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AMENDMENT CONTROL SHEET FOR RDT E 6-33T

The changes incorporated in the March 1977 issue of RDT E 6-33T are identified by the following marginal notations:

C Change
D Deletion
E Editorial
N Addition

The number suffix following the letter code on amendment pages corresponds to the number of the amendment in which the change was approved.

Amendment 1 (6-21-78) replaces pages of the March 1977 issue as follows:

<u>Old Pages</u>	<u>New Pages</u>
i	i
1 and 2	1* and 2
5 and 6	5*, 5A, 5B, 6*

*This page not amended

RDT STANDARD

U. S. DEPARTMENT OF ENERGY
DIVISION OF NUCLEAR POWER DEVELOPMENT

RDT E 6-33T, Amendment 1 (6-21-78)

DATE March 1977

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CONTROL ROD ASSEMBLY FOR LIQUID METAL FAST BREEDER REACTORS

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CONTROL ROD ASSEMBLY FOR LIQUID METAL FAST BREEDER REACTORS

| C

1. SCOPE

This standard establishes the requirements for fabrication, testing, and inspection of control rod assemblies for use in liquid metal fast breeder reactors.

| D

2. APPLICABLE DOCUMENTS

The following documents are a part of this standard to the extent specified in Sections 3 through 5. The issue of a document in effect on the date of the invitation to bid, including any amendments or other published changes also in effect on that date, shall be as specified in the Ordering Data. Where this standard appears to conflict with the requirements of a referenced document, such conflict shall be brought to the attention of the purchaser for resolution.

2.1 RDT Standards.

| D

RDT E 6-38T	Low Friction Hard Surfaces for Core Components	
RDT F 2-2	Quality Assurance Program Requirements	
RDT F 2-4T	Quality Verification Program Requirements	N
RDT F 3-2T	Calibration Program Requirements	
RDT F 3-15T	Requirements for Inspection of Dimensional Characteristics	D A2
RDT F 5-1T	Cleaning and Cleanliness Requirements for Nuclear Components	
RDT F 6-2T	Welding of Reactor Core Components and Test Assemblies	
RDT F 7-2T	Packaging, Packing, and Marking of Components for Shipment and Storage	
RDT F 7-3T	Marking of Components and Parts	
RDT F 8-6T	Hoisting and Rigging of Critical Components and Related Equipment	
RDT F 11-3T	Analytical Chemistry Methods for Metallic Core Components	N

2.2 American Society for Testing and Materials (ASTM) Publications.

ASTM E 29 Indicating Which Places of Figures are to be Considered
Significant in Specified Limiting Values

2.3 American National Standards (ANSI).

ANSI B46.1 Surface Texture

3. TECHNICAL REQUIREMENTS

3.1 Control Rod Assembly. Control rod assemblies shall be fabricated and assembled using components meeting the requirements of the standards, specifications, and drawings as specified in the Ordering Data.

3.2 Dimensions. Control rod assemblies and components thereof shall meet the dimensional requirements of the drawings as specified in the Ordering Data.

3.3 Control Rod Assembly Absorber Pin. The location, weight if required in the Ordering Data, and absorber isotopes content of each finished absorber pin (by serial number) within each control rod assembly shall be recorded and submitted with each assembly. Pins from a pellet lot shall not be mixed with pins from other pellet lots in more than one assembly without the purchaser's approval. Pins containing mixed pellet lots shall be considered as part of one of the parent lots.

3.4 Control Rod Assembly Absorber Isotopes Content. The absorber isotopes and the content of each absorber isotope in each control rod assembly shall be as specified in the Ordering Data.

| D1

3.5 Control Rod Assembly Welds. Control rod assembly weld types and configurations shall meet the requirements of the drawings as specified in the Ordering Data.

Welding procedure qualification, performance qualification, and production welding shall meet the requirements of RDT F 6-2, Sections 1, 2, 3, and 6. All welds shall be examined in accordance with the requirements and acceptance criteria as specified in the Ordering Data.

3.6 Control Rod Assembly Weight. The weight of each completed assembly shall be submitted with each assembly delivered.

4.3 Records. Records showing complete assembly sequence shall be maintained for each assembly and shall be traceable to components, design documents and revision numbers, material heat, lot number, and operating procedure and revision number. Such information shall be provided with the reports on tests made on each delivered assembly. Minimum records shall include special processes or nondestructive examination (NDE) qualifications, nonconformance reports, certifications of material, NDE records, and other inspection records as specified in the Ordering Data which verify conformance with specifications. Records of all tests and examinations shall be kept complete and available to the purchaser.

C

4.3.1 Certification Records Review. Before assemblies are released for shipment, certification records shall be reviewed for compliance with Sections 3 and 4. Specific records shall be as defined in the Ordering Data.

N

4.4 Inspection Requirements. Inspection requirements are listed in Table 1. Additional inspection requirements (if any) shall be as specified in the Ordering Data. Test methods used shall be the reference method or an equivalent method approved by the purchaser before use.

4.4.1 Tolerance Limit Interpretation.

a. Chemical Composition. For purposes of determining conformance with chemical composition requirements, an observed value or a calculated value shall be rounded off "to the nearest unit" in the last right-hand place of figures used in expressing the limiting value, in accordance with the rounding-off method of ASTM E 29.

b. Tensile Requirements. For purposes of determining conformance with tensile requirements, an observed value or a calculated value shall be rounded off to the nearest 100 psi (700 kPa) for tensile strength and to the nearest 0.1 percent for elongation, in accordance with the rounding-off method of ASTM E 29.

c. Dimensional Requirements. The method for determining conformance with dimensional requirements shall be the absolute method as defined in ASTM E 29. Measuring equipment accuracy shall comply with RDT F 3-15.

A2
C

4.5 Measuring and Test Equipment. Measuring and test equipment and measuring standards shall be calibrated and controlled in accordance with RDT F 3-2.

D

4.6 Inspection and Test Responsibility. Unless otherwise specified, the supplier shall be responsible for the performance of all tests and inspections required prior to submission to the purchaser of any item for acceptance. The performance of such tests and inspections does not limit the right of the purchaser to conduct such other tests and inspections as deemed necessary to assure that each item is in conformance with this standard.

N1

(End of Amendment Page)

Table 1. Quality Conformance Inspection

Characteristic	Requirement	Inspection Plan	Reference Test Method	
1. Control rod assembly				
a. Component material	3.1	Each assembly	Material certifications.	
b. Components	3.1	Each assembly	Certification of supplier's records.	
2. Dimensions				
a. Length	3.2	Each control rod assembly.	Standard gaging.	
b. Weld surfaces	3.2	Each control rod assembly.	Standard gaging.	
c. Concentricity	3.2	Each control rod assembly.	Standard gaging.	C
d. Straightness	3.2	Each control rod assembly.	Standard gaging.	D
3. Control rod assembly absorber pins				
a. Pin array	3.3	Each assembly	Certified supplier's records.	
b. Pin weight	3.3	Each absorber pin	Certification of pin supplier's records.	N

(continued)