

TEST REPORT

WARRES NO. L16934

IEC 332: PART 3: 1992
TESTS ON ELECTRIC CABLES
UNDER FIRE CONDITIONS
TESTS ON BUNCHED WIRES OR CABLES

THE PROFESSIONALS IN FIRE SAFETY •

Warrington
FIRE
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SPONSORED BY

MESC
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PURPOSE OF TEST

To determine the performance of a specimen of a cable when it is subjected to the conditions of test specified in IEC 332: Part 3: 1992 "Tests on electric cables under fire conditions. Tests on bunched wires or cables".

SCOPE OF TEST

IEC 332: Part 3: 1992 specifies a method of test for measuring the vertical flame propagation characteristics of a bunch of cables. The cable specimen, consisting of a number of 3.5m lengths of cable, is deemed to have met the requirements of the Standard if, after burning has ceased, the extent of charred or affected portion does not reach a height exceeding 2.5m above the bottom edge of the burner.

The Standard recommends the following three test categories, based on the amount of combustible materials contained in one metre of the cables being tested:

Category A:	7 litres per metre of combustible material
Category B:	3.5 litres per metre of combustible material
Category C:	1.5 litres per metre of combustible material

DESCRIPTION OF THE CABLE

The description of the cable given below has been prepared from information provided by the sponsor of the test. All values quoted are nominal, unless tolerances are given.

The product was a 10 pair instrument cable referenced "DC-79-1" having an overall diameter of 24.7mm and consisting of 1mm² copper conductors, XLPE insulation, SWA and PVC oversheath.

The oversheath of the cable was marked "PLTC CO/XLPE/SWA/PVC SHIELDED".

The details of all the individual components are given in Appendix 1.

The cable was supplied by the sponsor of the test on 21 July 1997. Warrington Fire Research Centre was not involved in any selection or sampling procedure.

CONDITIONING OF SPECIMEN

Prior to the test the specimen was conditioned at a temperature of $25 \pm 5^{\circ}\text{C}$ for 3 hours.

DATE OF TEST

The test was performed on 23 September 1997.

TEST PROCEDURE

A 50cm long specimen of the cable was separated into its component parts and the volume of each type of combustible material was determined. The individual weights, densities and volumes are given in Appendix 1.

Cable Composition:-

Length of specimen:	3.5m
Weight of cable:	1179.73g/m
Weight of metallic materials:	698.21g/m
Weight of non-metallic materials:	481.52g/m
Volume of combustible material:	319.69l/m

The number of cable lengths to be mounted on the test ladder was calculated by dividing the sum of the volumes into the volume per metre value corresponding to the appropriate category and rounding off the result to the nearest whole number (0.50 and above is counted as 1).

Number of cables required to give 1.5 litres per metre of combustible material = 5.

Cable mounting:-

5 cable lengths were arranged on the ladder as follows:

Front: 5 cables touching.
Rear: N/A

The test was performed in accordance with the procedure specified in IEC 332: Part 3: 1992, Category C and this report should be read in conjunction with that Standard.

ATMOSPHERIC CONDITIONS DURING THE TEST

External temperature at the start of the test:	19°C
External temperature at the end of the test:	19°C
Air flow through test rig:	5m ³ /min
External air speed:	0.6m/sec
Method of air flow measurement:	Anemometer
Period of flame application:	20 mins

TEST RESULTS

The test results relate only to the behaviour of the specimen of the product under the particular conditions of test; they are not intended to be the sole criterion for assessing the potential fire hazard of the product in use.

The test results relate only to the specimen of the product in the form in which it was tested. Small differences in the composition or thickness of the product may significantly affect the performance during the test and may therefore invalidate the test results. Care should be taken to ensure that any product which is supplied or used is fully represented by the specimen which was tested.

Visual observations made during the test are given in Appendix 2.

Photographs of the specimen before and after the test are given in Plates 1 and 2.

The maximum height of the cable charred or affected, as measured from the bottom of the burner, was as follows:-

In the front cable group: 90cm

In the rear cable group: N/A

CONCLUSION

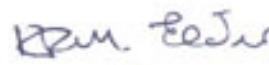
The specimen meets the performance requirement for IEC 332: Part 3: Category C Designation F.

Responsible Officer



S. KUMAR
Manager - Standard Testing

Approved



K. R. H. ELDER

M

R. J. SHAW

Director

for and on behalf of

WARRINGTON FIRE RESEARCH CENTRE

Date of issue: 30 September 1997

APPENDIX 1

DETERMINATION OF VOLUME OF COMBUSTIBLE MATERIAL

COMPONENT	LENGTH cm	WT g	DENSITY g/cc	VOLUME cc
SHEATH	52	123.80	1.57	78.85
ARMOUR	52	235.35	-	-
BEDDING	52	92.65	1.54	60.16
FOIL	52	6.82	-	-
MICA	52	8.34	-	-
WIRES	52	25.50	-	-
CONDUCTORS	52	95.40	-	-
INSULATION	52	25.60	0.94	27.23
TOTAL		613.46		166.24
TOTAL/METRE		1179.73		319.69

APPENDIX 2

OBSERVATIONS DURING TEST

TIME (MINS-SEC)	OBSERVATIONS
2-30	Flames reaching a height of 1.0m. One 500W flood light switched on. Ladder fully visible.
5-00	Flames reaching a height of 1.0m. Only flames visible.
10-00	Flames reaching a height of 1.2m. Only flames visible.
15-00	Flames reaching a height of 1.3m. Only flames visible.
20-00	Burner turned off. Cables flaming.
22-30	Flaming ceases.

All heights are estimated from floor level
The burner was positioned at a height of 0.6m from the floor.



Plate 1: Specimen before test



Plate 2: Specimen after test