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RDT Standards Transmittal

Hanford Engineering Development Laboratory

DISTRIBUTION	DATE JAN 25 1974		NO. 171
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List 1	NUMBER	DESCRIPTION	ACTION
		RDT F 5-1T, Cleaning and Cleanliness Requirements for Nuclear Components, Amendment 3 dated December 1973.	C,D

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H. T. Knudsen 1/25/74

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UNITED STATES ATOMIC ENERGY COMMISSION
DIVISION OF REACTOR RESEARCH AND DEVELOPMENT

RDT F 5-1T, Amendment 3

DATE December 1973

PAGE 1 OF 1

CLEANING AND CLEANLINESS REQUIREMENTS FOR NUCLEAR COMPONENTS

A M E N D M E N T 3

This amendment forms a part of RDT F 5-1T
dated February 1972

1. Page 1, 1: Change to read:

1. SCOPE

This standard covers minimum requirements for cleaning and cleanliness control during fabrication and assembly of nuclear service components such as vessels, heat exchangers, pumps, piping and valves and during on-site construction and field assembly of such components into complete systems. This standard does not cover requirements for the cleaning of mill products or in-place cleaning of installed total systems.

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		NUMBER	DESCRIPTION	ACTION
	Distribution List 1	<u>RDT F 5-1T</u>	Cleaning and Cleanliness Requirements for Nuclear Components, <u>Amendment 2</u> , March 1973	D

SIGNATURE

R. A. Schmidt

R. A. Schmidt, Reactor Standards Office

CLEANING AND CLEANLINESS REQUIREMENTS FOR NUCLEAR COMPONENTS

A M E N D M E N T 2

This amendment forms a part of RDT F 5-1T
dated February 1972

1. Page 1, 1: Change to read:

1. SCOPE. This standard covers minimum requirements for cleaning and cleanliness during fabrication and assembly of vessels, heat exchangers, pumps, piping, valves, and other components for nuclear service. The standard does not cover requirements for the cleaning of mill products or in-place cleaning of installed systems.

2. Page 12, 4.7.3e: Change to read:

e. Abrasive Blasting. Abrasive blasting shall be used only when approved by the purchaser. Surfaces that have been descaled or cleaned by abrasive blasting shall be subsequently machined, brushed, or ground to remove any embedded scale or blasting grit.

3. Page 13, 4.7.3f: Change last sentence to read:

After the tumbling operation the surfaces shall be cleaned with a tampico or stainless steel brush and then rinsed with Grade A or Grade B water.

4. Page 16, 7: Change heading to MAINTENANCE OF CLEANLINESS AND PREPARATION FOR DELIVERY.

5. Page 16, 7.2: Change to read:

7.2 Components and subassemblies that have been cleaned in accordance with approved procedures and which have reached the stage of fabrication or assembly where internal, critical or crevice-containing surfaces are created or become no longer accessible for further cleaning or inspection shall be sealed in accordance with RDT F 7-2 or alternate purchaser approved procedures so as to ensure maintenance of the component or subassembly cleanliness condition. Violations of the sealing configuration, other than those which are required by the supplier's approved procedures or authorized in writing by the purchaser, shall

be the basis for rejection of the component or subassembly. In the event there is an unauthorized violation of the sealing configuration, the component or subassembly shall be inspected to determine the extent to which the end item cleanliness requirement is violated. Where such inspection establishes that specified cleanliness requirements have been compromised, procedures for bringing the affected component or subassembly into conformance with the requirements of the standard shall be prepared by the supplier and approved by the purchaser prior to use.

6. Page 18, 8: Add new item 16, as follows:

16. Optional provisions invoked:

a. Chloride swab test (APPENDIX A).

7. Add new APPENDIX A, as follows:

APPENDIX A

METHOD FOR CHLORIDE SWAB TEST

This method provides a standard method of test for determining the presence of hydrolyzable chloride on metal surfaces. The surfaces to be subjected to test shall be selected by the purchaser, and shall include surfaces that have been subjected to liquid-penetrant inspection or otherwise known to have been exposed to chloride-bearing materials. When specified by the purchaser, this method shall be incorporated in the procedure approved by the purchaser (Par. 4.2).

A.1 PREPARATION FOR TEST

Boil each of 36 polyurethane sponges, 1 x 1 x 1/2 in., in 1000 ml Grade A water until the water contains less than 0.10 ppm chloride ion. Squeeze out excess water and package individually in clean, 50 ml vials.

A.2 TEST PROCEDURE

1. Swab an area of exactly 1 ft², using a template, in the following sequence:
 - a. With a sponge moistened with Grade A water, then with a dry sponge.
 - b. With a second sponge moistened with Grade A water, then with a second dry sponge.
 - c. Place all four sponges in a clean 3-1/2 in. OD x 3 in. vial.
2. In the laboratory, place the sponges in a 150 ml beaker, add 100 ml Grade A water, and heat at 80°C to 90°C for 20 min., stirring occasionally.

3. Cool and filter the water through a No. 41, 11 cm OD pre-washed Whatman filter paper into a 200 ml volumetric flask.
4. Remove sponges from beaker and put into a 50 ml syringe. Squeeze sponges in syringe and catch effluent in filter.
5. Draw 15 ml Grade A water into syringe, squeeze sponge to dryness, catching effluent in filter. Repeat twice.
6. Wash filter, cool contents of flask, and dilute contents to 200 ml.
7. Analyze 100 ml of the sample from the flask by the mercurimetric titration method of ASTM D512, Tests for Chloride Ion in Industrial Water and Industrial Waste Water.
8. Calculate chloride concentration of sample in accordance with Par. 11.1 of ASTM D512.
9. Repeat steps 2 through 7, using clean sponges from A.1, for blank.
10. Calculate chloride concentration of blank from step 9.

A.3 CALCULATION

Calculate surface contamination from the equation:

$$S = \frac{(C_s - C_b)}{720} \quad (1)$$

where S = surface contamination, $\text{mg}/\text{in.}^2$;

C_s = chloride concentration of sample, mg/liter ;

C_b = chloride concentration of blank, mg/liter .

A.4 ACCEPTANCE

Surface contamination shall not exceed 5 micrograms per in.^2 .

Where surfaces are found to not meet this requirement, disposition shall be in accordance with procedures approved by the purchaser.

A.5 NOTES

1. Wear clean latex gloves when preparing test sponges, making field test, and handling sponges in the laboratory. Handle sponges with tweezers or forceps.
2. Pre-wash all equipment with Grade A water before use.

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Hanford Engineering Development Laboratory

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	NUMBER	DESCRIPTION		ACTION
		RDT F 5-1T, Cleaning and Cleanliness Requirements for Nuclear Components, Amendment 4 dated September 1974.		D

SIGNATURE

E. Rogers

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UNITED STATES ATOMIC ENERGY COMMISSION
DIVISION OF REACTOR RESEARCH AND DEVELOPMENT

RDT F 5-1T, Amendment 4

DATE September 1974

PAGE 1 OF 1

CLEANING AND CLEANLINESS REQUIREMENTS FOR NUCLEAR COMPONENTS

AMENDMENT 4

This amendment forms a part of RDT F 5-1T
dated February 1972

1. Page 10, 4.6.7: Change the last sentence to read:

Handling equipment surfaces that come in contact with coolant surfaces, critical surfaces, or other surfaces specified by the purchaser shall be clean and shall consist of austenitic stainless steel or other corrosion-resistant alloy, nylon, polyethylene, or other material approved by the purchaser.