

International Standard



6381

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Ethylene and propylene for industrial use — Determination of traces of carbon monoxide and carbon dioxide — Gas chromatographic method

Éthylène et propylène à usage industriel — Dosage des traces de monoxyde et de dioxyde de carbone — Méthode par chromatographie en phase gazeuse

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

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.

International Standard ISO 6381 was developed by Technical Committee ISO/TC 47, *Chemistry*, and was circulated to the member bodies in October 1979.

It has been approved by the member bodies of the following countries :

Australia	Germany, F.R.	Philippines
Austria	Hungary	Poland
Belgium	India	Portugal
China	Italy	Romania
Czechoslovakia	Korea, Rep. of	South Africa, Rep. of
France	Netherlands	Switzerland

No member body expressed disapproval of the document.

Ethylene and propylene for industrial use — Determination of traces of carbon monoxide and carbon dioxide — Gas chromatographic method

1 Scope and field of application

This International Standard specifies a gas chromatographic method for the determination of traces of carbon monoxide and carbon dioxide in ethylene and propylene for industrial use.

The method is applicable to products having carbon monoxide concentrations greater than 0,1 ml/m³ and carbon dioxide concentrations greater than 0,5 ml/m³.

2 Reference

ISO 6377, *Light olefins for industrial use — Determination of hydrocarbon impurities by gas chromatography — General considerations.*

3 Principle

Separation of carbon monoxide, methane and carbon dioxide by gas chromatography through a Carbosieve B or Porapak N column. Passage through a column of hydrogenation catalyst which transforms the oxides of carbon to methane which allows the use of a flame ionization detector to make the final determination.

4 Materials

4.1 Hydrogen, pure and dry.

4.2 Nitrogen, pure and dry.

4.3 Air, compressed, dry.

4.4 Carbosieve B 60-80 or Porapak N 110-120.¹⁾

Carbosieve B is a special activated carbon which does not show the adsorption phenomena encountered in ordinary activated carbon. It is, however, preferable to avoid prolonged contact with the air and the carrier gas should be dry and oxygen free.

NOTE — The presence of air interferes with the determination of carbon monoxide using Porapak N.

4.5 Chromosorb W AW 80-100.¹⁾

4.6 Nickel nitrate hexahydrate [Ni(NO₃)₂·6H₂O], analytical grade.

4.7 Nickel based catalyst, prepared *in situ* in the catalyst column as described in the procedure.

NOTE — Other catalysts can be used, for example a reduced ruthenium catalyst.

4.8 Ethylene or propylene, pure, free from the impurities to be determined.

4.9 Standard mixture, containing 2 — 10 and 20 ml/m³ of carbon monoxide and carbon dioxide in pure ethylene or propylene.

5 Apparatus

5.1 Chromatograph, fitted with a flame ionization detector and a gas injection port.

The gas flow routes are shown in figure 1.

The gases leaving the chromatography column are passed through a catalyst oven before reaching the detector.

5.2 Injection device.

An eight-way valve allows reversal of the gas flow through the chromatography column in order to prevent hydrocarbons containing more than two carbon atoms reaching the catalyst oven, an example of the construction of which is shown in figure 2.

5.3 Columns.

The columns described below are given as examples. Any other columns complying with the same requirements for efficiency may be used.

¹⁾ Information on commercially available products can be obtained from the ISO Central Secretariat or from the Secretariat of ISO/TC 47/SC 14 (AFNOR).