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Replacing GB/T 10266-1998

Specification for sintered uranium dioxide pellets

烧结二氧化铀芯块技术条件

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Specification for sintered uranium dioxide pellets

1 Scope

This standard specifies the technical requirements, pellet batches, sampling, testing and inspection, packaging and transportation requirements for sintered uranium dioxide pellets (hereinafter referred to as "pellets").

This standard is applicable to pellets with various ^{235}U enrichments for nuclear reactors.

This standard does not include the relevant content of the prevention of criticality accidents and the requirements for safety and health. The use of this standard shall also comply with relevant national regulations on nuclear material control, transportation, handling, use.

2 Normative references

The provisions in following documents become the provisions of this Standard through reference in this Standard. For the dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this Standard; however, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

GB/T 10265 Specification for nuclear grade sinterable uranium dioxide powder (GB/T 10265-2008, ASTM C753:2004, MOD)

GB 11806 Regulations for the safe transport of radioactive material (GB 11806-2004, IAEA Safety Standards Series No. TS-R-1, 2003, IDT)

GB/T 13696 Specification for uranium hexafluoride enriched to less than 5% ^{235}U

EJ/T 689 Testing method for the thermal-stability of sintered UO_2 pellets

3 Technical requirements

3.1 Chemical requirements

All chemical analysis samples shall be representative AND meet the requirements of Chapter 5. All chemical analysis methods shall adopt national standards or industry standards, OR the methods agreed upon by both parties.

the buyer, such as the load-bearing capacity test. Refer to Appendix C for the load-bearing capacity test method.

3.3.4.1 Surface cracks

- a) Axial crack length (including cracks extending to the end of the pellet):
Less than one-half of the height;
- b) Circumferential crack length: Less than one-third of the circumference.

3.3.4.2 Block loss

- a) Cylindrical surface block loss
 - 1) Cylindrical surface block loss: Less than 5% of the surface area of the cylindrical surface of the pellet;
 - 2) Maximum linear size: The maximum linear size shall be able to ensure that, the fuel performance remains stable during use; its limit shall be negotiated by the supplier and the demander.
- b) Block loss at the end of pellet: less than 1/3 of the area of the end of the pellet (can be detected by 1/3 of the circumference of the pellet end defect).

3.3.5 Appearance quality of pellets

The surface of the finished pellets shall be free of visible slag and foreign matter, such as oil stains and grinding media.

3.4 Marking

A mark or code shall be used to identify the ^{235}U enrichment of the pellets.

3.5 Irradiation stability

In order to evaluate the radiation stability of pellets, EJ/T 689 shall be used for thermal stability test.

4 Requirements of pellets batch

4.1 Pellets, which are made from the same batch of uranium dioxide powder, meet the requirements of GB/T 10265, use the same group of process parameters, are defined as a pellet batch.

4.2 The identification of a pellet batch shall be retained, throughout the production process. In the whole process, it shall ensure the identity of batch

materials; it is not allowed for mixing of materials.

5 Sampling

5.1 Sampling, weighing, sample processing must be carried out, under conditions that ensure that the sample is representative of the batch. The sampling plan, which meets the acceptance criteria, shall be negotiated by both the supplier and the buyer.

5.2 The purchaser has the right to select a representative sample from each pellet batch, AND determine its chemical, nuclear or physical properties.

5.3 The batch of samples shall have a sufficient number of pellets, so that it can carry out the quality inspection and arbitration test if necessary, at the supplier's factory, as well as the acceptance test, at the buyer's factory, when necessary.

5.4 When necessary, the batch of samples for acceptance test at the buyer's factory shall be put into a separate container; the batch number shall be clearly marked; it can be shipped before or with the batch of pellets. The arbitration samples shall be clearly marked AND kept in the supplier's factory, until the buyer formally accepts the batch of pellets.

6 Test and inspection

6.1 The supplier shall test samples, in accordance with the requirements described in Chapter 5, to ensure that the pellets meet the requirements of Chapter 3. All tests shall be carried out on the basis of technology, which is agreed upon by the supplier and the buyer.

6.2 Within the time period, which is agreed upon between the supplier and the buyer, the supplier shall save all results AND provide all results when required, to prove that the pellets meet the requirements described in Chapter 3.

6.3 The buyer can use the samples, which are provided by the supplier, OR samples, which are taken from the buyer's factory, for acceptance tests. Acceptance shall be based on a batch of pellets; it shall depend on the material properties, which meet the requirements of Chapter 3 OR the requirements after amended according to the contract documents.

6.4 If there is a dispute over the analysis results, a third party, which is agreed upon by the supplier and the buyer, shall be determined as the arbitrator.

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