelines to use this document : the objective of the following indications, are to the help user to fill the **Technical Information Analysis Form**.

This document has to be sent to the manufacturer to start technical assessment process before any survey at manufacturer location.
The manufacturer has to fill all information requested in all tables.

1) "Production Range" card :

On this card, the manufacturer has to indicate all its production ranges submitted for approval.
After technical assessment, Total or its representative, is able to indicate for which production ranges the manufacturer is finally approved.

2) "Theme I to Theme IV" cards :

The manufacturer has to fill all tables of each cards, in order to have a better understanding of its production capacities.
After analysis of manufacturer answers, Total or its representative, can make comments, in blue column, for each manufacturer answers.

3) "Global Synthesis" cards :

On this card all general information (name, address, contact of manufacturer, date of audit, assessment report n°, Total specifications linked,...) written will be automatically pasted in all the others cards.

First section of this card has to be filled by the manufacturer by indicating general informations : name, address, contact, process concerned,...
The three others sections have to be filled by Total of its representative to summarize result and decision after analysis of the

Technical Information Analysis Form.

In the last section, the signature of Total or its representative will be done, in order to validate the analysis result of this Form.

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MANUFACTURER

Vendor / Packager Name XXX	Activity and Process Concerned XXX	Audit Date XXX
Office Address XXX	Name and Function of Auditees	
Audited Workshop Address XXX		

TOTAL OR REPRESENTATIVE COMPANY TEAM

TOTAL COMPANY Project Concerned	Name, Function, Service / Company of Auditor

Objectives of the Technical Information Analysis

TECHNICAL INFORMATION ANALYSIS / TECHNICAL ASSESSMENT RESULT (FOR THE PRODUCTION RANGE CONSIDERED) - TO BE FILLED BY TOTAL OR REPRESENTATIVE

Result of Information Analysis of GS EP MEC 901 - Appendix 1, filled by the Manufacturer		
	Yes / No	Comments
Level of information is appropriate		
On site Audit Requested		

Result of Technical Assessment of Manufacturer (to be filled if on site audit is not deemed necessary)		
	Decision *	Comments
Satisfactory		
Reserves to close to be satisfactory		
Not satisfactory		

Notes : * : Tip when appropriate

CONCLUSIONS OF TECHNICAL INFORMATION ANALYSIS / GENERAL COMMENTS

SIGNATURE OF TOTAL OR REPRESENTATIVE TEAM			
NAME	DATE	NAME	DATE



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MANUFACTURER		
Vendor / Packager Name	Activity and Process Concerned	Audit Date
xxx	xxx	xxx

ACTUAL PRODUCTION RANGE / APPROVED PRODUCTION RANGE OF VENDOR

To list all the actual production ranges of the vendor and select and comment the approved ones.

Type	Code	Designation	To be completed by the vendor							To be completed by Total or representative Company	
			Pump Designation	Capacity	Head	Pressure Rating	Power	Specific speed Ns	Specific Speed S	Approved	Comments
Centrifugal Pump	1511	Heavy Duty API610/ISO13709									
Centrifugal Pump	1512	Pump Class II, ISO 5199									

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MANUFACTURER

Vendor / Packager Name	Activity and Process Concerned	Audit Date
XXX	XXX	XXX

THEME I - GENERAL ORGANIZATION

All facilities described herein are meant to be permanent in-house facilities only. Any sub-contracted activity must be clearly indicated showing the names and addresses of related Subcontractors. The number, type and status of all listed equipment are subject to thorough checks by the COMPANY representative in charge of the Plant Survey during his visit of the facilities.

Table 1.1.a - General organization - Surface area (Plot plan to be joined if available)

Zone	Surface area (m ²)	Description	Comments <i>To be filled by TOTAL or Company representative</i>
Overall			
Covered areas			
Yard areas			
Offices			
Manufacturing workshops			
Laboratory			
Material and extrusion equipment			
Testing workshops			
Warehouses			
Covered storage areas			

Table 1.1.b - General organization - Manufacturer Management : organization chart to join

Position	Names	Comments	Comments <i>To be filled by TOTAL or Company representative</i>
Managing Director			
Sales Manager			
Plant / Yard Manager			
Production Manager			
Quality Assurance Manager			
Design/Engineering Manager			
Quality Control / Inspection Manager			
Head of Welding department			
HSE Manager			
Logistic Manager			
Others			

Table 1.1.c - General organization - Personnel

Quality of Employees	Staff Quantity (vendor's personnel)	Contracted Personnel Quantity (personnel from external company which are working at the vendor facilities)	Average years of service (staff)	Comments <i>To be filled by TOTAL or Company representative</i>
Commercial department				
Administration				
Project Management				

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THEME I - GENERAL ORGANIZATION

Engineering / R&D			
Laboratory			
Procurement			
Expediting / Shipment			
Production methodes office			
Fabrication : qualified welders			
Fabrication : machining			
Fabrication : assembling			
Fabrication : testing			
Quality Inspector (for testing : NDT, DT,...)			
Quality Inspector (on line)			
Quality assurance			
Quality for outsourced material			
Supervisory Personnel			
Management			
HSE employees			
Number of persons dedicated to customer site intervention			
Others			
Total number of Employees			

Table 1.1.d - General organization - Specific certification / habilitation of employees

Name of employees	Quality of employees (engineers, technicians, supervisors, operators...)	Type of certification	Level of certification	Comments <i>To be filled by TOTAL or Company representative</i>

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Vendor / Packager Name	Activity and Process Concerned	Audit Date
xxx	xxx	xxx

THEME I - GENERAL ORGANIZATION
Table 1.1.e - General organization - Communication With Customer / Working Documents Language

	Language used with customer : YES / NO ?	Which department team (engineering, commercial, production,...) and how many people are able to discuss in other language than mother tongue ?	Documents (testing procedures, drawing, control procedures,...) available in which language ?	Comments <i>To be filled by TOTAL or Company representative</i>
English				
French				
Others				

Table 1.1.f - General organization - Work Load Status

Items to check	Description	Comments <i>To be filled by TOTAL or Company representative</i>
Ownership		
Annual turnover in M\$ or M€ (3 previous year)		
Men hour capacity		
Work shift : normal, 2x8, 3x8		
Present and future work load (%)		
Future investment (tools, building, human resources,...)		
Number of international subsidiaries		
Location of international and/or others subsidiaries		

Table 1.1.g - General organization - List of documents to send by the vendor, to Total, in English (or French, if available) languages, with all Tables filled, before on site technical review

List of documents	Documents received : YES / NO ?	Documents available in English (or French) language : YES / NO ?	Comments <i>To be filled by TOTAL or Company representative</i>
Layout of the plant			
General Organization Chart			
Vendor Quality Organization			
Vendor Quality Control Organization			
Vendor Technical authority organization			
Interfaces between "New Products" Department and "Customer Support Services" Department			
Interfaces between workers in Factory and Field Engineers			
Products catalogue			
Process flow chart			
Performance & mechanical test procedure			
Control procedures : NDT, dye penetrant, Xray, magnetic particles procedures			

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Vendor / Packager Name XXX	Activity and Process Concerned XXX	Audit Date XXX

THEME II - ENGINEERING & DESIGN

All facilities described herein are meant to be permanent in-house facilities only. Any sub-contracted activity must be clearly indicated showing the names and addresses of related Subcontractors. The number, type and status of all listed equipment are subject to thorough checks by the COMPANY representative in charge of the Plant Survey during his visit of the facilities.

Table 2.1.a - Engineering & Design Capacity - Facilities Description				
Type of Equipment	Number of Equipment	Computer Program Names used	Comments / Description	Comments <i>To be filled by TOTAL or Company representative</i>
CAD Workstation				
Drawing Board				
Other				

Table 2.1.b - Engineering & Design Capacity - Description of Activities and Staff Qualification				
Number of Permanent Staff	Description of Engineering, Design and R&D activities	Staff Qualifications (Fitters, technicians, engineers...)	Sub-contracted (if any)	Comments <i>To be filled by TOTAL or Company representative</i>

Table 2.1.c - Engineering & Design Capacity - Calculation Facilities (Softwares for design calculation : finite element, thermal, stress, hydraulic, seismic calculations/analysis,...)					
Type of Design	Codes	Computer Programs	Subcontracted (if any)	Comments / Description	Comments <i>To be filled by TOTAL or Company representative</i>
Casing					
Blades					
Nozzles					
Shafts					
Rotors					
Fabricated piping					
Structural steel members					
Performances					
Other					



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THEME II - ENGINEERING & DESIGN						
Table 2.2.a - International Design Codes Application Deviation to International Recognized codes and standards						
Code or Standard	Date of Revision	Issue of Document used by vendor	Title	Deviation List available for Purchaser Review : Yes / No	Submitted to COMPANY : Yes/No	
API Std 610	latest		Centrifugal Pumps for Petroleum, Petrochemical and Natural Gas Industries			
API Std 613	latest		Special Purpose Gear Units for Petroleum, Chemical and Gas Industry Services			
API Std 614 / ISO 10438	latest		Lubrication, Shaft-sealing and Oil-control Systems and Auxiliaries			
API Std 671	latest		Special Purpose Couplings for Petroleum, Chemical and Gas Industry Services			
API Std 682	latest		Pumps - Shaft Sealing Systems for Centrifugal and Rotary Pumps			
ISO 5199	latest		Industrial Pumps - Technical Specification for Centrifugal Pumps - Class II			
Other						

Table 2.2.b -TOTAL General Specifications Application Deviation to TOTAL General Specifications						
GS EP	Date of Revision	Issue of Document used by vendor	Title	Deviation List available for Purchaser Review : Yes / No	Submitted to COMPANY: Yes/No	Comments <i>To be filled by TOTAL or Company representative</i>
GS EP MEC 021	01/2013		Rotating Machine Package Specification - Motopump			
GS EP MEC 026	To be released in 2014		Rotating Machine Package Specification - Motopump <500 kW			
GS EP MEC 271	01/2013		Centrifugal Pumps for the Petroleum, Chemical and Gas Industry Services according to API Standard 610			
GS EP MEC 273	01/2013		Supply of Centrifugal Pump class II according to ISO 5199			

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THEME III - MANUFACTURING

All facilities described herein are meant to be permanent in-house facilities only. Any sub-contracted activity must be clearly indicated showing the names and addresses of related Subcontractors. The number, type and status of all listed equipment are subject to thorough checks by the COMPANY representative in charge of the Plant Survey during his visit of the facilities.

Table 3.1.a - Workshop General Organization - Building Bay and Cranes Data of Covered Area / Handling and Transport facilities

Bay n°	Bay Dimensions (m x m)	Type of Crane / Handling tools / Transport	Number of Equipment	Max Capacity (tons)	Height under Hook (m)	Description (certification date, maintenance condition...)	Comments <i>To be filled by TOTAL or Company representative</i>
1							
2							
3							
4							
5							
6							
7							
8							

Table 3.1.b - Workshop General Organization - Cranes Data of Open Air Area / Handling and Transport facilities

Type of Crane / Handling tools / Transport	Number of Equipment	Max Capacity (tons)	Height under Hook (m)	Description (certification date, maintenance condition...)	Comments <i>To be filled by TOTAL or Company representative</i>

Table 3.2.a - Machining - Description of Equipment in Place

Type of Equipment	Description	Quantity	Max. Capacity (m)	General maintenance condition	Comments <i>To be filled by TOTAL or Company representative</i>

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THEME III - MANUFACTURING
Table 3.3.a - Control & Testing : Balancing - Description of Equipment in Place

Type of Equipment	Description	Quantity	Sensitivity (gram/mm)	General maintenance condition	Comments <i>To be filled by TOTAL or Company representative</i>

Table 3.3.b - Control & Testing : Hydrotest - Description of Equipment in Place

Type of Equipment	Description	Quantity	Max. Capacity (Barg)	General maintenance condition	Comments <i>To be filled by TOTAL or Company representative</i>

Table 3.3.c- Control & Testing - Performance test bench : Description of Equipment in Place

Type of Equipment	Description	Quantity	Max. Power (Kw)	General maintenance condition	Comments <i>To be filled by TOTAL or Company representative</i>

Table 3.3.d- Control & Testing - Mechanical test bench : Description of Equipment in Place

Type of Equipment	Description	Quantity	Max. Power (Kw)	General maintenance condition	Comments <i>To be filled by TOTAL or Company representative</i>

Table 3.3.e - Control & Testing - NPSH : Description of Equipment in Place

Type of Equipment	Description	Quantity	Max. Power (Kw)	General maintenance condition	Comments <i>To be filled by TOTAL or Company representative</i>

Table 3.4.a - Welding - Description of Equipment in Place (permanent equipment only)

Equipment	Number	Max Capacity (tons)	Comments / Description (Maintenance condition,...)	Comments <i>To be filled by TOTAL or Company representative</i>
Manual Welding Positioners				
Automatic Welding Positioners				
Others				

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Vendor / Packager Name xxx	Activity and Process Concerned xxx	Audit Date xxx
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THEME III - MANUFACTURING
Table 3.4.b - Welding and Heating - Description of Welding Staff : number and qualifications (to be joined)

	Number	Type of Qualification	Comments / Description	Comments <i>To be filled by TOTAL or Company representative</i>
Welding Engineer				
Welding Technician				
Welding Supervisor				
Arc-air gouging skillful operators				

Table 3.5.a - Mechanical Assembling - Description of Equipment in Place

Type of Equipment	Description	Quantity	Surfaces (m2)	General maintenance condition	Comments <i>To be filled by TOTAL or Company representative</i>

Table 3.6.a - Cleanliness of components and piping after assembly - Description of Equipment in Place

Type of Equipment	Description	Quantity	Capacity (turbulent flow)	General maintenance condition	Comments <i>To be filled by TOTAL or Company representative</i>

Table 3.7.a - Painting , Dust removal & Preservation - Description of Equipment in Place

Type of Equipment	Description	Quantity	Max. Capacity	General maintenance condition	Comments <i>To be filled by TOTAL or Company representative</i>

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Vendor / Packager Name	Activity and Process Concerned	Audit Date
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THEME IV - PRODUCT MANAGEMENT (Control, Testing, Inspection, Storage)

All facilities described herein are meant to be permanent in-house facilities only. Any sub-contracted activity must be clearly indicated showing the names and addresses of related Subcontractors. The number, type and status of all listed equipment are subject to thorough checks by the COMPANY representative in charge of the Plant Survey during his visit of the facilities.

Table 4.1.a - Outsourced Material Management - Material Storage

Type of Storage	Dimension	Material Stored	Comments <i>To be filled by TOTAL or Company representative</i>
Covered storage yard			
Open storage yard			
Non controlled temperature warehouse			
Cold control temperature warehouse			
Hot controlled temperature warehouse			

Table 4.1.b - Outsourced Material Management - Storage Conditions - identification

Storage Conditions for :	Description / Comments	Comments <i>To be filled by TOTAL or Company representative</i>
Raw casings		
Raw forgings		
Raw welded sub-assembly (base plate, piping, supports)		
Pre-machined casing and forging		
Pre-machined & welded sub-assembly (base plate, piping, supports)		
External source components		
External source equipments (delivered as full assembly)		
Seals and gaskets		
Bearings (anti-friction & hydrodynamics)		
Instruments, tubing, fittings, trays		
Electricals, cables, trays		
Non conform raw material		
Non conform pre-machined components		
Non conform external source components		
External source components		
External source equipments (delivered as full assembly)		
Flexibles & Hoses		
Welding products		
Preservation against corrosion and/or injuries of raw material machined components seal & gaskets external source components external source equipments		
Others		

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THEME IV - PRODUCT MANAGEMENT (Control, Testing, Inspection, Storage)
Table 4.1.c - Outsourced Material Management - Outsourced Inspection : Non Destructive Testing Equipment

Type of test / control	Equipment type	Range capability	Quantity of Equipment	Calibration of Equipment updated ?	Testing procedures and international standards used (availability, issuance, updating)	Recording and traceability	Comments <i>To be filled by TOTAL or Company representative</i>
Raw casings and forgings (dimensions, weight, NDT, material certificates, identification)							
Pre-machined casings and forgings (dimensions, weight, NDT, material certificates, identification)							
Welded sub-assembly (dimensions, NDT, material certificates, identification)							
Machined components (dimensions, NDT, material certificates, identification)							
External source components							
External source equipments							
Seals and gaskets							
Bearings (anti-friction & hydrodynamics)							
Instruments, tubing, fittings, trays							
Electricals, cables, trays							
Flexibles & Hoses							
Welding products							
Cleanliness and packing							

Table 4.2.a - Inspection, Testing and Quality Control - In house : Non Destructive Testing Equipment

Type of test / control	Equipment type	Range capability	Quantity of Equipment	Calibration of Equipment updated ?	Testing procedures and international standards used (availability, issuance, updating)	Recording and traceability	Comments <i>To be filled by TOTAL or Company representative</i>
Conventional dimensions & weight							
3 axis dimensions							
Homogeneity of material or coatings							
NDT dye penetrant							
NDT Xray							
NDT magnetic particles							

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THEME IV - PRODUCT MANAGEMENT (Control, Testing, Inspection, Storage)

Balancing							
Resonance							
Lab tests							
Metrologic							
Profile							
Thickness of coating							
Welded assembly							
Leak							
Pressure							
Product assembly							
Performances							
Mechanical							
De bugging							
Functional							
Others							

Table 4.2.b - Inspection, Testing and Quality Control - Destructive Testing Equipment

Type of test / control	Equipment type	Range capability	Number of Equipment	Calibration of Equipment updated ?	Testing procedures and international standards used (availability, issuance, updating)	Testing sub-contracted ? If yes, indicate the name of sub-contractor in annex	Recording and traceability	Comments <i>To be filled by TOTAL or Company representative</i>
Impact test								
Hardness								
Rupture test								
Coating homogeneity								
Elongation test								
Corrosion test								
Erosion test								
Wear test								
Stress failure								
Ageing test								
Prototype								

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Vendor / Packager Name	Activity and Process Concerned	Audit Date
xxx	xxx	xxx

THEME IV - PRODUCT MANAGEMENT (Control, Testing, Inspection, Storage)
Table 4.2.c - Inspection, Testing and Quality Control - Raw Material Chemical Analysis Equipment

Type of test / control	Equipment type	Range capability	Number of Equipment	Calibration of Equipment updated ?	Testing procedures and international standards used (availability, issuance, updating)	Testing sub-contracted ? If yes, indicate the name of sub-contractor in Annex	Recording and traceability	Comments <i>To be filled by TOTAL or Company representative</i>
Chemical analysis								
Mechanical performance								
Others								

Table 4.3.a - Finished Goods Management - Goods Storage

Type of Storage	Dimension	Material Stored	Comments <i>To be filled by TOTAL or Company representative</i>
Covered storage yard			
Open storage yard			
Warehouse			

Table 4.3.b - Finished Goods Management - Storage Conditions

Storage Conditions for :	Description / Comments	Comments <i>To be filled by TOTAL or Company representative</i>
Small Goods		
Fragile goods		
X-Ray films		
Others		

Table 4.3.c - Finished Goods Management - Shipping Facilities

Type	Maximum Dimension (m)	Maximum Capacity (weight in tons)	Comments	Comments <i>To be filled by TOTAL or Company representative</i>
Railroad siding with spur in yard				
Road / Trucking				
Air shipment				
Water				

Table 4.4.a - Procurement Practices - Raw Material Supplier List / Source of Materials

Raw Material	Suppliers	Number of audits / year	Comments (follow-up procedures, approval,...)	Comments <i>To be filled by TOTAL or Company representative</i>
Casing				
Forgings				
Base-plate				
Welding products				

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THEME IV - PRODUCT MANAGEMENT (Control, Testing, Inspection, Storage)
Table 4.4.b - Procurement Practices - Pre-machined Component Supplier List / Source of Materials

Pre-machined Components	Suppliers	Number of audits / year	Comments (follow-up procedures, approval,...)	Comments <i>To be filled by TOTAL or Company representative</i>
Casing				
Forgings				
Base-plate				

Table 4.4.c - Procurement Practices - Component Supplier List / Source of Materials

Components	Suppliers	Number of audits / year	Comments (follow-up procedures, approval,...)	Comments <i>To be filled by TOTAL or Company representative</i>
Machined components				
Flexibles				
Hoses				
Tubbings & Fittings				
Cable trays				
PLC (Process logic)				
Pressure transmitters				
Temperature transmitters				
RTD probes				
Thermocouples probes				
Level transmitters				
Level control valve				
Temperature control valve				
Pressure control valve				
Vortex flow meter				
Coriolis flow meter				
Turbine flow meter				
Orifice plates meter				
Multi-core instrument cables				
High temperature resistant instrument cables				
Compensation cables				
Valves (block)				
Valves (instrument manifold)				
Pressure Safety Valves				
Vibration monitor (PLC) & zener barrier				
Vibration, non contact probes and proximitors				
Vibration, accelerometer				
Vibration, velocimeter				
Heaters				
Gaskets				

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THEME IV - PRODUCT MANAGEMENT (Control, Testing, Inspection, Storage)

Seals (Rings, O rings)			
Seals (Mechanical seals)			
Bearings (hydrodynamic)			
Anti- friction bearings			
Couplings			
Piping			
Flanges			
Particles filters			
Coalescing filters			
Other			

Table 4.4.d - Procurement Practices - Equipment Supplier List / Source of Materials

Equipment	Suppliers	Number of audits / year	Comments (follow-up procedures, approval,...)	Comments <i>To be filled by TOTAL or Company representative</i>
Speed increaser gears				
Speed reducer gears				
Electrical motors (Main)				
Electrical motors (auxiliary)				
Pumps, centrifugal				
Other				

