Dr. J.W. Barrett.
Mr. J.S. Hunter.
Dr. J.A. Gardner.
Mr. C.G. Wickham/
Fulmer Library.
Dr. W.McG. Morgan.
Mr. W.E. Hamer.
Dr. D.S.P. Roebuck.
Mr. S. Baxter.
Mr. N.G.H. Thomas.
Dr. C.E. Morgan.
Dr. D.P. Dodgson.
Mr. N.E. Pate.
Mr. G. Hulse.

MONSANTO CHEMICALS LIMITED

PLASTICS DIVISION

FULMER

Application Research Laboratory Report No: L.57/2

Date: 13th August, 1957.

Job.No: 635.151.1151
Req.No: DF.57/32

Title: Further investigation of the high temperature stability of Aroclors 1243, 1248 and 1254.

Introduction:

Previous work on these Aroclors indicated that they were unstable at 250°C. (See A.R.L.R. L.57/1). This report deals with an attempt to determine the maximum working temperature of Aroclors in electrical applications.

Summary and Conclusions:

Tests over a period of 25 days at 200°C. and 50 days at 175°C. were carried out on various Aroclors.

At 200°C. Aroclor 1242 appeared to be unstable and would be unsuitable for use at this temperature. Both Lots of Aroclor 1248 degraded slightly and use of this material at 200°C. is not recommended. The sample of Aroclor 1254 also showed a deterioration although at the end of the ageing period its Power Factor was still low, 0.0024, and its Volume Resistivity high, 3.11 x 10^{12} ohms. cms.

0150842

At 175°C. no significant change in electrical properties of any sample was detected.

These results suggest that 175°C is the maximum working temperature of Aroclors 1242 and 1248, and possibly 200°C. for Aroclor 1254. Further long term tests are necessary to confirm these conclusions, and such tests have been initiated.

Details:

Representative samples of Aroclors 1242, 1248 and 1254 were selected for the tests (See Tables 1 and 2), and each sample was treated with Fullers Earth prior to measurements and ageing.

The ageing was carried out in two stages, first at 200°C. with tests after five days, fifteen days and twenty five days, and then at 175°C with tests after fifteen, twenty five and fifty days.

The test conditions were those usually maintained in this type of measurement viz.

Power Factor at 1000 cps. and 100°C.
Volume Resistivity at 200V DC and 100°C.

Results are given in Tables 1 and 2.

Discussion.

Aroclor 1242 shows a marked deterioration after ageing for 25 days at 200°C. and would be unsuitable for use at this temperature. No significant difference appears between the two lots of Aroclor 1248 tested, both show a slight degradation, which would probably increase with further ageing at 200°C. The change in electrical properties of the sample of Aroclor 1254 after ageing may be significant and further long term tests would be necessary before its use at 200°C. could be recommended.

After 50 days ageing at 175°C. all samples showed very little change in electrical properties. Discolouration had occurred in all samples, but to a greater extent in Aroclor 1254.

Further tests are being carried out over a longer ageing period to confirm these results.

It should be noted that during the ageing period some samples exhibited an initial improvement in electrical properties followed by a deterioration, but there is insufficient experimental evidence to indicate whether this is a real effect or merely due to random experimental errors.

No change in S.I.C. occurred in any sample over the period of ageing.

J. H. Gilbert.

John H. Gilbert.

WAM

0150844

Table 1.

Samples aged at 200°C.

Sample		Control 25 days at Room temp.	Aged for 5 days.	Aged for 15 days.	Aged for 25 days.
Aroclor 1242 Lot K.1	P.F.	0.0096	0.012	0.0084	0.050
	Vol.Res.	7.42×10^{11}	1.40×10^{12}	8.16×10^{11}	1.13×10^{11}
Aroclor 1248 Lot K.1	P.F.	0.0031	0.012	0.0051	0.010
	Vol.Res.	1.54×10^{12}	2.05×10^{12}	9.77×10^{11}	4.95×10^{11}
Aroclor 1248 Lot L.1	P.F.	0.0079	0.0074	0.0046	0.0049
	Vol.Res.	1.22×10^{12}	1.91×10^{12}	9.88×10^{11}	8.89×10^{11}
Aroclor 1254 Lot K.16	P.F.	0.00023	0.0012	0.00083	0.0024
	Vol.Res.	7.34×10^{12}	3.17×10^{12}	3.11×10^{12}	1.30×10^{12}

Table 2.

Samples aged at 175°C.

Sample		Control 50 days at Room temp.	Aged for 15 days.	Aged for 25 days	Aged for 50 days.
Aroclor 1242 Lot K.1	P.F.	0.013	0.016	0.007	0.011
	Vol.Res.	3.64×10^{11}	4.74×10^{11}	6.67×10^{11}	4.00×10^{11}
Aroclor 1248 Lot L.1	P.F.	0.009	0.024	0.0038	0.0056
	Vol.Res.	3.36×10^{11}	3.48×10^{11}	1.02×10^{12}	5.35×10^{11}
Aroclor 1248 Lot M.1	P.F.	0.006	0.0097	0.0042	0.0056
	Vol.Res.	6.63×10^{11}	7.96×10^{11}	1.13×10^{12}	4.95×10^{11}
Aroclor 1254 Lot K.16	P.F.	0.0017	0.018	0.0013	0.0013
	Vol.Res.	1.39×10^{12}	3.74×10^{11}	2.89×10^{12}	1.47×10^{12}

0150845