DRAFT AMENDMENT ISO 13628-1:2005/DAmd 2

ISO/TC **67**/SC **4** Secretariat: **ANSI**

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Petroleum and natural gas industries — Design and operation of subsea production systems —

Part 1:
General requirements and recommendations

AMENDMENT 2: Revised Annex L

Industries du pétrole et du gaz naturel — Conception et exploitation des systèmes de production immergés —

Partie 1: Exigences générales et recommandations

AMENDEMENT 2: Ajout de l'Annexe L

ICS 75.180.10

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The CEN Secretary-General has advised the ISO Secretary-General that this ISO/DIS covers a subject of interest to European standardization. **In accordance with the ISO-lead mode of collaboration as defined in the Vienna Agreement, consultation on this ISO/DIS has the same effect for CEN members as would a CEN enquiry on a draft European Standard.** Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month FDIS vote in ISO and formal vote in CEN.

In accordance with the provisions of Council Resolution 15/1993 this document is circulated in the English language only.

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Pour accélérer la distribution, le présent document est distribué tel qu'il est parvenu du secrétariat du comité. Le travail de rédaction et de composition de texte sera effectué au Secrétariat central de l'ISO au stade de publication.

Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

Amendment to ISO 13628-1:2005 was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, Subcommittee SC 4, *Drilling and production equipment*.

Petroleum and natural gas industries — Design and operation of subsea production systems —

Part 1:
General requirements and recommendations

AMENDMENT 2: Revised Annex L

Page 2, Clause 3, add the following Terms and definitions

carbon steel
generic term to designate the full range of carbon and carbon-manganese steels used in the construction of conventional oilfield equipment

clad carbon steel
carbon steel with a liner or layer in another metallic material, such as a nickel base or stainless steel alloy, metallurgical bonded to the carbon steel.

corrosion resistant alloys
CRAs
alloys that are intended to be resistant to general and localized corrosion in oilfield environments that are corrosive to carbon steels

extrados
outer curved section of the bend arc

intrados
inner curved section of the bend arc

low alloy steel
steel with a total alloying element content of less than about 5 %, but more than specified for carbon steel

minimum design temperature
the lowest anticipated metal temperature during system operation including transient conditions

Page 3, 3.2, add the following abbreviated terms

ACCP	ASNT Central Certification Program
ASNT	American Society of Non-destructive Testing
CRA	corrosion resistant alloy
DAC	distance amplitude curve
FBH	flat bottom hole
FL	fusion line
HAZ	heat affected zone
MDT	minimum design temperature
MPS	manufacturing procedure specification
NA	not applicable
NDT	non destructive testing
ppm	parts per million (1/1 000 000)
PT	penetrant testing
PWHT	post weld heat treatment
QTC	qualification test coupon
SMYS	specified minimum yield strength
UT	ultrasonic testing
WM	weld metal
WPS	welding procedure specification
WPQR	weld procedure qualification record

Page 231, add the following Informative Annex L

Annex L
(informative)

Materials and welding of manifold piping and jumpers

L.1 Ordering information

L.1.1 General

Annex L is informative; however users may, by agreement between the interested parties, consider the provisions to be either requirements or guidelines.

This Informative Annex specifies the requirements for subsea pressure-containing components and pipe assemblies for production of hydrocarbons and water/gas well-injection service, e.g. manifolds, jumpers and flow loops, fabricated in carbon, low-alloyed and stainless steels, and nickel based alloys. It includes all interfacing welds between manifolds and connecting components such as valves and connectors but excludes such items as valves, hubs, flexible pipes, control systems and support structures as templates covered by other standards.

It is based on using ASME B31.8 as the governing design code and gives additional requirements to that code. For installation where a different design code from ASME B31.8 applies the requirement of that different code shall govern unless this is less stringent than required by this Annex.

There are no specified pressure limitations for the application of this Annex.

L.1.2 Items to be agreed upon

Some requirements are specified as options or alternatives and must be clarified between contracting parties, when ordered under this specification.

	Requirement	References
a)	Annex mandatory	Annex L
b)	Use of other product reference standards	L.2.1
c)	Use of separated test blocks	L.2.5.2
d)	Corrosion testing of 22Cr Duplex	L.2.6.6.2
e)	Volumetric testing of forgings in stainless steels	L.2.7.3
f)	Weld overlay welding method	L.5.1
g)	Chemical composition of weld overlay	L.5.2
i)	Weld details and procedures for any nickel alloy buttering on low alloy steel	L.5.3
j)	Volumetric testing method of weld buttering	L.5.3
k)	Applicable welding code	L.6.1.1
l)	Use of socket welds	L.6.1.5.1
m)	Production test program	L.6.1.12
n)	Piping systems in carbon steel with cleanliness requirements	L.6.1.2
o)	Degree of oxidation during induction bending	L.6.2.7
p)	Qualifications of NDT personnel	L.7.1.2

L.2 Material standards and testing requirements

L.2.1 General

All components that may be exposed to cathodic protection shall comply with the following material usage limitations.

— The hardness of weld and HAZ of any steel grade shall not exceed 350 HV10 (Non H_2S containing service conditions).

— Ferritic materials exposed to a cold deformation resulting in a permanent deformation in excess of 5,0 % should be given a solution or stress relieve heat treatment after the cold forming operation.

— Free machining steel grades shall in general not be used.

— The actual yield strength of components in any steel grade shall not exceed 900 MPa and 35 HRC or 328 HB in hardness.

— The hardness of components in nickel based alloys shall not exceed hardness values specified in ISO 15156-3.

— Titanium based alloys should not be used for applications involving exposure to cathodic protection.

For valves and connectors designed to ISO 10423/API 6A, the material requirements in that standard apply.

The pressure containing parts of the manifold structure should be formed from carbon, low alloyed, stainless steel or nickel based alloys as listed in section L.2.2 and L.2.3 below.

A detailed material specification for each type of product shall be established. This specification shall clearly identify all manufacturing and testing requirements.

All components shall be delivered with a material certificate according to ISO 10474 Type 3.1.B/EN 10204 Type 3.1 confirming all requirements of relevant component standard and additional requirements of this standard.

All materials for pipe, forgings and fittings shall be manufactured and used in accordance with the listed product specifications of the design standard and this standard. Use of other product standard has to be agreed and approved by the end user.

The requirements in the following clauses shall be in addition to or replace the corresponding requirements in the reference standards as relevant.

L.2.2 Pipe and pipe-fittings

The pipes and pipe-fittings shall either be manufactured by a seamless process hot working steel to form a tubular product without a welded seam, or longitudinal arc welded with process adding filler material.

Carbon and low alloy steel pipe and fittings shall conform to an appropriate reference standard suitable for the purpose of the application, such as those specified in Table L.1. The material grade should be limited upwards to 560 MPa (80 ksi) minimum specified yield strength. The delivery condition of pipes may be in normalised, thermo-mechanically treated or quenched and tempered condition. All fittings shall be used in normalised, normalised and tempered, annealed or quenched and tempered condition. Welded pipes and fittings shall conform to the requirements of Clause L.6.

For welded pipes and fittings the PQR/WPQR shall be qualified in accordance with ASME IX or ISO 15614-1, and comply with the base material requirements. All welding shall be carried out by welders qualified in accordance with ISO 9606 (all parts), ASME IX or EN 287/EN 1418.

Table L.1 — Reference standards for seamless and welded manifold pipe and pipe-fittings in carbon and low alloy steel

Standard	Product	Standard	Product
API 5L PSL2	Seamless and welded pipe	EN 10217-3	Welded pipe
ASTM A 333	Seamless pipe	EN 10216-3	Seamless pipe
DNV OS-F101	Seamless and welded pipe	ASTM A420	Seamless and welded fittings
ISO 3183 PSL2	Seamless and welded pipe	ASTM A860	Seamless and welded fittings

Stainless steel and nickel base alloy pipe shall conform to an appropriate reference standard suitable for the purpose of the application, such as those specified in Table L.2.

Table L.2 — Reference standards for seamless and welded manifold pipe and pipe-fittings in stainless steel alloy

Standard	Product	Standard	Product
ASTM A 312	Seamless pipe	EN 10216-5	Seamless pipe
ASTM A 358	Welded pipe	EN 10217-7	Welded pipe
ASTM A 790	Seamless pipe	ASTM A 403	Seamless and welded fittings
ASTM A 928	Welded pipe	ASTM A 815	Seamless and welded fittings
ASTM B 705	Seamless and welded pipe	ASTM B 366	Seamless and welded fittings

The following stainless steels and nickel alloys, solid or clad, are applicable to manifold piping:

— austenitic stainless steel (e.g. 316 SS and 6 Mo);

— duplex stainless steel (e.g. type 22Cr or 25 Cr duplex);

— nickel based alloys (e.g. Alloy 625 or Alloy 825).

For clad pipe, the carbon steel pipe shall conform to an appropriate reference standard suitable for the purpose of the application, such as those specified in Table L.1.

L.2.3 Forged components

Forgings for pressure-containing components shall conform to an appropriate reference standard suitable for the purpose of the application, such as those specified in Table L.3.

In addition to the requirement listed in Table L.3 all components shall be heat treated in or as close to near net shape as practicable and weld repair of forgings shall not be permitted.

The Hot Isostatic Pressed (HIP) process according to ASTM A988 is an acceptable alternative to forging.