



CPRI

**CABLES LABORATORY
DIAGNOSTIC, CABLES & CAPACITORS DIVISION
CENTRAL POWER RESEARCH INSTITUTE**
P.B. No.8066, SADASIVANAGAR SUB P.O.
PROF.SIR C.V.RAMAN ROAD , BANGALORE - 560 080, INDIA.
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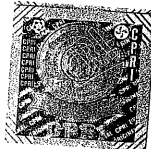
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TEST REPORT

Test Report Number	: DCCD- 11792	Dated: 29.11.2010
Name & Address of the Customer	: M/s.Rites Ltd, 3 rd floor, BMTC Complex, Shantinagar Bangalore - 27	
Name & Address of the Manufacturer	: M/s KEC International Limited No.349, Hebbal Industrial Area Hootagalli, Belavadi Post Mysore - 570 018.	
Particulars of sample tested	: 3.5 C X 240 Sq mm, Aluminium armoured 1.1 kV FRLSZI Electrical Cable	
Condition of the Sample on Receipt	: New	
Type	: NIL	
Designation	: 3.5 C X 240 Sq mm, Aluminium armoured 1.1 kV FRLSZI Electrical Cable	
Serial Number	: Drum No. 9X48283	
Number of samples tested	: One	
Date(s) of Test(s)	: 07.11.2010 to 24.11.2010	
CPRI sample code no	: DCCDFRLS10S0093	
Particulars of tests conducted	: 1) Oxygen index test 2) Temperature Index Test 3) Zero Halogen test 4) Smoke Density test	
Test in accordance with standard/specification	: 1) IS 10810 (P-58)/1993, RA 2003 2) IS 10810 (P-64)/1993, RA 2003 3) IEC-60754-2 /1991-07 , Am1 : 1997 4) ASTM D 2843-1999, RA 2004	
Sampling plan	: Not applicable	
Customer's requirement	: Nil	
Deviations if any	: Nil	
Name of the witnessing persons		
Customer's representatives	: None	
Other than Customer's representatives	: None	
Test subcontracted with address of the laboratory	: None	
Documents constituting this report (in words)		
Number of Sheets	: Seven	
Number of oscillograms	: Nil	
Number of graphs	: Nil	
Number of photos	: Nil	
Number of Test Circuit Diagrams	: Nil	
Number of Drawings	: Nil	

R. Arunjothi
(R. Arunjothi)
Test Engineer



(A.Sudhindra)
Additional Director

AUTHORISED SIGNATORIES



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TEST REPORT

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TEST RESULTS

The FRLSZH insulation was moulded in the form of sheets to obtain the desired thickness and the following tests were conducted.

1. OXYGEN INDEX TEST (IS 10810 (P-58)/1993, RA 2003)

- No. of specimen tested : Five
Type : Self supporting material.
Conditioning : Samples were conditioned at 27±2°C & 50±5% R.H for 24 Hours.

Sample Number	Sample Dimensions (in mm)		Period of Burning (in Sec)	Extent of Burning (in mm)	Oxygen Index At 27°C (in %)
	Length 150 mm	Width Thickness			
1.	6.52	3.01	180	< 50	33.0
2.	6.52	3.02	180	< 50	33.0
3.	6.52	3.01	180	< 50	33.0
4.	6.51	3.01	180	< 50	33.0
5.	6.52	3.02	180	< 50	33.0

Observed Oxygen Index : 33.0 %

Observation : No charring, dripping, severe shrinkage or erratic burning, after glow was observed during the test.

Note: The test results relate only to the behaviour of the test specimens under the conditions of this test method and that these results must not be used to infer the fire hazards of the material in other forms or under other conditions

R. Arunjothi
(R. Arunjothi)
Test Engineer



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TEST RESULTS

**2. OXYGEN INDEX AT ELEVATED TEMPERATURE : (IS 10810 (P-64)/1993, RA 2003)
(TEMPERATURE INDEX TEST)**

- No. of specimen tested : Three
Type : Self supporting material.
Conditioning : Samples were conditioned at 27±2°C & 50±5% R.H for 40 Hours.

Test Results:

Sample Number	Sample Dimensions (in mm) Length 150 mm		Temperature In degree C	Oxygen Index value (Avg) in %
	Width	Thickness		
1.	6.51	3.02	40	32.4
2.	6.51	3.01	60	31.6
3.	6.52	3.02	80	31.0

Observed Temperature index by extrapolation method : 340 °C

Observation: None of charring, dripping, severe shrinkage or erratic burning, after glow was observed during the test.

Note: The test results relate only to the behaviour of the test specimens under the conditions of this test method and that these results must not be used to infer the fire hazards of the material in other forms or under other conditions

R. Arunjothi
(R. Arunjothi)
Test Engineer



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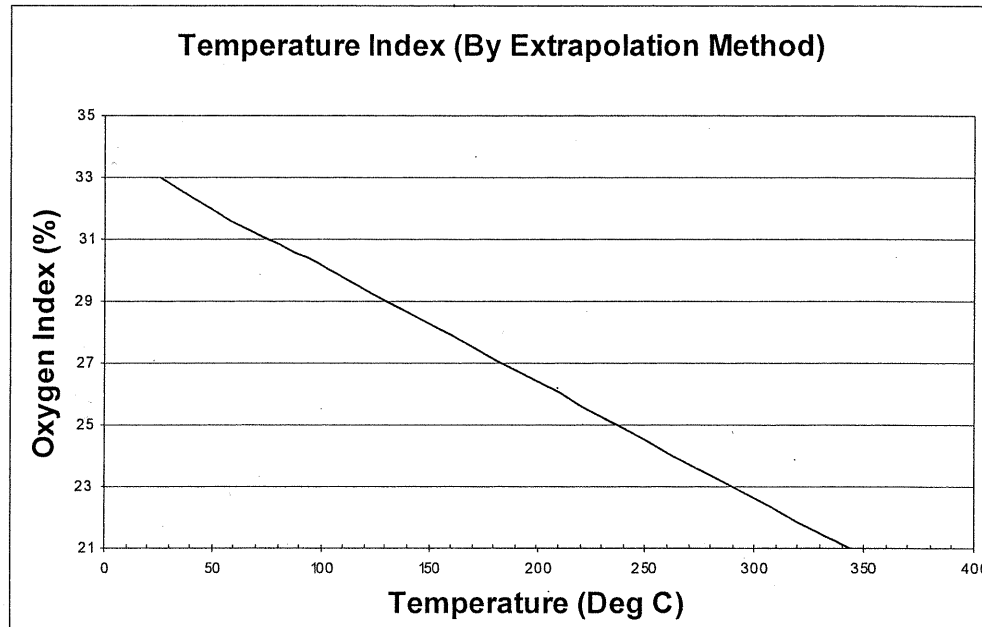
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TEST REPORT

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TEST RESULTS



3. PH & CONDUCTIVITY OF SHEATH (ZERO HALOGEN ACID TEST) :

Conditioning : Samples were conditioned at $23 \pm 2^\circ\text{C}$ Temp. & $50 \pm 5\%$ R.H for 16 Hours.

Temperature during the test : 935 deg.C

Duration of Test after attaining 935°C : 30 minutes

Mass of the sample : 1.0 g

Result :

Observed Average pH value : 5.65

Observed Average Conductivity value : $8.52 \mu\text{S}/\text{mm}$

Specified values of pH : 4.3 (Min)

Specified value of Conductivity : $10 \mu\text{S}/\text{mm}$ (Max)

Conclusion : The cable meets the requirements of the standard

R. Arunjothi
(R. Arunjothi)
Test Engineer



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TEST RESULTS

4. SMOKE DENSITY TEST :

Reference Specification : As per ASTM-D-2843-1999, RA 2004

No. of specimen tested : Three

Sample Dimensions : Length : 25.4 mm, Width : 25.4 mm,

Conditioning : Samples were conditioned for 48 hours at 23±2°C & 50 ± 5% RH

Time in		Absorbance in percent			
Mts.	Secs.	Sample 1 (Thickness 6.0 mm)	Sample 2 (Thickness 6.0mm)	Sample 3 (Thickness 6.0 mm)	Average Absorbance in percent
00	15	0.00	0.00	0.00	0.00
00	30	0.00	0.00	0.00	0.00
00	45	0.00	0.00	0.00	0.00
01	00	0.00	0.00	0.00	0.00
01	15	0.00	0.00	0.00	0.00
01	30	0.00	0.00	0.00	0.00
01	45	0.00	0.00	0.00	0.00
02	00	0.00	0.00	0.00	0.00
02	15	0.00	0.49	0.00	0.16
02	30	0.98	0.49	1.95	1.14
02	45	2.44	1.95	4.39	2.93
03	00	4.88	2.93	5.37	4.39
03	15	8.78	4.39	7.32	6.83
03	30	13.66	5.85	10.73	10.08
03	45	19.02	7.32	14.63	13.66
04	00	23.90	11.22	18.05	17.72

Maximum smoke density in Percent light Absorption : 17.72 %

Area in percent under the light absorption time curve (Smoke density rating) : 3.06%

Observation of time taken for sample to burst into flame: 120 seconds

Observement of 'EXIT' sign : 'EXIT' sign was observed throughout the test

NOTE: This standard should be used to measure & describe the response of the materials , products or assemblies to heat & flame under controlled laboratory conditions & should not be used to describe or appraise the fire hazard or fire risk of materials, products or assemblies under actual fire conditions However, results of this test may be used as elements of a fire hazards assessment or a fire risk assessment which takes into account all of the factors which are pertinent to an assessment of the fire hazard or fire risk of a particular end use.

R. Arunjothi
(R. Arunjothi)
Test Engineer



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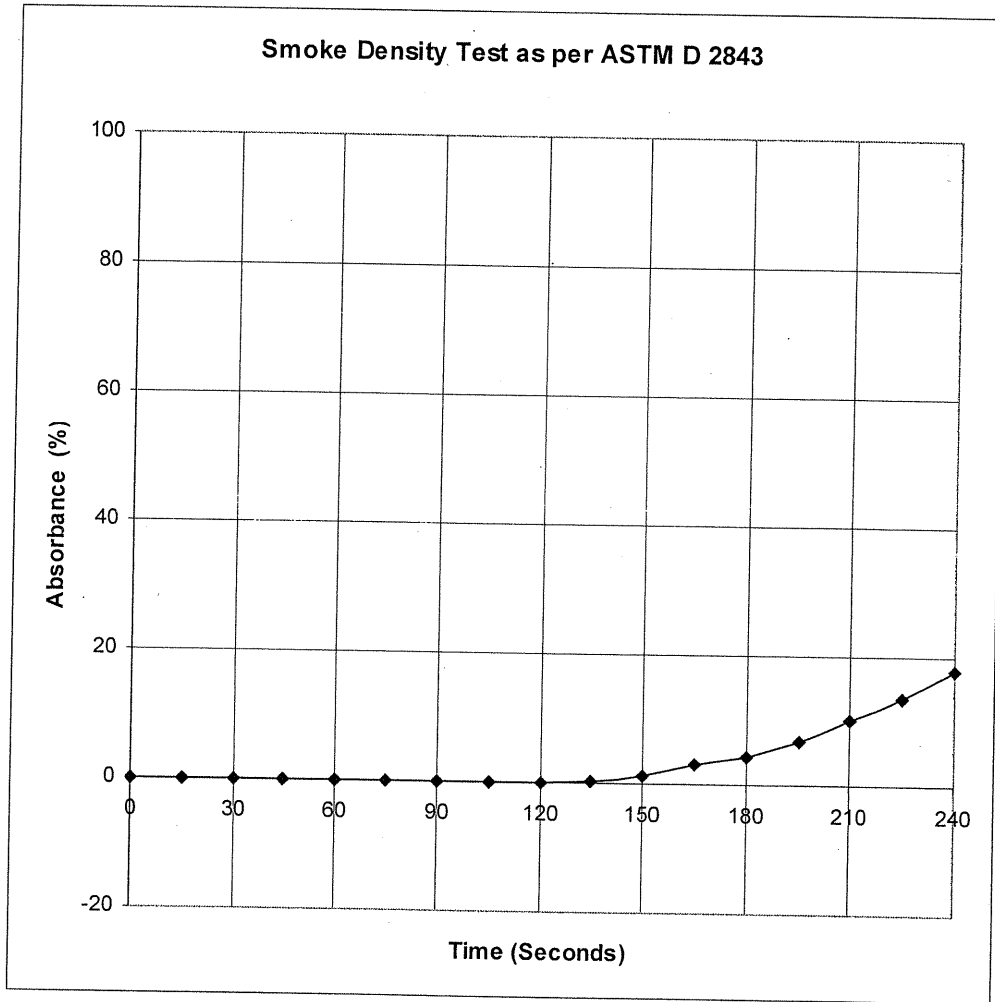
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TEST RESULTS



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Test Engineer



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NOTE

- a) The test results relate only to the item(s) tested.
- b) Publication or reproduction of this test report in any form other than by complete set of the whole report and in the language written, is not permitted without the written consent of CPRI.
- c) Any Correction/erasure invalidates this test report.
- d) Any anomaly/discrepancy in this test report should be brought to our notice within 45 days from the date of issue.
- e) The verification of the sample drawings by CPRI is limited to dimensional checkings only wherever possible.

R. Arunjothi
(R.Arunjothi)
Test Engineer