
Non-destructive testing — Gamma ray scanning method on process columns

*Essais non destructifs — Méthode de balayage de rayon gamma sur
les colonnes de processus*



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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Gamma ray scanning is a non-intrusive and non-destructive method, which is widely used in petrochemical and chemical process plants for troubleshooting and diagnosing purposes. Gamma ray scanning provides an indication of online conditions inside processing columns and vessels. Gamma ray scanning has proven itself as a method for the identification of plant and process problems, resulting in considerable economic savings. The gamma ray scanning method is an inspection which is carried out while the process is in operation, without interruption.

The benefits, obtained from the application of the gamma ray scanning method for problem solving, are many folds, such as safety improvement, environment pollution prevention and economic savings.

Gamma ray scanning is based on the gamma ray transmission techniques. When a gamma ray passes through a column, the intensity of the transmitted beam is related to the path length and density of the material through which the beam passes. An appropriate gamma source and a detector are aligned at the same elevation opposite to each other on the exterior of the column. Measurements of radiation intensity are taken at appropriate positions as the source and detector are moved together along the column. The source-detector data thus obtained are shown in plots of radiation intensity or material density as a function of the position. Detailed analysis of these data enables making assessments about the condition of internal structures and process materials within the column.

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IMPORTANT — The electronic file of this document contains colours which are considered to be useful for the correct understanding of the document. Users should therefore consider printing this document using a colour printer.

1 Scope

This document is used for non-destructive testing by the gamma ray scanning method for troubleshooting and testing process columns in industries. This document is applicable to the testing of all kinds of separation processes columns and pipes. This includes columns with different tray configurations and with packed beds.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 5576, *Non-destructive testing — Industrial X-ray and gamma-ray radiology — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5576 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

column

vertical cylindrical vessel used for facilitating the separation of a liquid mixture through distillation or extraction

3.2

demister

device, often fitted with vapour-liquid separator vessels, to enhance the removal of liquid droplets or mist entrained in a vapour stream

[SOURCE: ISO/TR 27912:2016, 3.25]

3.3

downcomer

device conveying liquid from one tray to the next one below it in a *column* (3.1)

3.4

entrainment

mist, fog droplets or particles transported by a fluid

[SOURCE: ISO 3857-4:2012, 2.37]