ISO 20769-1:2018 (E)

Non-destructive testing — Radiographic inspection of corrosion and deposits in pipes by X- and gamma rays — Part 1: Tangential radiographic inspection

Contents

Foreword

1 Scope

2 Normative references

3 Terms and definitions

4 Classification of radiographic techniques

5 General

- 5.1 Protection against ionizing radiation
- 5.2 Personnel qualification
- 5.3 Identification of radiographs
- 5.4 Marking
- 5.5 Overlap of films or digital images
- 5.6 Types and positions of image quality indicators (IQI)
- 5.6.1 Single wire or step hole IQIs
- 5.6.2 Duplex wire IQI (digital radiographs)

6 Recommended techniques for making radiographs

- 6.1 Test arrangements
- 6.1.1 General
- 6.1.2 Radiation source located on the pipe centre line
- 6.1.3 Radiation source located offset from the pipe centre line
- 6.1.4 Alignment of beam and film/detector
- 6.2 Choice of radiation source
- 6.3 Film systems and metal screens
- 6.4 Screens and shielding for imaging plates (computed radiography only)
- 6.5 Reduction of scattered radiation
- 6.5.1 Filters and collimators
- 6.5.2 Interception of back scattered radiation
- 6.6 Source-to-detector distance
- 6.7 Axial coverage and overlap
- 6.8 Dimensional comparators
- 6.9 Image saturation and use of lead strips to avoid burn-off
- 6.10 Selection of digital radiographic equipment
- 6.10.1 General
- 6.10.2 CR systems
- 6.10.3 DDA systems

7 Radiograph/digital image sensitivity, quality and evaluation

- 7.1 Evaluation of image quality
- 7.1.1 General
- 7.1.2 Maximum grey level in free beam (digital radiographs)
- 7.1.3 Minimum normalized signal-to-noise ratio (digital radiographs)
- 7.2 Density of film radiographs
- 7.3 Film processing
- 7.4 Film viewing conditions
- 7.5 Dimensional calibration of radiographs or digital images
- 7.5.1 General
- 7.5.2 Measurement of distances in radiographic setup
- 7.5.3 Measurement of pipe outside diameter

7.5.4 Dimensional comparator
7.6 Wall thickness measurements for film radiographs
7.7 Wall thickness measurements for digital radiographs
7.7.1 Interactive on-screen measurements
7.7.2 Grey-level profile analysis methods
7.7.2.1 General
7.7.2.2 Automated routines
7.7.2.3 Interactive methods
7.8 Remaining thickness measurements for degradation
7.8.1 Measurements for internal degradation
7.8.2 Measurements for external degradation

8 Digital image recording, storage, processing and viewing

8.1 Scan and read out of image
8.2 Multi radiograph technique
8.3 Calibration of DDAs
8.4 Bad pixel interpolation
8.5 Image processing
8.6 Digital image recording and storage
8.7 Monitor viewing conditions

9 Test report

Annex A (informative) Choice of radiation source for different pipes

Annex B (informative) Remaining thickness measurements for internal degradation

B.1 General
B.2 Reduced sensitivity
B.3 Sizing of indications of localized internal degradation on digital radiographs

Annex C (informative) Remaining thickness measurements for external degradation

C.1 General
C.2 Limited circumferential coverage and effect of misalignment
C.3 Sizing accuracy for convex and concave outer profiles for remaining wall
C.4 Sizing accuracy for external corrosion with fine pitting

Page count: 37