



LABORATORY TEST REPORT

Subject: Thermal Stability (Congo Red) Testing of Olsent Cable Samples

AMCP Project No. C01803

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Sample Description: See Appendix A Table A1 for a list of all samples supplied by ACCC, Table 1 in the Results section below lists those cables tested on this occasion, including 2 from QESO.

Method Ref: Broadly consistent with AS 1660.2.3 *Test methods for electric cables, cords and conductors Method 2.3: Insulation, extruded semiconductive screens and non-metallic sheaths—Methods specific to PVC and halogen free thermoplastic materials*, and ISO 182-1:1990 *Plastics -- Determination of the tendency of compounds and products based on vinyl chloride homopolymers and copolymers to evolve hydrogen chloride and any other acidic products at elevated temperatures -- Part 1: Congo red method*. See report for departures.

1. INTRODUCTION

A box containing 30 cable samples was supplied by ACCC for the purposes of testing. The cable samples were variously marked as Infinity or Olsent brand. A list of all samples supplied is presented in Appendix A. Some confusion was expressed due to the likelihood that some Olsent cabling had been manufactured by the Infinity factory while some had not. In order that this matter might be clarified, ACCC requested that a Thermal Stability (Congo Red) Test be performed on the Olsent samples.

Further to the batch of ACCC samples, two samples of Olsent cable were also supplied by Mr Carl Porritt of the Queensland Electrical Safety Office and their details have been appended to the list in Appendix A. This report presents the results obtained for samples tested for Thermal Stability (Congo Red).

2. METHOD

The results obtained by this test were primarily for comparison purposes – is there a cohort of results by brand that would allow grouping into factory sources? Therefore direct compliance with a standard was not necessary and it was noted that some variation between standards exists for the determination of Thermal Stability (Congo Red). Our heating apparatus was an

aluminium block adjusted to a temperature of 200°C and the procedure adopted for performing the test was the same as all published methods. However, our sample tube, sample size and configuration comprised:

Tubes: 100mm long x 11mm id

Depth of insertion into block: 35mm

Weight of sample: 50 mg

Height of sample in tube: ≤ 10 mm

Test paper: MACHEREY-NAGEL pH - Fix indicator paper strips pH 0,0 - 6,0 (Middle section is Congo Red)

Other: Tubes were wrapped with aluminium foil to prevent condensation of HCl below the test paper level.

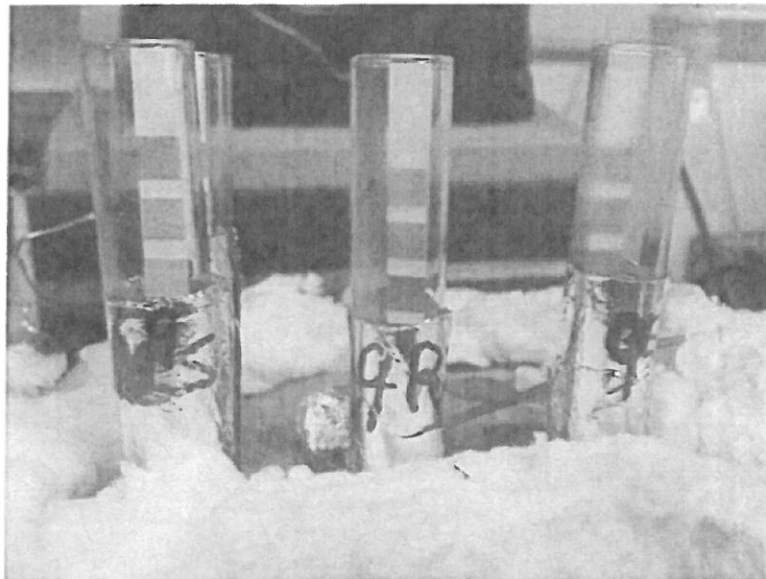


Fig. 1. Congo Red Test in progress.



3. RESULTS

Table 1. PVC Thermal Stability Test – “Congo Red”

UQMP Lab #	ACCC # & Description	Sheath	Black	Earth	Red	Blue	White
12825	#4 INFINITY 2013 2.5mm ² X 4C+E 100433436 ORANGE	63	22	20	20	17	23
12830	#9 OLSENT 2012 1.5mm ² X 2C+E 100433090 ORANGE	56	18	16	16	-	-
12831	#10 OLSENT 2012 1.5mm ² X 4C+E 100433321 ORANGE	50	13	17	18	14	15
12832	#11 OLSENT 2012 2.5mm ² X 2C+E 100238593 ORANGE	58	14	14	12	-	-
12833	#12 OLSENT 2012 4mm ² X 2C+E 100433153 ORANGE	69	14	16	18	-	-
12834	#13 OLSENT 2012 4mm ² X 3C+E 100434181 ORANGE	72	-	16	16	14	18
12835	#14 INFINITY 2012 1.0mm ² X 2C+E 100434076 ancillary after [⊖]	14	21	15	17	-	-
12837	#16 INFINITY 2011 1.5mm ² X 2C+E 100238358 ancillary after	26	29	19	29	-	-
12841	#20 INFINITY 2012 2.5mm ² X 2C+E 100238403 ancillary after	12	13	10	12	-	-
12847	#26A OLSENT 2012 1.5mm ² X 2C+E 100238358 ancillary after	16 17,15,15 ^ψ	18	12	20	-	-
12848	#26B OLSENT 2012 1.5mm ² X 2C+E 100238358 ancillary after	17	13	19	17	-	-
12849	#27 OLSENT 2013 1.5mm ² X 2C+E 100238358 ancillary before	>75	>75	>75	>75	-	-
12850	#28 OLSENT 2012 2.5mm ² X 2C+E 100238403 ancillary before	>75	>75	>75	>75	-	-
12851	#29 OLSENT 2012 2.5mm ² X 2C+E 100238403 ancillary before	>75	>75	>75	>75	-	-
12861	QESO OLSENT 2013 1.5mm ² X 2C+E 100238358 ancillary before	>75	>75	>75	>75	-	-
12862	QESO OLSENT 2012 1.5mm ² X 2C+E 100238358 ancillary after	19	13	16	17	-	-

ψ Replicates on this sample to establish repeatability

Samples passing 40 minutes criterion marked green

⊖ Printing on the cable comprises terms required under AS 5000.2, viz. – Manufacturer, DOM, insulation code & “ELECTRIC CABLE” and voltage rating. Some ancillary terms are often added, e.g. number and size of cores, SKU (stock code number), etc. All Infinity cables supplied to UQMP have the ancillary terms after the required terms (indicated here by ‘ancillary after’ while the Olsent cables were a mixture of ‘ancillary after’ and ‘ancillary before’. We also noted that ‘ancillary after’ markings consisted of typeface about 4.5-5.0 mm high; ‘ancillary before’ markings consisted of typeface about 3.0 mm high. (see Fig. 2 below for order of markings and typeface size)

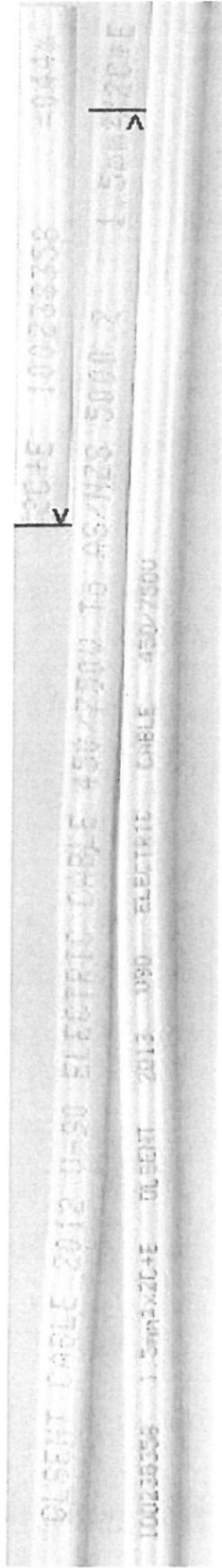


Fig. 2. Olsent cables ex Qld ESO. Top cable marked 'ancillary after' and bottom cable marked 'ancillary before' where "OLSENT 2012 V-90 ELECTRIC CABLE 450/750" is the required AS 5000.2 marking, "To AS 5000.2 1.5mm²x2C+E 100238358" is the ancillary marking. Note also "Large print" vs "Small print" as an extra distinction.



Table 1. above shows results for a number of Infinity brand cables. These were analysed to establish a range of values for cable manufactured by the Infinity factory.

4. COMMENTS

[REDACTED] We found 17 Infinity brand samples failed at an average of 19 minutes, and 33 Olsent brand samples failed at an average of 16 minutes. Overall 50 samples from our batch, of both Infinity and Olsent, failed at an average of 17 minutes.

Mr Carl Porritt of Qld ESO advised that he had been told that Olsent cables with '**ancillary after**' and large print markings (see Fig. 2. above) had originated from the Infinity factory while the cables with '**ancillary before**' and small print did not. It is noted that all of the Infinity flat cable samples supplied by ACCC had '**ancillary after**' and large print markings, 12 specimens taken from the flat Infinity cables returned an average of 18 minutes. Three Olsent cables (one of which came from QESO) had '**ancillary after**' and large print markings and these yielded 15 specimens which averaged 16 minutes. All 4 Olsent cables with '**ancillary before**' and small print markings yielded 16 specimens all of which gave a value of >75 minutes. **That is, for all samples tested at UQMP, Carl Porritt's advice holds – 'ancillary after' markings and large print are associated with cables from the Infinity factory and PVC from these cables fails the Australian industry standard of 40 minutes; all Olsent samples with 'ancillary before' markings and small print yielded PVC specimens which easily met the 40 minute criterion.**

[REDACTED] We analysed 6 orange sheath materials finding a range of 50-72 minutes, i.e. all passed. However, all primary insulation specimens from the orange cables we tested failed to meet the 40 minutes (23 specimens averaging 17 minutes). Of these, one was Infinity brand and five were Olsent brand. **All Olsent orange circular cables tested appear to come from the Infinity factory.**

Signed for and on behalf of UQ Materials Performance



Jim Haig



APPENDIX A

Table A1. SAMPLES SUPPLIED BY ACCC

UQMP Lab #	ACCC # & Description
12822	#1 INFINITY-WANMA 2010 1.5mm ² X 4C+E 100433321 ORANGE
12823	#2 INFINITY-WANMA 2010 2.5mm ² X 3C+E 100434164 ORANGE
12824	#3 INFINITY 2011 2.5mm ² X 4C+E 100433436 ORANGE
12825	#4 INFINITY 2013 2.5mm ² X 4C+E 100433436 ORANGE
12826	#5 INFINITY 2011 4mm ² X 4C+E 100433575 ORANGE
12827	#6 INFINITY-WANMA 2010 4mm ² X 3C+E 100434181 ORANGE
12828	#7 INFINITY-WANMA 2011 6mm ² X 2C+E 100433241 ORANGE
12829	#8 INFINITY 2013 6mm ² X 4C+E 100433671 ORANGE
12830	#9 OLSENT 2012 1.5mm ² X 2C+E 100433090 ORANGE
12831	#10 OLSENT 2012 1.5mm ² X 4C+E 100433321 ORANGE
12832	#11 OLSENT 2012 2.5mm ² X 2C+E 100238593 ORANGE
12833	#12 OLSENT 2012 4mm ² X 2C+E 100433153 ORANGE
12834	#13 OLSENT 2012 4mm ² X 3C+E 100434181 ORANGE
12835	#14 INFINITY 2012 1.0mm ² X 2C+E 100434076
12836	#15 INFINITY 2013 1.0mm ² X 2C+E 100434076
12837	#16 INFINITY 2011 1.5mm ² X 2C+E 100238358
12838	#17 INFINITY 2013 1.5mm ² SDI 100434009
12839	#18 INFINITY 2010 2.5mm ² X 2C+E 100434041
12840	#19 INFINITY 2011 2.5mm ² X 2C+E 100434041
12841	#20 INFINITY 2012 2.5mm ² X 2C+E 100238403



Table A1. SAMPLES SUPPLIED BY ACCC

UQMP Lab #	ACCC # & Description
12842	#21 INFINITY 2012 2.5mm ² SDI 100434025
12843	#22 INFINITY 2013 4mm ² X 2C+E 100238091
12844	#23 INFINITY 2012 1.0mm ² X 2C 100238331
12845	#24 INFINITY 2012 1.5mm ² X 2C 100238340
12846	#25 INFINITY 2012 1.0mm ² SDI 100238235
12847	#26A OLSENT 2012 1.5mm ² X 2C+E 100238358
12848	#26B OLSENT 2012 1.5mm ² X 2C+E 100238358
12849	#27 OLSENT 2013 1.5mm ² X 2C+E 100238358
12850	#28 OLSENT 2012 2.5mm ² X 2C+E 100238403
12851	#29 OLSENT 2012 2.5mm ² X 2C+E 100238403

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