2. RECOMMENDED PRACTICE FOR THE NEUTRON RADIOGRAPHY OF NUCLEAR FUEL

a) This part of the Neutron Radiography Handbook is a guide for the satisfactory neutron radiographic testing of nuclear fuel. It relates to the use of photographic film, radiographic film and tracketch recording materials.

b) It includes statements about preferred practice but does not discuss the technical background which justifies the preference. Such background information is given in Part 1 of the Handbook.

c) This document does not recommend a preferred design for the equipment which produces the neutron radiographic beam, or the preferred quality of the beam (neutron energy, gamma contamination etc.). For this data reference should be made to the neutron radiographic principles discussed in Part 1 of this Handbook.

d) This document describes methods of measuring radiographic quality and refers to reference radiographs for nuclear fuel, but it does not cover the interpretation or acceptance standards to be applied as this is considered to be a subject that should be covered by the Order Specification and therefore a matter of contractual agreement between the supplier and the purchaser.

e) The numerical data quoted herein has been taken from Part 1 of the Handbook, which gives the relevant source references.

f) Sections 2.7, 2.8, 2.9, 2.11 and 2.12 of this Recommended Practices have been taken verbatim from ASTM E94-77 ‘Standard Recommended Practice for Radiographic Testing’ and the compilers of this Handbook make grateful acknowledgement to the American Society for Testing Materials for their permission to do this.1)

2.1 APPLICABLE DOCUMENTS


2.2 ORDERING INFORMATION

The following list gives the information which is recommended for inclusion in a Purchase Order for the services covered in this recommended practice.

a) Clients name and address.

b) Description of the object to be radiographed.

c) Objective of the neutron radiographic examination, giving qualitative and quantitative information.

d) Information on previous radiographic examinations (including X-radiography, gamma-radiography, etc.).

e) Any radiographic parameters that must be met.

f) Identification requirements.

g) Radiographic density requirements.

h) Radiographic quality as defined by an image quality indicator.

i) Requirements for the written report.

2.3 EQUIPMENT

2.3.1 General

2.3.1.1 Where possible a neutron radiography facility which is most suitable for carrying out the required detection or measurement should be used. To obtain this requirement the advantages of optimising the geometry, neutron energy, and beam quality should be considered whenever the facility allows these parameters to be controlled.

2.3.1.2 The use of the track etch technique is discussed in para. 2.4.12 and all references to 'film' in the following paragraphs relate to photographic film. Information on track-etch materials is included in the Table 2.5.

2.3.2 Geometry

The geometry may be controlled by varying the size of the beam inlet-aperture, by changing the inlet-aperture to object distance or by changing the object to film distance (see para. 2.4.7). It is recommended that the equipment should have the facility to vary the geometry.