DETAIL DESIGN OF LUFENG OILFIELDS DEVELOPMENT PROJECT

JOB NO. 19ZB-DD05

COSIGN
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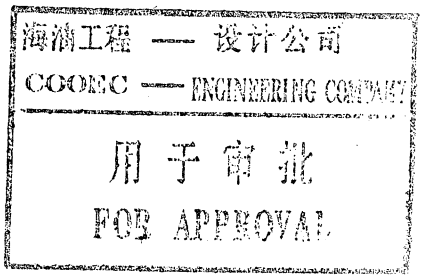
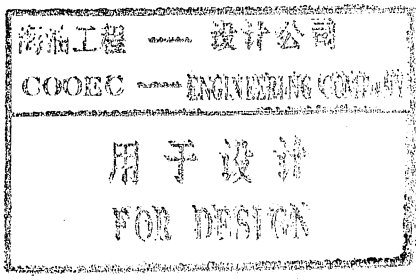
PIPING





REV.	DATE	DESCRIPTION	BY	CH'K.	REV'W.	EXAM.	APPRO.
0	2019.11.1	ISSUED FOR APPROVAL					

CLIENT CNOOC Ltd. Shenzhen CERTIFI. NO. **A112002816**	**SPECIFICATION FOR TECHNICAL SUPPLY CONDITIONS OF Cu/Ni PIPE AND FITTINGS** (CN-USP- SCS(E)-LF14-4&LF15-1)	**Offshore Oil Engineering Co.,Ltd.** **DOCUMENT NO.** DD-SPC-GEN-PI-1019

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1 SCOPE

This Specification defines the minimum technical requirements pertaining to the supply of 90/10 Cu/Ni pipes, fittings, flanges and other piping materials used on offshore facility.

This specification shall be part of purchase order for 90/10 Cu/Ni pipes, fittings and flanges, any deviation from this specification shall be written for approval of COOEC.

This specification does not replace the requirements listed within codes and standards. The purpose of this Specification is to:

- Supplement basic codes and standards.
- Define which options, if such exist, are required.
- Specify any additional tests.
- Specify any additional acceptance criteria.

In case of conflicts, the more restrictive requirements govern and any conflicts are to be agreed in writing with COOEC.

2 APPLICABLE DOCUMENTS

The applicable standards and codes below shall be part of this specification.

Designation	Standard or Specification
EEMUA 234	90/10 Copper nickel alloy piping for offshore applications Specification,2015
ASME V	Bolier and Vessel Nondestructive Examination,2015
ASME VIII	ASME Boiler & Pressure Vessel Code.2015
ASME B1.20.1	Pipe Threads, General Purpose(Inch),2013
ASME B16.5	Pipe Flanges and Flanged Fittings NPS 1/2 Through NPS 24 Metric/Inch Standard,2017
ASME B16.11	Forged Fittings—Socket-Welding and Threaded,2016
ASME B16.47	Large Diameter Steel Flanges (NPS 26" Through NPS 60"),2017
ASME B16.48	Line Blanks,2015
ASTM A370	Standard Test Methods and Definitions for Mechanical Testing of Steel Products,2017a
ASTM B151	Standard Specification for Copper-Nickel-Zinc Alloy (Nickel Silver) and Copper-Nickel Rod and Bar, 2013
ASTM B466	Standard Specification for Seamless Copper-Nickel Pipe and Tube,2014
ASTM B467	Specification For Welded Copper-Nickel Pipe,2014
BS EN 10204	Metallic Products-Types of Inspection Documents,2004

3 TERMS AND DEFINITIONS

For the purpose of this Specification, the following terms and definitions apply:

Terms	Description
COOEC	Offshore Oil Engineering Co. Ltd.
Purchaser	Who issues the enquiry and manages the purchase of the products.

4 UNITS

- Nominal pipe sizes and pipe nipple diameters are to be shown in inches.
- Pipe and tubing lengths are to be shown in meters and decimal fractions.
- Pressure ratings (i.e. CL 150 flange or CL 3000 fitting) are to be shown in pounds but pressures are to be expressed in MPa.

5 SUPPLIER'S QUALIFICATION REQUIREMENT

The Supplier for 90/10 Cu/Ni pipes, fittings and flanges to be used on the offshore facility shall have the following qualification as a minimum, and the related document shall be submitted when bidding:

★ Valid Type approval certificates or Manufacture approval certificates issued by third party (CCS, ABS, DNV, BV or LR).

★ Valid Manufacture License of Pressure piping components as per TSG D2001/TSG 07 (if applicable).

★ Valid Quality management system certificate in accordance with GB/T19001、ISO 9001 or API Q1.

★ Experience for bidding products, the relevant experience list and completed Purchase Order (PO) copies shall be provided by supplier:

1) At least 1piece Experience that not less than 24"×20bar;

2) At least 1 piece within the latest 5 years for offshore project (Offshore platform, FPSO or other offshore floating facilities) Experience that not less than 20bar.

Clauses with Pentagram symbol ★ means the requirements are mandatory, which must be rigidly followed by the supplier. Any unconformity shall result in invalid bidding.

6 GENERAL REQUIREMENTS

Material grade selected as UNS C70600 according to ASTM B466, B467 and B151.

Pressure rating of Components shall be 20bar.

Each component material of the products shall be new. Any used or refurbished material will be rejected.

Welding and heat treatment procedure for welded materials shall be submitted by vendor. The procedure shall make sure the weld seam can keep the same corrosion

resistance and strength with body material which specified in this specification. Deleterious phases shall not form in the as-welded material or the weld deposit.

Positive Alloy Material Identification (PAMI) shall be carried out 100% and PAMI procedure shall be submitted by vendor for approval.

6.1 Pipes

Pipes shall be as per EEMUA 234.

Pipe size equal and smaller than NPS 10 shall be seamless. Pipe size larger than NPS 10 can be welded. Welded pipe shall be double or single straight welded. Seamless pipe can be supplied substituting welded pipe.

Welded pipe shall be electric fusion welded with additional of filler metal process and shall be 100% radiographed.

6.2 Flanges

Flanges shall be as per EEMUA 234. Blind flanges shall be as per ASME B16.5 and ASME B16.47 A series.

Flanges shall be forged with not less than 3 forge ration for ingot/billet.

6.3 Fittings

Fittings shall be as per EEMUA 234.

Thread type fittings shall be in accordance with ASME B16.11 and ASME B1.20.1.

Wall thickness of thread nipples shall be SCH160 minimum.

Forged fittings shall be made with not less than 3 forge ration for ingot/billet.

Fittings size equal and smaller than NPS 10 shall be seamless. Fittings size larger than NPS 10 can be welded. Welded fittings shall be double or single straight welded. Seamless fittings can be supplied substituting welded fittings.

Welded fittings shall be electric fusion welded with additional of filler metal process and shall be 100% radiographed.

7 CHEMICAL COMPOSITION

The products shall conform to the chemical compositional requirements presented in table 1. All elements listed in Table 1 determined, the sum of results shall be 99.5 % minimum.

Table 1: Chemical Composition, % max (unless shown as range or min)

Steel Grade	Copper incl Silver	Nickel incl Cobalt	Lead, max	Iron	Zinc, max	Manganese, max	Sulfur, max	Phosphorus, max
UNS C70600	Remainder	9.0-11.0	0.05	1.0-1.8	1.0	1.0	0.02	0.02

8 MECHANICAL PROPERTIES

Table 2: Mechanical requirements

Steel Grade	Type	Tensile Strength, min	Yield Strength, in At 0.5% extension under load	Elongation
UNS C70600	Pipes and Wrought fittings	260MPa	90MPa	25%(in 2in，min)
UNS C70600	Forged fittings and Flanges	260MPa	105MPa	30%(in 4×Diameter or thickness of Specimen，min)

9 DIMENSIONS, MASS AND TOLERANCES

Tolerances for diameter, wall thickness, length, straightness and mass shall be in accordance with EEMUA 234 and applicable standard.

If length not specified in the purchase order, 6, 9 or 12 meter lengths with no minus tolerance shall be supplied. Other length may be supplied with COOEC agreement.

10 HEAT TREATMENT

All material shall be heat treatment as applicable code and standards.

Seamless pipe shall be annealed temper (O60) as per ASTM B466.

Welded pipe shall be fully finished and annealed (WO61) as per ASTM B467.

Fittings and flanges shall be annealed.

11 INSPECTION AND TESTING

Prior to the start of manufacture, ITP (Inspection and Test Plan) shall be submitted for approval.

The ITP shall include inspection and testing activities to be performed, including those at sub-suppliers' works and shall make reference to all testing procedures, control documents, and resulting records and reports.

Inspection and testing shall be in accordance with EEMUA 234 and applicable standard.

Samples for production testing shall realistically reflect the properties in the actual component.

All the weld seams of pipes and fittings shall be liquid dye penetrant test.

Radiographic examination shall be performed on the completed length of all welds for pipes and fittings.

Each pipe shall be hydraulically tested to an internal pressure of not less than 1.5 times the rating pressure. In each case the pressure shall be stabilized and

maintained for sufficient time to allow for inspection without any leakage and showing weakness or defects. In each case the test pressure for seamless pipe shall be maintained for 10s minmum for size upto 4" and 20s minmum for size above 4", and for welded pipe shall be maintained for 20s minmum for size upto 16" and 30s minmum for size above 16".

All material before delivery shall be witnessed factory acceptance test (FAT). Vendor shall submit detailed ITP (Inspection and Test Plan) based on Project datasheet and specification requirements.

12 REPAIR OF DEFECTS

Repairs to base material shall not be allowed. Repair of weld seams in welded pipe and subsequent reheat treatment shall be in conformance to EEMUA specification. Repair welds shall be recorded and identified

13 MARKING

Marking shall be in accordance with EEMUA 234 and applicable standard.

Marking shall be by means of a vibratory etching tool or electrochemical etching.

14 PREPARATION FOR SHIPMENT

Unless other specified, pipes, fittings and flanges shall be adequately protected to withstand at least six months of unsheltered storage at the job site before installation. Machined or threaded exterior surfaces shall be protected from corrosion during shipment and subsequent storage.

Flanges shall be supplied with heavy duty plastic protective plugs or caps.

Fittings shall be supplied with heavy duty plastic or equivalent protective plugs or caps.

For beveled ends, the caps shall protect the full area of the bevel.

All pipes, fittings and flanges shall be handled, stored and transported in such a manner to prevent damage to the wall and ends.

15 CERTIFICATION

Material Certification compliance with the specification and related code shall be submitted according to BS EN 10204 type 3.1 or equal. Certification shall include as a minimum chemical analysis, mechanical test results, impact test result, heat treatment, pressure test, NDT, and special requirements.

Sub-vendor list and raw material certification shall be submitted to COOEC/Client for approval.

Final documentation shall be supplied as per project specified. Documents as a minimum requirement shown in table 3 shall be submitted.

Table 3: Vendor Documents Requirements

Item	Document Title
1.	Project Management and execution plan.
2.	Overall project time schedule.
3.	Sub-vendor list and sub-order list.
4.	Inspection and Test Plan.
5.	Quality plan and quality manual.
6.	Product drawings, Design and Calculation Documents.
7.	Instruction manuals for installation, operation and maintenance.
8.	Shop inspection and test procedure.
9.	Inspection and test Records/Reports.
10.	Raw Materials and Material inspection certificates.
11.	Instruction for transportation and storing.
12.	Release Note.
13.	Other documents specified in project.