
International Standard



7382

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Ethylene for industrial use — Sampling in the liquid and the gaseous phase

Éthylène à usage industriel — Échantillonnage en phase liquide et en phase gazeuse

First edition — 1986-09-15

UDC 661.716.2 : 543.05

Ref. No. ISO 7382-1986 (E)

Descriptors : industrial products, chemical compounds, ethylene, sampling, sampling equipment.

Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 7382 was prepared by Technical Committee ISO/TC 47, *Chemistry*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Ethylene for industrial use — Sampling in the liquid and the gaseous phase

WARNING — In putting the operating techniques described in this International Standard into practice, it is mandatory to take account of the current official regulations.

1 Scope and field of application

This International Standard describes the procedures and the precautions to be taken in drawing representative samples of ethylene in the liquid phase stored at $-100\text{ }^{\circ}\text{C}$ and in the gaseous phase, for the purpose of their analysis excluding the determination of water content, other polar components and hydrocarbons heavier than C_5 [for the preparation of samples for the determination of water or polar compounds, use ISO 8916 (see clause 5)].

It also sets out, in annex, a diagrammatic representation of a system for the removal of the portion of the sample not used in the analysis.

2 Sampling from a container filled with ethylene in the liquid phase

2.1 Safety measures

The ethylene shall be stored and transported in the liquid phase at a temperature below $-100\text{ }^{\circ}\text{C}$.

The critical temperature of ethylene is $9,5\text{ }^{\circ}\text{C}$ and its critical pressure is $10,5\text{ MPa}^*$. As the boiling temperature of ethylene at atmospheric pressure is $-103,9\text{ }^{\circ}\text{C}$, it follows that ethylene sampled in the liquid phase cannot be kept in that state at room temperature, without taking account of the pressure. All sampling equipment shall be capable of resisting the sample pressure after complete vaporization.

The construction materials shall be capable of withstanding rapid changes in temperature, for example, rising from $-100\text{ }^{\circ}\text{C}$ to $+20\text{ }^{\circ}\text{C}$ in 1 to 2 min. Passivated stainless steel should be selected for preference.

Owing to the low temperatures of the product and its associated equipment, operators shall wear well-insulating, non-cracking plastics or rubber-coated gloves to protect themselves from burns. They shall also wear close-fitting protective goggles.

Ethylene is extremely flammable, and all precautions shall be taken to avoid forming an explosive atmosphere. Suitable ventilation is essential, particularly during the purging operations.

Also, the sample cylinder shall always be connected to earth by means of an equipotential clamp.

2.2 Apparatus and procedures

The two sampling apparatus described below have been found satisfactory and are available commercially.

2.2.1 Sampling apparatus No. 1

The apparatus is shown in figure 1 and is composed of the following parts:

A cylinder tested at $34,5\text{ MPa}$, of 0,15 to 1 litre capacity. This cylinder shall be fitted with one dip pipe, marked on the cylinder, ending at 30 % of the distance from the base, and ensuring that the cylinder can be filled to only 30 % of its capacity. An inlet valve A is fitted to the cylinder, and an outlet valve B to the dip pipe.

To aid handling and to protect the operator from low temperature burns, the cylinder shall be fitted with a foot and one or two handles.

A passivated stainless steel connecting pipe 2 m long and 4 mm internal diameter, with threaded joints, is joined to the ethylene tank (valves P and P') and to the inlet valve A of the cylinder.

A T-union is fitted into the above pipe as close as possible to valve A of the cylinder, to connect a stainless steel vent line 50 cm long and 4 mm internal diameter to a valve Q.

A stainless steel vent line 50 cm long and 4 mm internal diameter is fitted to the drainage valve B of the cylinder.

2.2.2 Procedure

Open the valve P then the valve P' at the point of sampling and slowly open the valve Q of the vent line, in order to purge the sampling line.

Avoid excessive purging, which would cause ice formation at the outside or on the internal parts of the valve and also a pollution of the atmosphere.

As soon as the liquid ethylene appears at the vent line close valve Q.

Open valve B completely.

* 1 MPa = 10 bar