

**Gaasivarustussüsteemid. Maa-alune
gaasisäilitus. Osa 2: Funktsionaalsed
soovitused säilitamiseks nafta- ja
gaasimaardlates**

Gas supply systems - Underground gas storage -
Part 2: Functional recommendations for storage in
oil and gas fields

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 1918-2:2000 sisaldab Euroopa standardi EN 1918-2:1998 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 11.01.2000 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 1918-2:2000 consists of the English text of the European standard EN 1918-2:1998.</p> <p>This document is endorsed on 11.01.2000 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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Võtmesõnad: hooldus, kasutusnõuded, keskkonnakaitse, konstruktsioon, kontrollimine, ladustamine, looduslik gaas, määratlused, ohutus, paigutus, puurkaevud, tehnilised andmed, testimine

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Gas supply systems

Underground gas storage

Part 2: Functional recommendations for storage in oil and gas fields

Systèmes d'alimentation en gaz –
Stockage souterrain de gaz –
Partie 2: Recommandations fonction-
nelles pour le stockage en gisements
de pétrole et de gaz

Gasversorgungssysteme – Untertage-
speicherung von Gas – Teil 2:
Funktionale Empfehlungen für die
Speicherung in Öl- und Gasfeldern

This European Standard was approved by CEN on 1998-01-22.

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CEN

European Committee for Standardization
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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 234 "Gas supply", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 1998, and conflicting national standards shall be withdrawn at the latest by August 1998.

It is Part 2 of a standard on underground gas storage which includes the five following Parts:

- Part 1 - Functional recommendations for storage in aquifers
- Part 2 - Functional recommendations for storage in oil and gas fields
- Part 3 - Functional recommendations for storage in solution mined salt cavities
- Part 4 - Functional recommendations for storage in rock caverns
- Part 5 - Functional recommendations for surface facilities

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

Natural gas produced from oil and gas fields is increasingly being used to supply energy requirements. The inflexible gas production from these fields does not match the variable market demand. Underground storage of compressed natural gas in oil and gas fields is an efficient common technology and has been used since 1915 for adjusting supply to meet demand.

For underground storage, natural gas is injected into subsurface oil and gas reservoirs when market demand falls below the delivery from the supply sources. It is withdrawn from storage to supplement the steady supply when demand exceeds that supply.

The primary function of underground gas storage is to ensure that supply is adjusted for peak and seasonal demand. Apart from this, the storage facilities can provide standby reserves in case of interruption to the normal supply and can help to conserve energy by storing associated gas which, otherwise, would have to be flared.

Oil and gas fields are preferred as underground storage for large gas volumes, as the containment up to the initial pressure of these reservoirs is proven by the existence of the hydrocarbon accumulation. Furthermore the knowledge about the reservoir behaviour and properties is available from the exploration phase and from the production period of the oil and gas field.

Nevertheless the suitability of each oil and gas reservoir for gas storage has to be investigated individually, to operate the storage facilities in an efficient, safe and environmentally compatible manner.

In order to construct a storage facility, wells are used to establish a controlled connection between the reservoir and the surface. The wells used for cycling the storage gas are called operating wells. In addition to the operating wells, specially assigned observation wells may be used.

Figure 1 illustrates a storage facility in an oil and gas field. Two typical completions of storage wells are shown in figures 2 and 3.

Natural gas is injected via the operating wells into the pores of a subsurface reservoir, which was originally hydrocarbon bearing, thus building up a containment of compressed natural gas. Gas is withdrawn using the operating wells. Compression may be needed for injection and withdrawal.

The storage can be cycled between the maximum and minimum operating pressures equivalent to the working gas capacity. Below the minimum operating pressure it is inevitable that a large quantity of gas, known as cushion gas, remains in the reservoir. This cushion gas volume usually represents roughly half the maximum volume of gas in place.

Recommendations for the design, construction and operation of underground storage facilities in oil and gas fields are described in clauses 4 to 7.

For specific elements of an underground gas storage facility, e.g. wells and surface installations, existing standards should be applied.

1 Scope

This standard specifies procedures and practices which are safe and environmentally acceptable.

It covers the functional recommendations for design, construction, testing, commissioning, operation and maintenance of underground gas storage facilities in oil and gas fields up to and including the wing valve of the wellhead.

The necessary surface facilities for underground gas storage are described in EN 1918-5.

In this context "gas" is any gaseous fuel which is in a gaseous state at a temperature of 15 °C and under a pressure of 1 bar and which remains in a gaseous state under storage conditions.

This European Standard specifies common basic principles for gas supply systems. Users of this European Standard should be aware that more detailed national standards and/or codes of practice may exist in the CEN member countries.

This European Standard is intended to be applied in association with these national standards and/or codes of practice and does not replace them.

This standard is not intended to be applied retrospectively to existing facilities.

2 Definitions

For the purposes of this standard, the following definitions apply:

2.1 abandoned well

Well whose use has been discontinued and which has been permanently plugged.

2.2 annulus

Space between two strings of pipes or between the casing and the borehole.

2.3 aquifer

Reservoir, group of reservoirs, or a part thereof that is fully water-bearing.

2.4 boundary fault

Fault which forms the physical border of a field.

2.5 capillary pressure

Pressure difference between the non-wetting phase and the wetting phase in porous rock.

2.6 caprock

Oiltight and gastight layer covering a porous and permeable formation.