STANDARD **1065**

Second edition
1991-09-01

Non-ionic surface-active agents obtained from ethylene oxide and mixed non-ionic surface-active agents — Determination of cloud point

Agents de surface non ioniques obtenus à partir de l'oxyde d'éthylène et mixtes — Détermination de la température de trouble (point de trouble)

Reference number
ISO 1065:1991(E)

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.

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.

International Standard ISO 1065 was prepared by Technical Committee ISO/TC 91, *Surface active agents*.

This second edition cancels and replaces the first edition (ISO 1065:1975), to which two new methods (D and E) have been added in order to extend the scope to cover mixed non-ionic surface-active agents.

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Introduction

Aqueous solutions of non-ionic surface-active agents derived from ethylene oxide become heterogeneous when their temperature is raised, because of the formation of two liquid phases. The temperature above which this phenomenon occurs is referred to as the cloud point.

This phenomenon occurs at a temperature which increases as the number of molecules of ethylene oxide combined in the product increases. The system becomes homogeneous when the temperature falls. The temperature at which the system becomes homogeneous is called the "temperature of clarification" as defined in ISO 862:1984, *Surface active agents — Vocabulary* (definition No.10).

The temperature of clarification is often determined as the "cloud point".

The knowledge of the cloud point is of great importance in all applications, as the surface-active properties vary very rapidly around this temperature.

The determination of the cloud point of a non-ionic product is a rapid and precise method of control. In manufacture, it is the quickest method of assessing the quantity of ethylene oxide bonded to a given base molecule. However, it must be remembered that the curve relating cloud point and the extent of ethoxylation tends towards an asymptote; as a consequence, this method of checking is less precise for products with a long ethoxyl chain.

The cloud temperature is a lower critical temperature of separation; above this critical temperature, the solution separates into two phases, and the appearance of these two phases when the temperature is raised leads to the clouding of the solution. This property is not specific to ethoxylated derivatives and it is possible to determine cloud temperatures for other types of derivative.

Methods A, B and C specified in this International Standard deal primarily with the determination of the cloud point of non-ionic surface-active agents derived from ethylene oxide by condensation with lipophilic base molecules such as fatty alcohols, fatty amines, fatty acids, alkylphenols and esters of fatty acids.

Other non-ionic surface-active agents, e.g. ethylene oxide/propylene oxide block copolymers, are known to have properties which make it difficult to determine their cloud points. Such properties include the appearance of a progressive clouding over a temperature range of several degrees, and the existence of two or three very distinct cloud points.

Two further methods (D and E) are therefore specified for the determination of the cloud point of such materials, for which methods A, B and C are unsuitable.