

NORSOK STANDARD

COMMON REQUIREMENTS
**PIPING FABRICATION, INSTALLATION, FLUSHING
AND TESTING**

L-CR-004
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Provided by Standard Online AS for rayan 2013-07-21

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CONTENTS

1 FOREWORD	ERROR! BOOKMARK NOT DEFINED.
2 SCOPE	3
3 NORMATIVE REFERENCES	3
4 DEFINITIONS AND ABBREVIATIONS	4
4.1 Definitions	4
4.2 Abbreviations	4
5 MATERIALS	4
5.1 Colour marking of materials	4
5.2 Material storage, handling, recieval and identification control	4
6 FABRICATION OF PIPEWORK	5
6.1 General requirements	5
6.2 Welding and NDE	5
6.3 Butt welds for orifice runs	5
6.4 Screwed pipework	5
6.5 Dimensional tolerances for pre-fabricated piping assemblies	5
6.6 Branch connections and outlets	8
6.7 Pipe coupling	8
7 INSTALLATION OF PIPING	8
7.1 Pipework erection	8
7.2 Flanged joints	8
7.3 Valve and equipment flange connections	8
7.4 Gaskets	9
7.5 Bolting	9
7.6 Pipe support	9
7.7 Global tolerances, installation	10
8 FLUSHING	10
8.1 General	10
8.2 Hydro flushing	10
8.3 Pressurised air shockblowing	11
8.4 Pneumatic flushing	11
9 PRESSURE TESTS	11
9.1 General	11
9.2 Test preparation	11
9.3 Test media	12
9.4 Hydrostatic testing	13
9.5 Pneumatic testing	13
9.6 After completion of test	13
9.7 Verification of cleanliness	14
10 CHEMICAL CLEANING	14
11 HOT OIL FLUSHING	15
11.1 General	15
11.2 Marking	15

11.3 Documentation	15
12 SYSTEM COLOUR CODING OF PIPING	16
12.1 Purpose	16
12.2 Types of markers	16
12.3 Marker texts	16
12.4 Material of markers	16
12.5 Positioning of markers	17
12.6 Fluid description/colour code tabulation	18
12.7 Colour coding information.	18
ANNEX A ALTERNATIVE TEST METHODS	19
A.1 SCOPE	19
A.2 GENERAL	19
A.3 ALTERNATIVE TESTING METHOD	19
A.4 DOCUMENTATION	19
A.5 ALTERNATIVE TEST MATRIX	20
ANNEX B REQUIREMENTS FOR INTERNAL TREATMENT OF PIPING AFTER PREFAB AND INSTALLATION BEFORE COMMISSIONING (TABLE 1)	21

1 ERRATA: CORRECTED TYPING ERROR IN ANNEX A.3 (APRIL 1998)

1 FOREWORD

NORSOK (The competitive standing of the Norwegian offshore sector) is the industry initiative to add value, reduce cost and lead time and remove unnecessary activities in offshore field developments and operations.

The NORSOK standards are developed by the Norwegian petroleum industry as a part of the NORSOK initiative and are jointly issued by OLF (The Norwegian Oil Industry Association) and TBL (The Federation of Norwegian Engineering Industries). NORSOK standards are administered by NTS (Norwegian Technology Standards Institution).

The purpose of this industry standard is to replace the individual oil company specifications for use in existing and future petroleum industry developments, subject to the individual company's review and application.

The NORSOK standards make extensive references to international standards. Where relevant, the contents of this standard will be used to provide input to the international standardisation process. Subject to implementation into international standards, this NORSOK standard will be withdrawn.

All annexes are normative.

2 SCOPE

This standard covers the basis for fabrication, installation, flushing, pressure testing, chemical cleaning, hot oil flushing and system colour coding of process, drilling and utility piping for offshore oil and/or gas production facilities.

This standard does not cover the following:

- All instrument control piping downstream of first piping block valve.
- Sub-sea pipework and risers.
- Flexible hoses.
- Sanitary piping systems within living quarters and other domestic areas (H-CR-002).
- GRP piping.

3 NORMATIVE REFERENCES

The fabrication, installation, flushing, pressure testing, chemical cleaning, hot oil flushing and system colour coding shall be in accordance with all applicable sections of the latest edition of the regulations, codes, standards listed below:

ASME B31.3	Chemical plant and petroleum refinery piping
ASME B2.1	Pipe threads, general purpose
DIN 2505	Flanged joint calculation
Norsok Z-DP-002	Coding system
Norsok L-CR-001	Piping and valves
Norsok M-CR-601	Welding and inspection of piping
NS 813	Piping systems. Identification colours for the content.

NS 4054	Colour for identification.
ISO 4406	Hydraulic fluid power-fluids-method for coding level of contamination by solid particles
ISO 9095	Steel tubes - Continuous character marking and colour coding for material identification

4 DEFINITIONS AND ABBREVIATIONS

4.1 Definitions

Normative references	Shall mean normative in the application of NORSOK standards.
Informative references	Shall mean informative in the application of NORSOK standards.
Shall	Shall is an absolute requirement which shall be followed strictly in order to conform with the standard.
Should	Should is a recommendation. Alternative solutions having the same functionality and quality are acceptable.
May	May indicates a course of action that is permissible within the limits of the standard (a permission).
Can	Can-requirements are conditional and indicates a possibility open to the user of the standard.

4.2 Abbreviations

ABS	Absolute
CTF	Cut To Fit
HVWF	High Velocity Water Flushing
NS	Norwegian Standard
ASME	American Society of Mechanical Engineers
PVC	Polyester Vinyl Chlorid
ID	Inner Diameter
PAS	Pressurised Air Shock Blowing
P&ID	Piping and Instrument Diagram
NDE	Non Destructive Examination
HVAC	Heating, Ventilation and Air-Conditioning
ISO	International Organisation for Standardisation
RAL	Übersichtkarte. Übersicht über die farben des farbregisters RAL 840 HR
RTJ	Ring Type Joint
GRP	Glassfiber Reinforced Plastic

5 MATERIALS

5.1 Colour marking of materials

If colour marking shall be implemented, ISO 9095 shall be used.

5.2 Material storage, handling, recieval and identification control

Procedures for off-loading, storage, recieval, control, traceability and inspection of piping material supplied for fabrication and installation shall be worked out.

6 FABRICATION OF PIPEWORK

6.1 General requirements

Prefabricated pipe spools shall be cleaned, painted (if required) and preserved prior to installation.

6.2 Welding and NDE

All welding and NDE shall be in accordance with M-CR-601.

Internals of in-line valves and equipment that could be damaged due to heat transfer shall be removed prior to welding and/or heat treatment.

6.3 Butt welds for orifice runs

When the design of an orifice run necessitates welds, these shall be ground smooth and flush with the inside of the pipe. Pipe-tap connections where required, shall be drilled through the pipe wall and be smooth inside.

6.4 Screwed pipework

Unless otherwise stated on approved drawing or specifications, pipe threads shall conform to ASME B2.1.

All threading shall be carried-out after bending, forging or heat treatment but where this is not possible, suitable thread protection must be provided.

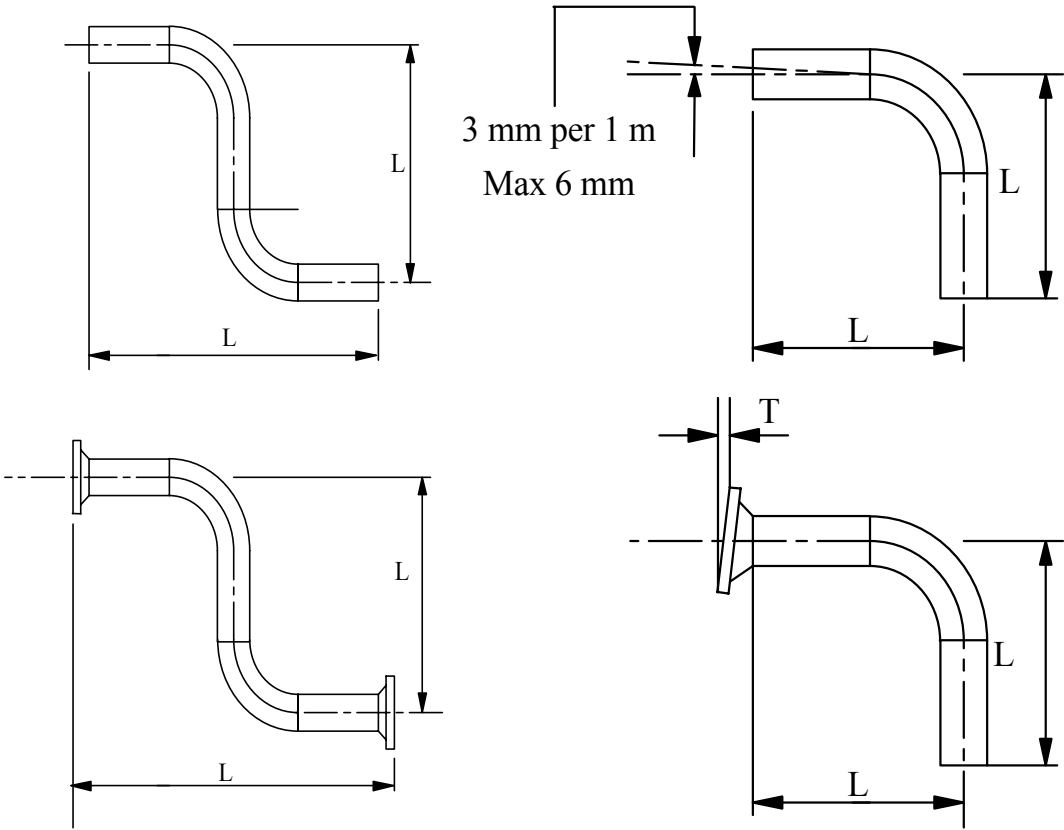
6.5 Dimensional tolerances for pre-fabricated piping assemblies

The tolerances on linear dimensions (intermediate or overall) is illustrated on figures 1 and 2. These tolerances are not accumulative.

Angularity tolerances across the face of flanges, weld end preparation and rotation of flanges shall be as stated in figures 1 and 2.

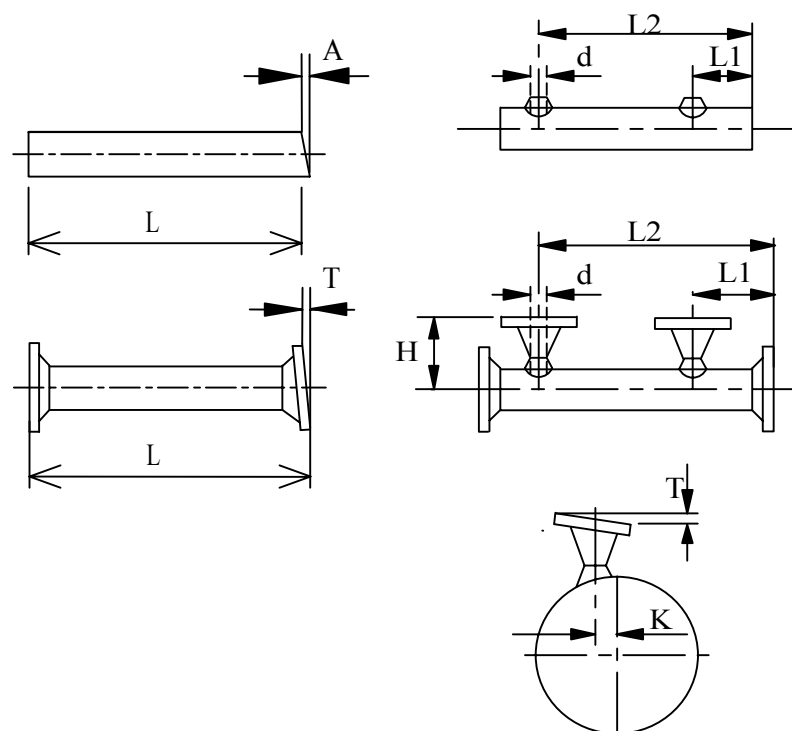
Closer tolerances on weld end preparations than stated in figures 1 and 2, may be specified in the relevant welding specification for the material in question, and shown on the fabrication isometric(s).

When closer tolerances other than those given above are required, these shall be as specified on the isometric drawing in question.



L (m)	Tolerances (mm)	
	ΔL	T
≤ 6	± 5	± 1.5
> 6	± 10	± 1.5

Figure 1. Tolerances for prefabricated piping assemblies



L (m)	Tolerances (mm)		
	L	A	T
≤ 6	3	1.5	1.5
> 6	5	1.5	1.5

	Tolerances (mm)		
	2" ≤ d ≤ 10"	12" ≤ d ≤ 20"	d > 20"
L1	± 3	± 5	± 5
L2	± 3	± 5	± 5
H	± 3	± 3	± 3
T	1.5	1.5	1.5
K	2	3	3

d=nominal diameter

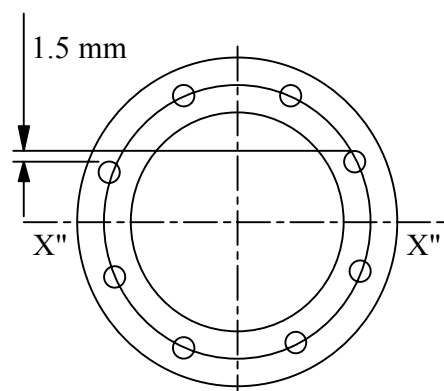


Figure 2: Tolerances for prefabricated piping assemblies

Notes:

1. Before reworking any spools contact engineering department in order to check complete isometric.
2. For spools CTF dimensions the overall length to be approximately 50mm overlength.
3. Bolt holes on flanges shall straddle the horizontal or vertical lines or plant north/south centre lines when orientation is not given on drawings.