

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION

R 182

PLASTICS

DETERMINATION OF THE THERMAL STABILITY OF POLYVINYL CHLORIDE
AND RELATED COPOLYMERS AND THEIR COMPOUNDS
BY SPLITTING OFF OF HYDROGEN CHLORIDE

2nd EDITION

June 1970

This second edition supersedes the first edition

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BRIEF HISTORY

The ISO Recommendation R 182, *Determination of the thermal stability of polyvinyl chloride and related copolymers and their compounds by the Congo red method*, was drawn up by Technical Committee ISO/TC 61, *Plastics*, the Secretariat of which is held by the American National Standards Institute (ANSI).

Work on this question led to the adoption of Draft ISO Recommendation No. 216 which was circulated to all the ISO Member Bodies in May 1959. It was approved by 22 Member Bodies. One Member Body (France) opposed the approval of the Draft.

This Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in February 1961, to accept it as an ISO RECOMMENDATION.

BRIEF HISTORY RELATING TO THE 2nd EDITION

In 1964, ISO/TC 61 Secretariat decided to prepare a draft method combining the Congo red method and the pH method, and a Draft ISO Recommendation (No. 1301) was adopted for the revision of ISO Recommendation R 182-1961.

In July 1967, this Draft ISO Recommendation was circulated to all the ISO Member Bodies for enquiry and was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Argentina	Germany	Romania
Australia	Hungary	South Africa, Rep. of
Austria	India	Spain
Belgium	Iran	Sweden
Bulgaria	Israel	Switzerland
Canada	Italy	Turkey
Chile	Japan	U.A.R.
Colombia	Netherlands	United Kingdom
Czechoslovakia	New Zealand	U.S.A.
France	Poland	U.S.S.R.

No Member Body opposed the approval of the Draft.

This Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided to accept it as the second edition of ISO Recommendation R 182-1961, the title of which is modified as follows : *Plastics – Determination of the thermal stability of polyvinyl chloride and related copolymers and their compounds by splitting off of hydrogen chloride*.

This edition (2nd edition) cancels and replaces the first edition of ISO Recommendation R 182-1961.

PLASTICS

**DETERMINATION OF THE THERMAL STABILITY OF POLYVINYL CHLORIDE
AND RELATED COPOLYMERS AND THEIR COMPOUNDS
BY SPLITTING OFF OF HYDROGEN CHLORIDE**

1. SCOPE

This ISO Recommendation describes two methods for the determination of thermal stability of polyvinyl chloride and related copolymers and their compounds in general :

- A : the Congo red method;
- B : the pH method.

Each of these two methods allows determination of the thermal stability with regard to splitting off of hydrogen chloride from polyvinyl chloride (PVC) and from chlorinated polymers and copolymers and their compounds in general when they are brought to a high temperature for extruding, moulding, calendering or other processing.

Purchaser and supplier have to agree which of the methods is to be used. The Congo red method is simple and rapid, but gives one value only and the attention of an observer is required. The pH method permits the use of recording equipment and gives more information.

In some circumstances other tests also can be used, for example milling.

2. DEFINITION

Thermal stability or thermal life of a compound of vinyl chloride polymers or copolymers means the time, in minutes, from the moment at which the material is exposed to a given temperature in a given atmosphere until the first sign of decomposition is observed. The mode of decomposition is based on the splitting off of hydrogen chloride.

3. PRINCIPLE**3.1 Congo red method**

Heating of the test portion, in still air, to the test temperature recommended for the material under test.

Measurement of the time required until the hydrogen chloride split off results in a colour change from red to blue of Congo red paper placed above the test portion.

3.2 pH method

Heating of the test portion, in a moving gas medium, to the test temperature recommended for the material under test; the hydrogen chloride split off is collected in a pH measuring cell.

Measurement of the time required until the hydrogen chloride split off results in a decrease of pH to a value corresponding to that at which Congo red paper changes colour from red to blue.

NOTES

1. Air is a suitable gas if the process of interest implies oxidation, for example milling or calendering. On the other hand, if oxidation is essentially excluded by the process, as in extrusion, an inert gas such as nitrogen may be used.
2. The chief difference between the two methods is the fact that the measurement is made in still air in the Congo red method and in a moving gas medium, which need not necessarily be air, in the pH method.