

NORSOK STANDARD

COMMON REQUIREMENTS
PIPING AND PLUMBING

H-CR-002
Rev 1, January 1996

Please note that whilst every effort has been made to ensure the accuracy of the NORSOK standards neither OLF nor TBL or any of their members will assume liability for any use thereof.

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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 Subject to implementation into international standards, this NORSOK standard will be withdrawn.

Annex A is normative.

2 SCOPE

This standard identifies the basic requirements for design, fabrication, testing and installation of domestic piping and equipment:

- Hot water heating system.
- Potable water system.
- Domestic water heaters.
- Sewage.
- Open drain.
- Chilled water system.
- Sea water system.

The standard is limited to the part of the systems contained within Living Quarters and other domestic areas.

The sewage system is limited to pipes for drainage of waste water from sanitary equipment, kitchen/laundry equipment and floor gullies.

3 NORMATIVE REFERENCES

BS 5422	Method for specifying Thermal insulating materials on pipes,
BS 5970	Code of practice for Thermal insulation of pipework and equipment.
DIN 2463	Welded austenitic stainless steel tubes; dimensions and
DIN 17455	General purpose welded circular stainless steel tubes, Technical delivery conditions.
DIN 19530	Steel pipes and fittings with slip joint for sewage pipelines, dimensions.

Kommunenenes Sentralforbund	Normalreglementet for sanitæranlegg, tekniske bestemmelser
NS 1758	Copper tubes for capillary soldering.
NS 1759	Capillary solder fittings for copper tubes.
NS 5581	Pipe threads where pressure-tight joints are not made on threads.
SDH	Forskrift nr. 68: Forskrift om vannforsyning og drikkevann mm.
UNS S31600	Austenitic stainless steel (type 316)
UNS S31603	Austenitic stainless steel (type 316L)
NORSOK L-CR-001	Piping and valves
NORSOK L-CR-004	Piping fabrication, installation, flushing and testing
NORSOK M-DP-001	Materials selection

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.

All terms and phrases within the scope of this standard shall be regarded as defined in the regulations and international codes and standards referred to in this document.

4.2 Abbreviations

BS	British Standard
DIN	Deutsches Institut für Normung
HVAC	Heating, Ventilation and Air-Conditioning
NS	Norsk Standard (Norwegian Standard)
SDH	Sosial- og helsedepartementet (Department of Health and Social Security)
UNS	Unified Numbering System

5 TECHNICAL REQUIREMENTS

5.1 Design conditions

Hot potable water temperature: +55°C

5.2 Line sizing

All line sizing for potable water, sewage and drain systems shall be in accordance with "Normalreglementet".

5.3 Hot and cold water supply

The hot and cold water consumption shall be calculated from the “Normalreglementet” and actual figures for main consumers such as kitchen and laundry equipment.

The redundancy requirement for hot water supply shall be calculated.

6 SYSTEM REQUIREMENTS

6.1 General

For the design and installation of piping and plumbing systems, the following are considered to be of prime importance:

- The use of standard equipment.
- Accessibility for maintenance and inspection.
- Weight of components and equipment.
- Design of systems due to dynamic load and heeling angles.

Water filled equipment and pipes exposed to frost conditions shall be insulated and/or heat traced if necessary.

6.2 Hot water heating system

The hot water heating system shall be a closed circuit for service to heating coils and domestic water heaters.

Equipment for automatic removal of air should be installed.

Drain shall be installed on all low points.

The system shall be designed to prevent hot water to intrude into the potable water system.

6.3 Potable water system

The hot potable water system for Living Quarters shall include necessary mixing arrangement for supply of +55°C water for general use. Equipment which require higher water temperature shall be provided with facilities to raise the temperature to the required level.

Domestic water heaters operated by hot water heating system shall have back-up of electric immersion heaters installed in the water jacket.

Hot water risers and main distribution pipes in corridors shall be heat-traced with self regulating electric cables, unless a circulation system is provided.

All mixing taps shall in general be with ceramic seals and for one hand operation with single lever. Mixing units in showers shall be of thermostatic type.

Material selection of pipes, valves and fittings shall be compatible with the water quality.

All consuming points shall be provided with an isolation valve.

6.4 Sewage

Requirements for vents shall be according to «Normalreglementet».

Drainage from drip trays, extract hoods and similar equipment shall be lead to floor gullies.

6.5 Open drain

Open drain includes drain from helideck, roof drain and drain from test lines.

Drain from helideck shall be designed to include drain capacity for a fire-scenario on helideck.

6.6 Chilled water system

The chilled water system shall be a closed circuit for service to cooling coils in the HVAC-systems.

Vents shall be provided on all high points where air might be trapped.

Drain shall be installed on all low points.

6.7 Sea water system

The sea water system is an integrated part of the general sea water system on the installation for service to cooling coils (an alternative to chilled water) or to heat exchangers in closed fresh water cooling systems.

Vents shall be provided on all high points where air might be trapped.

Drain shall be installed on all low points.

6.8 Instrumentation and controls**6.8.1 Hot water heating system**

The water flow through all consumers shall be individually controlled.

Manual isolating valve, temperature and pressure indicators shall be provided on both supply and return pipes.

6.8.2 Potable water

Temperature-indicators shall be provided in the hot potable water supply.

Safety relief valves shall be provided on domestic water heaters.

Hot water storage tanks shall be provided with factory mounted el. central and contactor cabinet. Separate equipment shall be provided for power regulation.

6.8.3 Chilled water

The water flow through all consumers shall be individually controlled by a valve in the return pipe. The valve is to be activated by a temperature sensor/transmitter in the duct/room.

Manual isolating valve, temperature and pressure indicators shall be provided on both supply and return pipes.

6.8.4 Sea water cooling

Manual isolating valve, temperature and pressure indicators shall be provided on both sea water supply and return pipes.

Orifices shall be installed for flow control and flow measuring.

The pressure drop across the orifice shall not create noise which will be in conflict with noise level requirements for the HVAC installations in the area.

6.9 Piping material

The following material qualities shall be used for the different piping systems.

If other materials are chosen in order to reduce weight or cost, quality and an acceptable standard shall be proven.

Table 1 Material qualities

PIPING SYSTEM	MATERIAL	COMMENTS
Hot water heating system	Carbon steel	Piping & valves, L-CR-001
Potable water system	Copper	Inside module: Capillary brazing, 1758 and NS 1759
	UNS S31600	Inside module: DIN 2463 and DIN 17455
	UNS S31603	Outside module: Piping & Valves, L-CR-001
Sewage	Polyethylene (high density)	Inside module: Welded
	Hot dipped galvanised steel	Inside module: Socket pipe, DIN 19530
	UNS S31600	Inside/outside module: Socket pipe, DIN 2463
Open drain	Materials selection, M-DP-001	Piping & valves, L-CR-001
Chilled water system	Carbon steel	Piping & valves, L-CR-001
Sea water system	Materials selection, M-DP-001	Piping & valves, L-CR-001

7 LAYOUT AND ARRANGEMENT

7.1 Pipe routing

All piping shall be routed to provide a simple, neat and economical layout allowing for easy supporting and adequate flexibility.

Piping and plumbing systems shall, where feasible, be installed behind wall-panels, in shafts or above suspended ceiling.

Visible penetrations in light duty partitions and liner walls shall have cover plates.

Flanged or screwed joints are not acceptable on any concealed piping.

7.2 Accessibility

All piping shall be arranged to provide required headroom and clearances for installations, operation, inspection, maintenance and dismantling with the minimum interference or removal of piping and/or equipment. Inspection and maintenance doors shall be installed in shafts, walls and ceiling for access to valves and rodding points.

8 INSTALLATION

8.1 Joints

When other joints than covered by NS 1758 and NS 1759 are used for the potable water system, the system shall be accepted by the client.

8.2 Hangers and support

Pipe supports shall be arranged to prevent any movement and shall be adequately sized for mechanical loads and to accommodate the shipment and tow-out of the platform.

Pipe supports shall be arranged to avoid forces being transferred from the pipework.

Surfaces of all supports shall receive the protective coating before assembly.

8.3 Piping insulation

Selection and installation of piping insulation shall be in accordance with BS 5422 and BS 5970.

8.4 Identification of piping

The piping shall be marked in accordance with Norsok standard L-CR-004.

In addition to requirements specified in L-CR-004, identification symbols shall be placed on all piping behind access/inspection points.

8.5 Cleaning and protection

All pipes shall be internally cleaned before installation.

All open ends on piping and equipment shall immediately after and during installation be supplied with dust blinds. The dust blinds shall remain in place until the system is operable.

All protective covers on equipment shall be left in place as long as possible during erection. Surfaces and equipment easy damaged shall be adequately protected during construction.

When the pipe system is finally installed and mechanically complete, the system shall be flushed and internally cleaned.

8.6 Testing

8.6.1 *General requirements*

In general, all sanitary piping shall be pressure tested and function tested after installation. The test shall be performed prior to application of any thermal insulation.

8.6.2 *Sewage*

Atmospheric system: Sufficient blinding of the sanitary equipment shall be completed prior to the test. The sewage system shall be pressure tested with a pressure of 0.5 barg for a period of 30 minutes without any pressure decrease or leakage.

8.6.3 *Potable water*

The domestic potable water system, including the domestic water heaters, shall be pressure tested for a period of 60 minutes without any pressure decrease or leakage. Test pressure to be 150% of the design pressure.

9 EQUIPMENT

Annex A includes data sheets for the domestic water heater.

ANNEX A DATA SHEET (NORMATIVE)

CONTENTS

HDS-016 Sanitary equipment

NORSOK H-CR-002 Rev. 1, Jan. 1996	SANITARY EQUIPMENT DATA SHEET	HDS-016 Rev. 1, Jan. 1996 Page 1 of 1	
Package No.	Doc. No.	Rev.	
Tag No. _____ Unit _____ Service _____ Size & Type _____ Supplier _____ Manufacturer _____ Model _____ Location/Module _____ No. Req'd _____ Inquiry No. _____ Quote No. _____ P.O. No. _____ Job No. _____ Serial No. _____			
1 Technical Data			
2	Volume water jacket (primary)	l	_____
3	Volume storage tank (secondary)	l	_____
4	Heating capacity (water Dt= _____ °C) Note 1	kW	_____
5	Electrical immersion heater	kW	_____
6	Power supply	V/Hz	_____
7	Design pressure primary	barg	_____
8	Design pressure secondary	barg	_____
9	Test pressure primay	barg	_____
10	Test pressure secondary	barg	_____
11	Design temperature	°C	_____
12	Unit height	mm	_____
13	Unit diameter	mm	_____
14	Weight Dry	kg	_____
15	Operational	kg	_____
16	Connection sizes Supply, primary side	mm	_____
17	Return, primary side	mm	_____
18	Supply, secondary side	mm	_____
19	Return, secondary side	mm	_____
20	Connection sizes mixing valve Cold water	mm	_____
21	Hot water +55°C	mm	_____
22	Hot water +85°C	mm	_____
23			_____
24 Materials			
25	Vessel	Material	_____
26	Vessel	Thickness mm	_____
27	Lining	Material	_____
28	Lining	Thickness mm	_____
29	Jacket	Material	_____
30	Jacket	Thickness mm	_____
31	Insulation	Material	_____
32	Insulation	Thickness mm	_____
33	Foundation Ring	Material	_____
34	Safety Relief Valve	Material	_____
35	Mixing Valve	Material	_____
36	Expansion Tank	Material	_____
37 Notes			
38	1. Temperature difference between mean temperature primary side and mean temperature secondary side		
39	_____		
40	_____		
41	_____		
42	_____		
43	_____		