SLOVENSKI STANDARD
SIST EN ISO 23251:2007

01-oktober-2007

Petrokemiļ na industrija ter industrija za predelavo nafte in zemeljskega plina - Sistemi za sproģļ anje in izravnavanje tlaka (ISO 23251:2006)

Petroleum, petrochemical and natural gas industries - Pressure-relieving and depressuring systems (ISO 23251:2006)

Erdöl-, petrochemische und Erdgasindustrie - Druckentlastungs- und Druckausgleichssysteme (ISO 23251:2006)

Industries du pétrole, de la pétrochimie et du gaz naturel - Systemes de dépressurisation et de protection contre les surpressions (ISO 23251:2006)

Ta slovenski standard je istoveten z: **EN ISO 23251:2007**

ICS:

75.180.20	Predelovalna oprema	Processing equipment

SIST EN ISO 23251:2007 **en,fr**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 23251

July 2007

ICS 75.180.20

English Version

Petroleum, petrochemical and natural gas industries - Pressure-relieving and depressuring systems (ISO 23251:2006)

Industries du pétrole, de la pétrochimie et du gaz naturel - Systèmes de dépressurisation et de protection contre les surpressions (ISO 23251:2006)

Erdöl-, petrochemische und Erdgasindustrie - Druckentlastungs- und Druckausgleichssysteme (ISO 23251:2006)

This European Standard was approved by CEN on 12 July 2007.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN ISO 23251:2007: E

Foreword

The text of ISO 23251:2006 has been prepared by Technical Committee ISO/TC 67 "Materials, equipment and offshore structures for petroleum and natural gas industries" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 23251:2007 by Technical Committee CEN/TC 12 "Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries", the secretariat of which is held by AFNOR.

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 January 2008, and conflicting national standards shall be withdrawn at the latest by January 2008.

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

Endorsement notice

The text of ISO 23251:2006 has been approved by CEN as EN ISO 23251:2007 without any modifications.

INTERNATIONAL STANDARD

ISO 23251

First edition
2006-08-15

Corrected version
2006-10-01

Petroleum, petrochemical and natural gas industries — Pressure-relieving and depressuring systems

Industries du pétrole, de la pétrochimie et du gaz naturel — Systèmes de dépressurisation et de protection contre les surpressions

Reference number
ISO 23251:2006(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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.

ISO 23251 was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, Subcommittee SC 6, *Processing equipment and systems*.

This corrected version of ISO 23251:2006 incorporates corrections to Table 4, column 2, second row under the header, and the five rows of data in column 3.

Introduction

This International Standard is based on the draft 5th edition of API RP 521, with the intent that the 6th edition of API RP 521 will be identical to this International Standard.

The portions of this International Standard dealing with flares and flare systems are an adjunct to API Std 537 [10], which addresses mechanical design, operation and maintenance of flare equipment. It is important for all parties involved in the design and use of a flare system to have an effective means of communicating and preserving design information about the flare system. To this end, API has developed a set of flare data sheets, which can be found in of API Std 537, Appendix A. The use of these data sheets is both recommended and encouraged as a concise, uniform means of recording and communicating design information.

Petroleum, petrochemical and natural gas industries — Pressure-relieving and depressuring systems

1 Scope

This International Standard is applicable to pressure-relieving and vapour-depressuring systems. Although intended for use primarily in oil refineries, it is also applicable to petrochemical facilities, gas plants, liquefied natural gas (LNG) facilities and oil and gas production facilities. The information provided is designed to aid in the selection of the system that is most appropriate for the risks and circumstances involved in various installations. This International Standard is intended to supplement the practices set forth in ISO 4126 or API RP 520-I for establishing a basis of design.

This International Standard specifies requirements and gives guidelines for examining the principal causes of overpressure; and determining individual relieving rates; and selecting and designing disposal systems, including such component parts as piping, vessels, flares, and vent stacks. This International Standard does not apply to direct-fired steam boilers.

Piping information pertinent to pressure-relieving systems is presented in 7.3.1.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4126 (all parts), *Safety devices for protection against excessive pressure*

API RP 520-I:2000, *Sizing, Selection and Installation of Pressure-Relieving Devices in Refineries — Part I: Sizing and Selection* [1)]

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
accumulation
pressure increase over the maximum allowable working pressure of the vessel allowed during discharge through the pressure-relief device

NOTE Accumulation is expressed in units of pressure or as a percentage of MAWP or design pressure. Maximum allowable accumulations are established by pressure-design codes for emergency operating and fire contingencies.

1) American Petroleum Institute, 1220 L Street, N.W., Washington, D.C., 20005-4070, USA.

3.2
administrative controls
procedures intended to ensure that personnel actions do not compromise the overpressure protection of the equipment

3.3
assist gas
combustible gas that is added to relief gas prior to the flare burner or at the point of combustion in order to raise the heating value

3.4
atmospheric discharge
release of vapours and gases from pressure-relieving and depressuring devices to the atmosphere

3.5
back pressure
pressure that exists at the outlet of a pressure-relief device as a result of the pressure in the discharge system

NOTE The back pressure is the sum of the superimposed and built-up back pressures.

3.6
balanced pressure-relief valve
spring-loaded pressure-relief valve that incorporates a bellows or other means for minimizing the effect of back pressure on the operational characteristics of the valve

3.7
blowdown
depressurization of a plant or part of a plant and equipment

NOTE Not to be confused with the difference between the set pressure and the closing pressure of a pressure-relief valve.

3.8
blow-off
loss of a stable flame where the flame is lifted above the burner, occurring if the fuel velocity exceeds the flame velocity

3.9
breaking-pin device
pressure-relief device actuated by static differential or static inlet pressure and designed to function by the breakage of a load-carrying section of a pin that supports a pressure-containing member

3.10
buckling pin device
pressure-relief device actuated by static differential or static inlet pressure and designed to function by the buckling of an axially-loaded compressive pin that supports a pressure-containing member

3.11
built-up back pressure
increase in pressure at the outlet of a pressure-relief device that develops as a result of flow after the pressure-relief device opens

3.12
buoyancy seal
dry vapour seal that minimizes the amount of purge gas needed to protect against air infiltration

NOTE The buoyancy seal functions by trapping a volume of light gas in an internal inverted compartment; this prevents air from displacing buoyant light gas in the flare.

3.13
burnback
internal burning within the flare tip

NOTE Burnback can result from air backing down the flare burner at purge or low flaring rates.

3.14
burning velocity
flame velocity
speed at which a flame front travels into an unburned combustible mixture

3.15
burn-pit flare
open excavation, normally equipped with a horizontal flare burner that can handle liquid as well as vapour hydrocarbons

3.16
burst pressure
value of the upstream static pressure minus the value of the downstream static pressure just before a rupture disk bursts

NOTE If the downstream pressure is atmospheric, the burst pressure is the upstream static gauge pressure.

3.17
closed disposal system
disposal system capable of containing pressures that are different from atmospheric pressure

3.18
cold differential test pressure
CDTP
pressure at which a pressure-relief valve is adjusted to open on the test stand

NOTE The cold differential test pressure includes corrections for the service conditions of back pressure or temperature or both.

3.19
combustion air
air required to combust the flare gases

3.20
conventional pressure-relief valve
spring-loaded pressure-relief valve whose operational characteristics are directly affected by changes in the back pressure

3.21
corrected hydrotest pressure
hydrostatic test pressure multiplied by the ratio of stress value at design temperature to the stress value at test temperature

NOTE See 4.3.2.

3.22
deflagration
explosion in which the flame-front of a combustible medium is advancing at less than the speed of sound

cf. **detonation** (3.25)

3.23
design pressure
pressure, together with the design temperature, used to determine the minimum permissible thickness or physical characteristic of each component, as determined by the design rules of the pressure-design code

NOTE The design pressure is selected by the user to provide a suitable margin above the most severe pressure expected during normal operation at a coincident temperature, and it is the pressure specified on the purchase order. The design pressure is equal to or less than the MAWP (the design pressure can be used as the MAWP in cases where the MAWP has not been established).

3.24
destruction efficiency
mass fraction of the fluid vapour that can be oxidized or partially oxidized

NOTE For a hydrocarbon, this is the mass fraction of carbon in the fluid vapour that oxidizes to CO or CO_2.

3.25
detonation
explosion in which the flame-front of a combustible medium is advancing at or above the speed of sound

cf. **deflagration** (3.22)

3.26
dispersion
dilution of a vent stream or products of combustion as the fluids move through the atmosphere

3.27
elevated flare
flare where the burner is raised high above ground level to reduce radiation intensity and to aid in dispersion

3.28
enclosed flare
enclosure with one or more burners arranged in such a manner that the flame is not directly visible

3.29
enrichment
process of adding assist gas to the relief gas

3.30
flame-retention device
device used to prevent flame blow off from a flare burner

3.31
flare
device or system used to safely dispose of relief gases in an environmentally compliant manner through the use of combustion

3.32
flare burner
flare tip
part of the flare where fuel and air are mixed at the velocities, turbulence and concentration required to establish and maintain proper ignition and stable combustion

3.33
flare header
piping system that collects and delivers the relief gases to the flare

3.34
flashback
phenomenon occurring in a flammable mixture of air and gas when the local velocity of the combustible mixture becomes less than the flame velocity, causing the flame to travel back to the point of mixture

3.35
ground flare
non-elevated flare

NOTE A ground flare is normally an enclosed flare but can also be a ground multi-burner flare or a burnpit.

3.36
heat release
total heat liberated by combustion of the relief gases based on the lower heating value

3.37
huddling chamber
annular chamber located downstream of the seat of a pressure-relief valve, which assists the valve to lift

3.38
hydrate
solid, crystalline compound of water and a low-boiling-point gas (e.g. methane and propane), in which the water combines with the gas molecule to form a solid

3.39
jet fire
fire created when a leak from a pressurized system ignites and forms a burning jet

NOTE A jet fire can impinge on other equipment, causing damage.

3.40
knockout drum
vessel in the effluent handling system designed to remove and store liquids

3.41
lateral
section of pipe from outlet flange(s) of single-source relief device(s) downstream of a header connection where relief devices from other sources are tied in

NOTE The relief flow in a lateral is always from a single source, whereas the relief flow in a header can be from either single or multiple sources simultaneously.

3.42
lift
actual travel of the disc from the closed position when a valve is relieving

3.43
liquid seal
water seal
device that directs the flow of relief gases through a liquid (normally water) on the path to the flare burner, used to protect the flare header from air infiltration or flashback, to divert flow, or to create back pressure for the flare header

3.44
Mach number
ratio of a fluid's velocity, measured relative to some obstacle or geometric figure, divided by the speed at which sound waves propagate through the fluid