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KLM Technology Group #03-12 Block Aronia, Jalan Sri Perkasa 2 Taman Tampoi Utama 81200 Johor Bahru Malaysia	PIPELINE FUNCTIONAL SPECIFICATION FOR PIPING SPECIAL ITEMS (PROJECT STANDARDS AND SPECIFICATIONS)	

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SCOPE

This Project Standard and Specification refers to the minimum and mandatory requirements of designs & materials for piping specialties & components as per approved P& ID, approved Data-Sheet and Bid-Package. All piping assemblies, specialties & materials supplied or installed under these specifications shall be in accordance with sound engineering principles. Any omission from this specification shall not relieve the contractor from his responsibility of furnishing equipment's or materials to meet the specific process parameters, environmental parameters, safety parameters and any other applicable statutory laws or relevant codes & standards. Substitution or changes from this specification must be accompanied with sufficient information/justification and written approval shall be obtained from the Company.

UNITS

SI units shall be used. Dimensions shall be in mm and be related to the Platform datum's or reference lines.

GENERAL REQUIREMENTS

Company's Requirements

The contractor shall prepare detailed datasheet for each specialty item based on this bid package and approved P&ID and submit to the company for approval. The Datasheet shall contain the following data, but not limited to:

- Design Pressure and design temperature.
- Material of construction.
- Rating.
- Governing Codes and Standards and Specification.
- Relevant technical notes.
- Tag no.
- Size.
- Reference to approved P&ID.
- Relevant calculations.
- Relevant drawings.

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DESIGN REQUIREMENTS

General

Materials shall conform to this Specification with the attached piping specification index and the identified API, ASME, ASTM, BS and NACE codes and Standards. Pressure and temperature ratings of ASME B16.5 shall apply for the design conditions.

Requests for substitutions of any kind shall be complete with all pertinent engineering information required for the Company's evaluation of the proposed substitution.

Design Load Cases

Specialties, its supports and anchors, shall be designed to withstand the results of the following applicable combinations of loads and forces within the limits of stress set by ASME B31.3:

1. Hydro-test Condition (The empty weight plus weight of water to fill the piping).
2. Operating and Design Conditions (The empty weight plus the weight of operating fluid).
3. Wind loading condition
4. Dynamic Loading Condition
5. Periodic Site Test Condition
6. Any other condition that would affect the safety of the pipe work, e.g. cyclic loading and slug forces, when identified on the Data Sheet.

Design Stress

Allowable stress shall be the maximum stresses permitted by ASME B31.3

Drawings and Calculations

Vendor drawings shall contain all pertinent information relating to the Codes, Standards and Specifications used in the design, fabrication, inspection and testing of all the specialties, the pipe work, including the materials used.

The Contractor shall submit detailed calculations establishing the compliance of their design with the requirements of ASME B31.3.

Contractor to prepare the data sheets for each specialty & shall provide the information such as item description, pipe size, thickness, valve selection & tag

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Nos, designed pressure- temperature ratings, hydrostatic pressure, list of spares and applicable codes/standards. Contractor to submit the data sheets and all other informations required for design of each specialty for company's review & approval.

Contractor to prepare the specifications, data sheets based on the functional parameters, relevant piping class as per approved P&ID & material of construction and submit to company for review & approval.

All calculations shall be complete, giving all references and showing all working methods. The Contractor shall be able to provide proof of software verification for any software used. Computer printouts will not be accepted without the program flow chart, input data and complete printout, and then only by prior written agreement with the Company at the quotation stage.

Where relevant, additional calculations shall be undertaken regarding the effects of slug forces.

The pipe work shall be analyzed in its corroded state for each load combination. Approval of drawings, calculations and other documents by the Company does not relieve the Contractor of their responsibility for the correctness of the design to suit the stated conditions.

MATERIALS

General

Materials shall be as per ASTM, BS or API specifications.

Material Identification

All piping specialties except those with threaded connections, shall be supplied with mill certified test reports and certificates to identify the type of steel, composition, heat number and any special testing.

The Contractor shall furnish to the Company Inspector (OD- Rep) with one (1) copy of all mill certificates for all the materials purchased by the Contractor duly certified by company approved third party inspection agency.

Certification Documents

All pressure parts material certification shall be traceable to heat numbers. Certificates, including all material certificates, mechanical test certificates, welding qualification certificates, heat treatment certificates and hydrostatic test

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certificates shall be available at final inspection and for counter signature by the certification authority and stored by the Contractor for a minimum of 5 years after acceptance of the piping by the Company. Pressure retaining parts shall be clearly marked to allow verification of tractability.

SPECIALTY ITEMS

Specialty items shall be supplied with a stainless steel tag. Specialty Items shall be supplied, designed, tested & installed as specified in the Project Specification for specialty items. This specialties refers to items like Strainers, Scrapper Tees, Hinged Closures, Pig Detector, CP/BP/SP, 5D radius Bends, SDV, HCV, Choke Valves, Strainers, Spray Nozzle, Fire water & foam hose reel, Chemical and Utility hose reel, Continuous drainer etc. used in the Offshore Platforms. The materials of construction, piping class, governing codes and standards, quality assurance shall be followed as per relevant clauses of this specification. All specialties shall be hydro tested as per respective piping class and 1.5 times the design pressure. All pressure welds shall be 100% radio graphed. However, piping speciality supplied by the vendor with primer as per Spec. 2005 followed by subsequent coating (With touch up primer coating wherever required as per Spec. 2005) by main contractor is also acceptable.

Strainers

All basket type strainers shall be designed as per ASME Section – VIII. Div. 1 and others as per ASME B 31.3, MOC of the body, nozzle etc shall be same as that of the connected piping.

Screen material shall be as follows:

<u>Body Material</u>		<u>Screen Material</u>
C.S.	-	S 316
C.S. (NACE)	-	SS 316 (NACE)
Other than C.S.	-	Compatible with Piping Class.

Mesh size for all strainers shall be 40, unless otherwise specified.

Drains with ball valve and blind shall be provided.

Installation of strainer shall conform cleaning without dismantling strainer housing and associated piping & instrumentation.

Break out spools shall be installed wherever the temporary strainers are recommended in P&ID.

Scrapper Tees

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Scrapper tee (or sphere tee or flow tee as it is called) essentially consists of concentric barrel tees. The purpose of the scrapper tee is not to allow passage of pig sphere/scrapper on to the branch side.

The scrapper tee shall be suitable for pigging operation with process hydrocarbon/raw sea water. The scrapper tee inside diameter shall be same as that of inside diameter of riser in splash zone to maintain constant ID to permit smooth pigging operations.

No bars shall be used. Maximum possible opening shall be provided through slots to limit the pressure drop i.e. total opening shall be 1.0 to 1.5 times the branch pipe area.

Thickness of run/branch is to be calculated by Vendor to the required design pressure and temperature and it shall match with the corresponding matching pipeline for free passage of pig as per DNV rules for submarine pipeline

Shut Down Valves (XSDV)

1. Shut Down Valves (XSDV):

- Type : Flanged Ball valve with manual override
- Size : Contractor to prepare data sheet based on process parameter.
- Others : Valves rating; flange facing; body, ball, seat and trim material, packing etc. shall be to the relevant piping specs. All XSDV shall have flanged ends irrespective of line sizes and class rating.
- Shutdown time : Contractor to specify.

2. Actuator:

- Type : Pneumatic piston, spring return, Quarter turn operation
- Size : Actuator torque shall be 1.25 times the valve torque required at full rated differential pressure of valve, (Vendor shall indicate actuator model no, valve torque and actuator torque in a tabular form along with the quotation.
- Supply : Pressure Instrument air/gas at 7 kg/cm²g (10.6 kg/cm² g max) (min. pressure being 5.5 kg/cm²g)
- Pneumatic : 3/8" NPT (female) Tubing shall be SS 316 3/8" OD x 0.049" WT
- Accessories : Filter regulator with gauge.

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3. Valve Position Switch (XVPS):

Valve positions switches to indicate open/close position for remote operation.

Type	Sealed Micro type, lever operated
Rating	24V DC 2 amp suitable for inductive load
Enclosure	Weatherproof and explosion proof (NEMA 4/7)
Area classification	NEC Class 1, Division 1, Group-D
Housing	CS Nickel plated
Contacts	DPDT
Cable	Entry 2 Nos. 3/4" NPT (F)

4. Pilot Valve (XPV):

Pneumatic Pilot valve for remote operation with manual reset / shut in

Type	Three-way NC SIGMA 11 RSS 83 or equal
Body trim material	SS 316 Valve to be leak proof with 'O' ring seal
Supply	Instrument air/gas at 7.0 kg/cm ² g (10.6 kg/cm ² g max.) (Min pressure being 5.5 kg/cm ² g)
Signal	0 or 3.5 kg/cm ² g instrument air
Accessories	Filter regulator with gauge (1 No.)

5. Solenoid Valve (XSV):

Electrical solenoid valve for remote operation (If shown in P&ID)

Type	Three-way NC manual reset/shut in
Connection	Universal, inbuilt terminal box
Body/trim material	SS 316 Valve to be leak proof with O ring seals
Enclosures	Weatherproof and explosion proof (NEMA 4/7)
Area Classification	NEC Class-I, Division I, Group-D
Power supply	4V DC (-ve earthed)
Supply pressure	Instrument air/gas at 10.6 kg/cm ² (max) 7.0 kg/cm ² g (normal) 5.5 kg/cm ² g (min.)
Cable entry	3/4" NPT (F)
Accessories	Filter regulator with gauge

Notes:

- 1) Valves to be designed and tested as per API-6D or BS-5351 as applicable.

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- 2) Actuator shall be mounted on the valve and tested as follows:
 - Cycle (open and shut) each valve with its actuator at least five (5) times to ensure smoothness of operation
 - Shut valve and apply hydraulic differential pressure across the valve. Open valve with the installed actuator and note valve operation. Valve operation should not be jerky or binding. This shall be repeated at least three (3) times and shutdown time noted at minimum supply pressure.
- 3) Test shall be witnessed by company's or company's authorized representative
- 4) All valves shall be of fire safe design as per API 607/API6FA/BS 6755 Part 2.
- 5) Fire safe tests duly witness and certified by recognized third party inspection agency e.g. LLOYD/DNV/BV/EIC shall be furnished for approval with quotation.
- 6) Valve with actuator shall be suitable for installation in horizontal/vertical lines.

Utility Hose Reels

Galvanized, welded steel hose reel drum with single length (15M min.), noncollapsible, non-shrinkable hose with end connections.

Nozzles wherever required shall be of Elkart SFL make (or equal), 95 GPM capacity suitable for required service conditions.

Hose coupling wherever required shall be KAMLOCK Fig 633A and 634B or equivalent.

Hose reel assembly shall be mounted on a frame.

Hosepipe shall have an external coating of oil and abrasion resistant material unless otherwise specified to protect them from sunlight or mild dew damage.

Each hose reel assembly shall be hydrostatically tested to two times the working pressure or at 21.0 kg/cm²g whichever is higher.

5D Radius Bends

Bends shall be manufactured by hot bending of pipe applying heating only. Company's approval for bending procedures shall be obtained prior to start of work. The adopted procedure shall be such that the finished product shall not require any additional heat treatment after bending. If such a heat treatment is