Raychem

Electrical Products Division Report

Title	Pages:
NWRT NUCLEAR WIRE REPAIR TAPE FLAMMABILITY TESTING IN ACCORDANCE WITH UL 224 AND ICEA S-19-81.	8

Report Number:	Date:
EDR-5258	4/28/95

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I. OBJECTIVE

To evaluate the performance of Raychem's NWRT nuclear repair kit when subjected to the flammability requirements of UL 224 and ICEA S-19-81.

II. SUMMARY

Three samples were evaluated for flame resistance. These samples were evaluated in accordance with UL 224, Section 15 and ICEA S-19-81, Section 6.19.6.

III. CONCLUSION

By performing well above these flammability requirements, it is concluded that the NWRT nuclear repair kit is acceptable for use as an insulating or jacketing material for cables where flame resistant properties are required.

IV. TEST SAMPLES FOR UL 224 AND ICEA S-19-81

Sample preparation was modified to facilitate the use of heatshrinkable tape.

Support Mandrel:	Rockbestos Fire Retardant Insulated wire.
Tape:	WWTF, Work Order #12989, Reel #1
Adhesive:	S1119, Lot #93B-1358, Type T446-2
Number of Samples:	3
Cable Data:	
Manufacturer	Rockbestos
Class	600 Volt
Temperature Rating	90°C
Identification	Type SIS 90 MIL-75670A MARK WJG-6
Conductor	14 AWG Copper
Insulation O. D.	.14"

V. TESTING TO UL 224 AND ICEA S-19-81

Test Apparatus

1. A sheet metal test chamber 12 inches wide, 14 inches deep and 24 inches high, open at the top and completely enclosed in a draft free ventilation hood.

2. A rod and clamp assembly to support the sample at its upper end in a vertical position.

3. A Tirrill burner with a pilot light mounted on a 20° angle block. Tirrill burner = 3/8-inch bore and 4-inch length.

4. An adjustable jig attached to the bottom of the chamber to insure proper location of the burner in relationship to the sample.

5. A flat horizontal layer of untreated surgical cotton approximately 1/8 inch thick to cover the floor of the enclosure.

6. A digital watch with a readout in 100ths of seconds.

7. A strip of gummed kraft paper with a thickness of 0.005 inches and a width of 0.5 inches used for a flame indicator.

Test Procedure

The sample was clamped vertically in the test chamber. The Tirrill burner was adjusted so that the flame height was 5 inches with a 1-1/2-inch inner blue cone. The burner was positioned so that the vertical plane through the stem of the burner included the axis of the test sample. The angle block was positioned so that the distance between the tip of the burner and the surface of the test sample was 1-1/2 inches. The cotton was laid on the floor of the enclosure so that the upper surface was no more than 9-1/2 inches below the point where the tip of the blue inner cone of the test flame touches the specimen.

The gummed kraft paper was applied to the sample in the form of a flag at a point 12 inches above the point of contact between the flame and the test sample. The kraft paper flag extended 3/4 inch beyond the sample surface and was positioned on the opposite side of the flame impingement area. (See Figure 2).

The flame was applied for 15 seconds and then the gas valve was closed for 15 seconds. This cycle was repeated 4 times for a total of 5 applications.

Requirements

1. No more than 25 percent of the extended portion of the paper flag flame indicator shall be burned.

2. The sample shall not continue to burn longer than 1 minute after the fifth flame application.

3. The sample shall not emit flaming or glowing particles or flaming drops at any time that ignite the cotton on the burner, wedge, or floor of the enclosure (flameless charring of the cotton is to be ignored) .

Results

Samples tested in accordance with ICEA S-19-81, Section 6.19.6 and UL 224, Section 15.

Sample No.	*Flag Burn*	*Afterburn (Seconds)*	*Cotton Burn (Y/N)*
1	0	0	N
2	0	0	N
3	0	30	N

APPENDIX I

REFERENCES

1. ICR Publication No. 5-19-81 "Flame Resisting Test For Thermoplastic Cable Jackets Section 6.19.6.

2. UL 224,1981 "Extruded Insulating Tubing", Section 15.

3. Raychem Lab Notebook 12297, pg. 38 'NWRT-1(NS) Flame Test'

Flame Test Setup

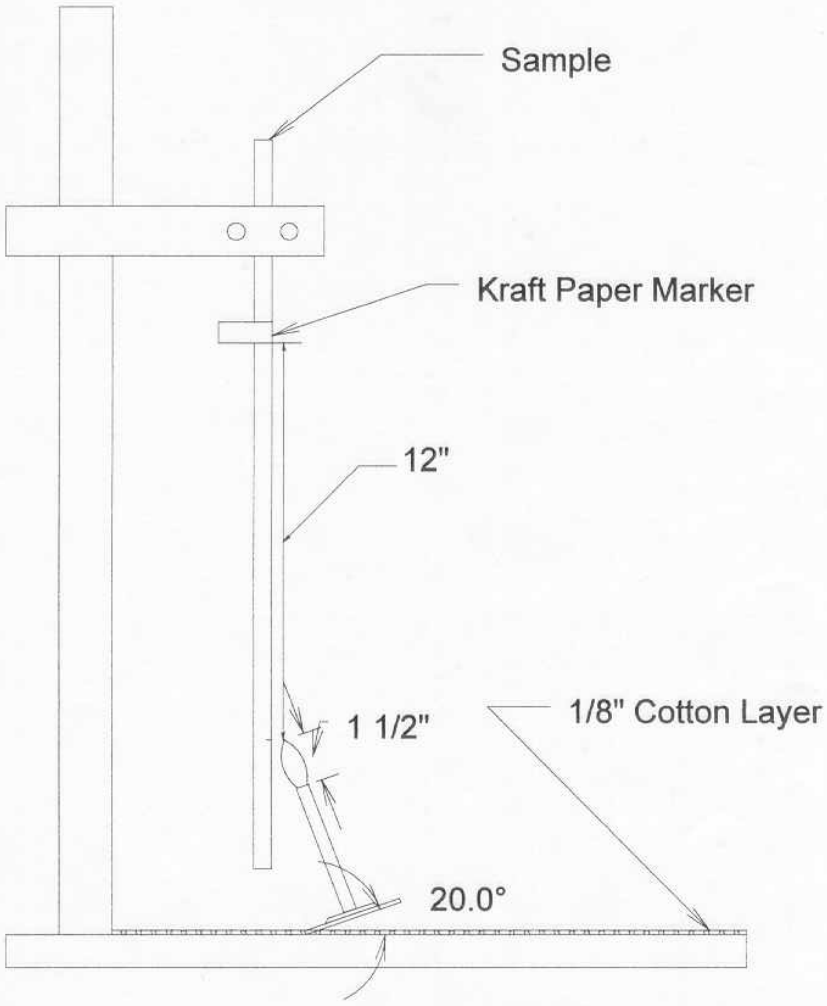

Figure 2