

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 |