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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 43658.1-2024

**Non-destructive testing - Radiographic inspection of corrosion
and deposits in pipes by X and gamma rays - Part 1: Tangential
radiographic inspection
(English Translation)**

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Table of Contents

Preface
Introduction
1 Scope
2 Normative references
3 Terms and Definitions
4 Radiographic Testing Technology Classification
5 General Requirements
6 Recommended Radiographic Inspection Techniques
7 Sensitivity, quality and assessment of radiographic films/digital images
8 Digital image recording, storage, processing and display
9 Test report
Appendix A (Informative) Selection of radiation sources for different pipelines
Appendix B (Informative) Measurement of Remaining Wall Thickness of Internal Wall Corrosion
Appendix C (Informative) Measurement of Remaining Wall Thickness of External Wall Corrosion
Reference

Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

This document is Part 1 of GB/T 43658 Non-destructive testing of pipeline corrosion and deposits - X-ray and gamma-ray testing.

GB/T 43658 has published the following parts.

--- Part 1: Tangential radiographic testing;

--- Part 2: Double wall radiographic testing.

This document is equivalent to ISO 20769-1:2018 "Non-destructive testing of pipeline corrosion and deposits - X-ray and gamma-ray testing - Part 1 Tangential ray detection.

Introduction

Small-diameter pipes, pressure pipes, boiler drums, pressure vessels and other pipe products are widely used in industry.

The inner and outer walls are very susceptible to corrosion damage and may cause the pipeline system to fail.

Corrosion and scab formation, actual pipe wall thinning. There is a difference in thickness between the corroded and uncorroded parts, and the corrosion damage is detected by radiographic testing.

Compared with other non-destructive testing methods, X-ray testing technology can detect the corrosion of the inner and outer walls of pipes in time due to its high sensitivity and intuitiveness.

This is of great significance to ensure the safe operation of pipe fittings. GB/T 43658 is planned to consist of two parts.

--- Part 1: Tangential radiography. The purpose is to specify the use of industrial film radiography, computer radiography (CR) and digital Digital detector array (DDA) detects and measures thickness loss in the wall thickness direction on and off the pipe centerline.

Tangential detection technology.

--- Part 2: Double wall radiographic testing. The purpose is to specify the use of industrial film radiography, computer radiography (CR), digital the Dual Detector Array (DDA) detects and measures in-service material loss inside or outside pipelines that may be caused by corrosion or erosion.

Wall X-ray detection technology.

This document is the first part of GB/T 43658, which covers the classification of radiographic testing technology, general requirements, recommended radiographic testing technology, it specifies the technology, sensitivity, quality and evaluation of radiographic films/digital images, array image recording, storage, processing and display.

Nondestructive testing of pipeline corrosion and deposits X and Gamma ray testing Part 1: Tangential ray testing

1 Scope

This document specifies film and digital radiographic testing that meets testing requirements to obtain satisfactory, economical and reproducible test results.

The technology specified in this document is based on basic detection theory and experiments.

This document is applicable to the radiographic detection of defects such as pitting corrosion, surface corrosion and erosion caused by steel pipes during service.

The term "tube" used in this specification includes, in addition to its conventional meaning, other cylindrical objects, such as small-diameter tubes, pressure tubes, boiler drums and pressure vessels.

The detection technology specified in this document is applicable to weld detection of corrosion/erosion defects, and is not applicable to typical defects generated during the welding process.

Detection.

This document describes methods for evaluating the loss of material inside or outside a pipeline that may be caused by corrosion or erosion. The pipeline may or may not contain Insulation.

This document specifies the tangential inspection technique for detecting and measuring thickness loss through the wall thickness, including the following radiation source arrangements.

- a) on the pipe centreline; and
- b) Deviate from the center line in the direction of the pipe diameter.

ISO 20769-2 specifies the double-wall radiographic inspection technique. The double-wall double-image technique is usually used together with the tangential radiographic technique where the source is on the centerline of the pipeline.

Used in combination.

This document applies to tangential radiography using industrial film radiography, computed radiography (CR) and digital array detectors (DDA).

Line detection technology.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to this document.

tion of NDT personnel) Note. GB/T 9445-2015 Qualification and certification of non-destructive testing personnel (ISO 9712:2012, IDT) ISO 11699-1 Industrial radiographic films for non-destructive testing - Part 1: Classification of industrial radiographic film systems (Non-radiography Note. GB/T 19348.1-2014 Industrial

radiographic films for non-destructive testing Part 1: Classification of industrial radiographic film systems (ISO 11699-1:2008,MOD) ISO 11699-2 Non-destructive testing of industrial radiographic films - Part 2: Control of film processing by reference value method (Non-reference values) Note. GB/T 19348.2-2003 Non-destructive testing of industrial radiographic films Part 2: Control of film processing using reference value method (ISO 11699-2.

1998, IDT)

ISO 16371-1 Non-destructive testing - Industrial computed radiography based on storage phosphor imaging plates - Part 1: Classification of systems