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Experimental Study of Effect of Life of Silicone Rubber Coatings on Different Type Insulator during Various Temperatures

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Abstract: **Visual observations of arcing and audible corona are the first indications that signal changes to the coating have taken place. It emphasizes that in the absence of reliable data one can use observations based on hydrophobicity to evaluate when maintenance or replacement of the coated insulators is necessary. Life extension strategies are suggested. It also demonstrates that there are differences in the hydrophobicity characteristics among commercially available coatings, and these can be quantified using standard laboratory techniques. Field experience suggests that the life of the RTV coatings can exceed 10 years even under the severest conditions of pollution.**

Keywords: **RTV, silicone rubber, end-of-life, insulator coatings.**

1. INTRODUCTION

The products have proved their effectiveness in preventing contamination outages in sea coast environments and in many industrial settings with few problems reported. However, problems have been encountered under difficult application conditions in the field, where for example applications have been made during moist conditions. Another situation where the effectiveness of coatings has been diminished is under conditions of continuous wetting in which hydrophobicity is lost within a short period of time.

Now that the coatings have been in service for many years users are beginning to be concerned about the increased risk of flashover that comes with aging, or the end-of-life, and the course of action that may be necessary for life extension or replacement. A comprehensive study of the performance characteristics of four commercial RTV silicone rubber coatings for high voltage insulators has shown considerable variation in the aging characteristics of the coatings affecting life .

2. EXPERIMENTAL SETUP

This fluid acts to impart non-wetting characteristics to deposited contaminants by surrounding the particles with a monolayer of fluid. As the fluid is removed from the surface through natural washing, constant wetting, or discharge activity, the ability of the coating to suppress leakage current is diminished. After a period of prolonged wetting and/or discharge activity, the coating becomes wettable thereby increasing the risk of flashover. Lifetime is not easy to assess as many factors play a role in the life of a coating; however, it is generally considered that the end of life is associated with the depletion of low molecular weight (LMW) fluid causing significant loss of hydrophobicity.

Soxlet extraction of LMW species is a useful tool for determining both the quantity and species of residual LMW fluid in a field aged coating that has minimal NSDD. Also both LMW silicone recovery tests, GC and Soxlet extraction, are

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usually carried out at room temperature in the laboratory. However, the most important characteristic of coatings with regard to end-of-life is the rate of recovery after a temporary loss of hydrophobicity as a function of ambient temperature.

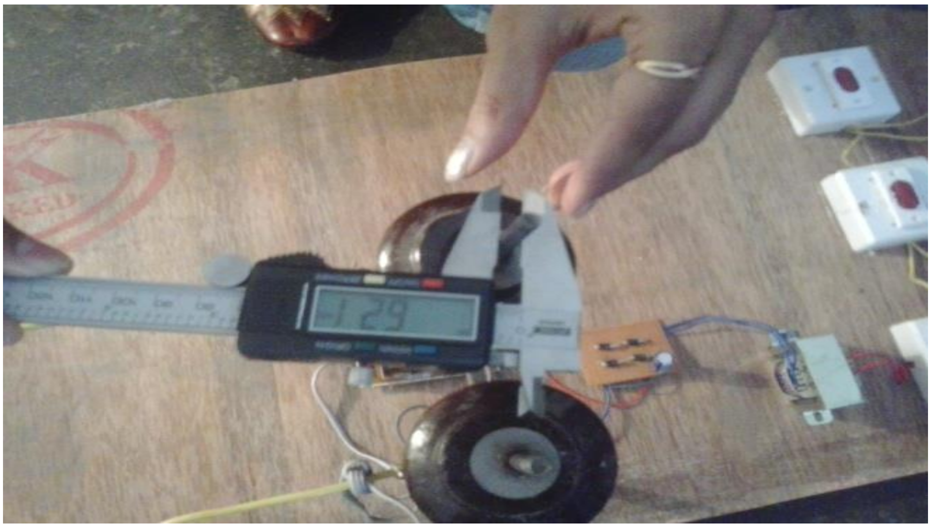

Figure 2.1-Measurment of dimensions

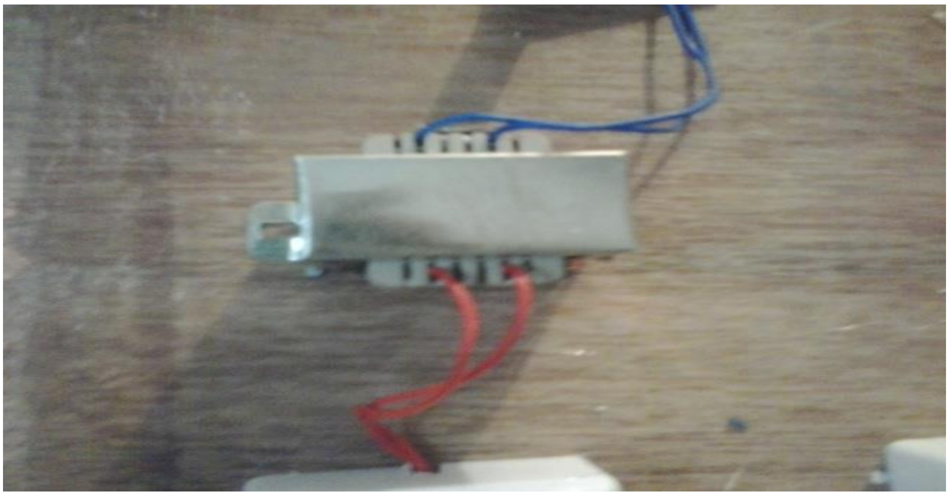

Figure 2.2- Stepdown transformer

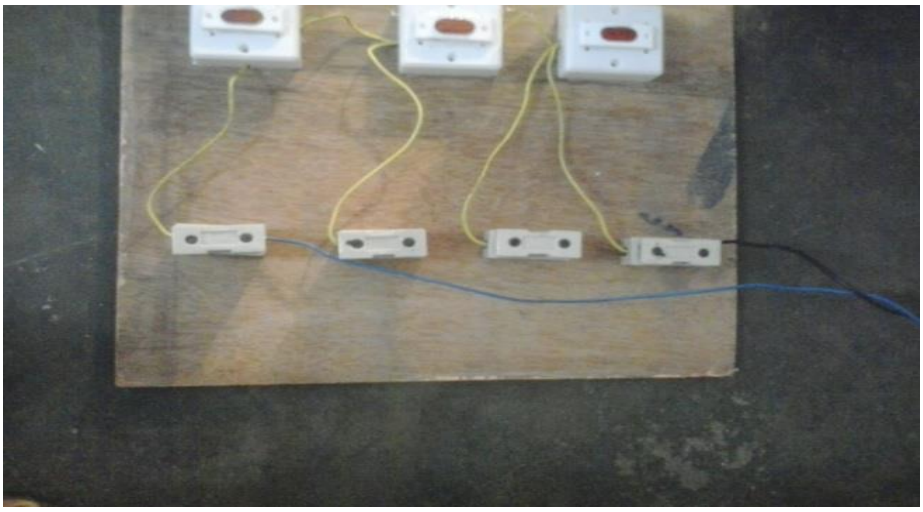

Figure 2.3- Three phase power supply

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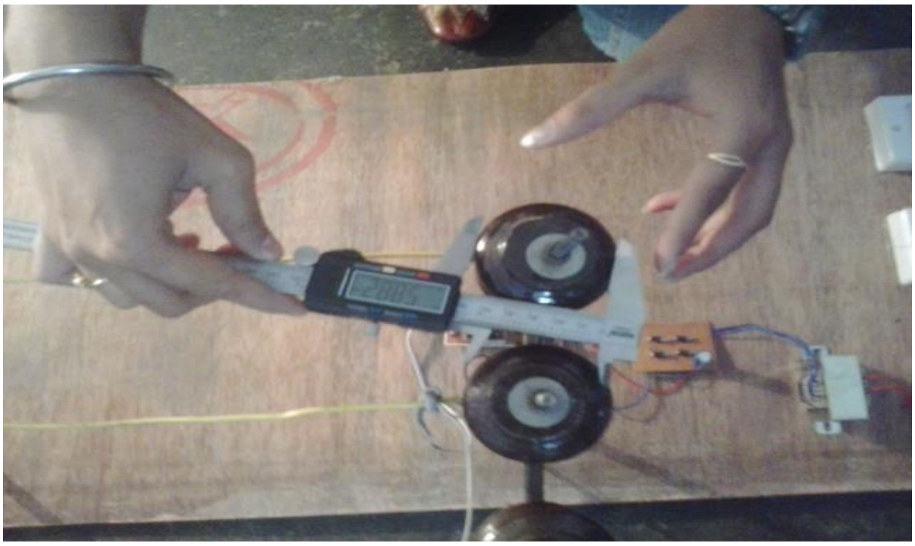

Figure 2.4- Outer diameter measurement of insulator

Figure 2.5- Wire thickness measurement

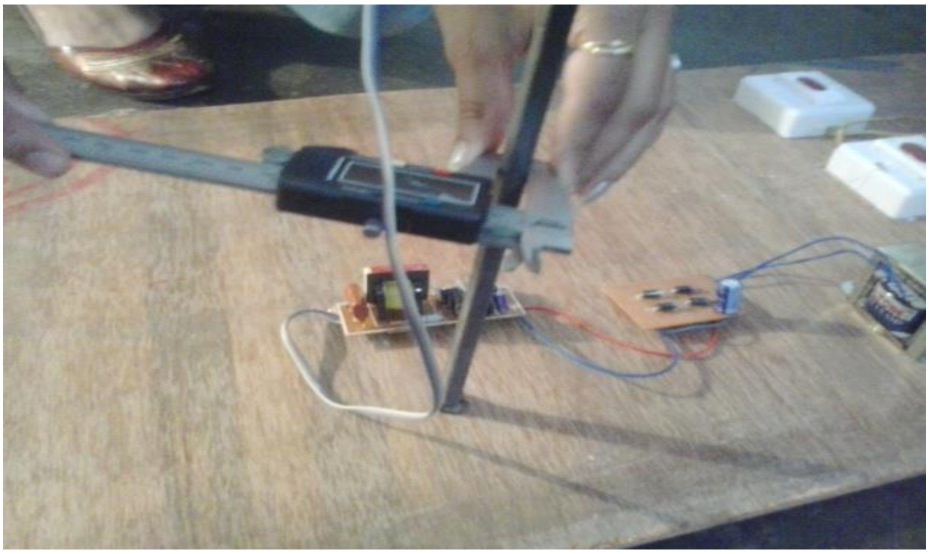

Figure 2.6- Dimension measurement of tee shaped rod

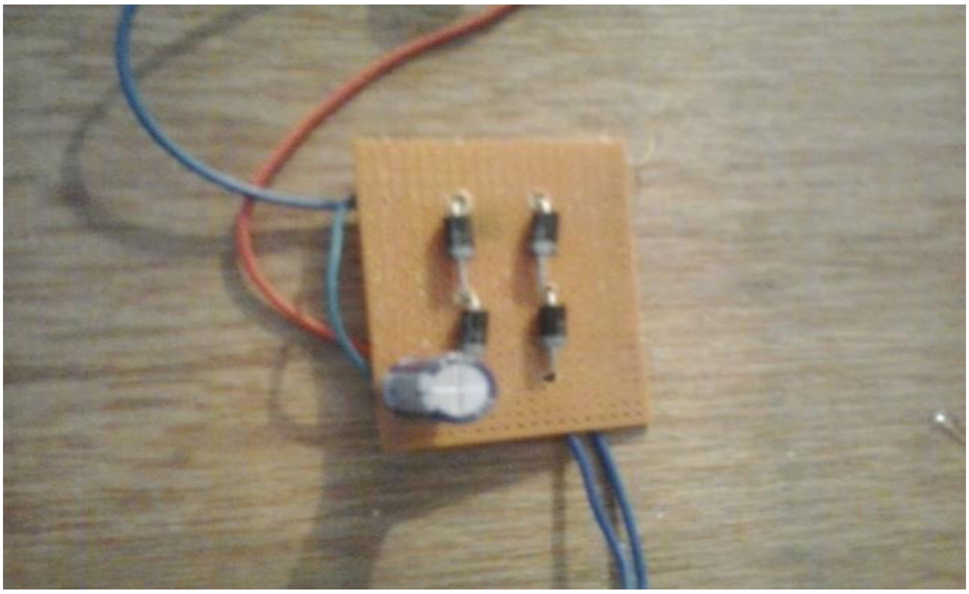

Figure 2.7- Power supply with filter

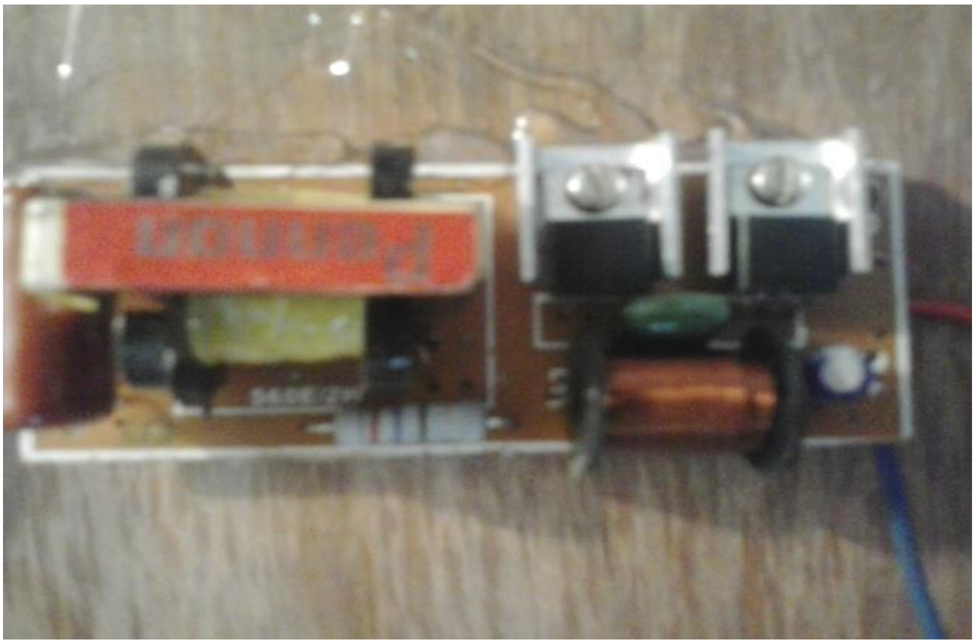

Figure 2.8- Experimental circuit of stepup transformer

3. RESULT AND DISCUSSION

Table 3.1.Field aged samples of RTV at 25°C

Sr. No.	Time in hours	Contact Angle , Aged	Contact Angle , New
1	2	66	75
2	4	72	85
3	6	76	95
4	8	77	100
5	10	80	115
6	12	82	120
7	14	86	120

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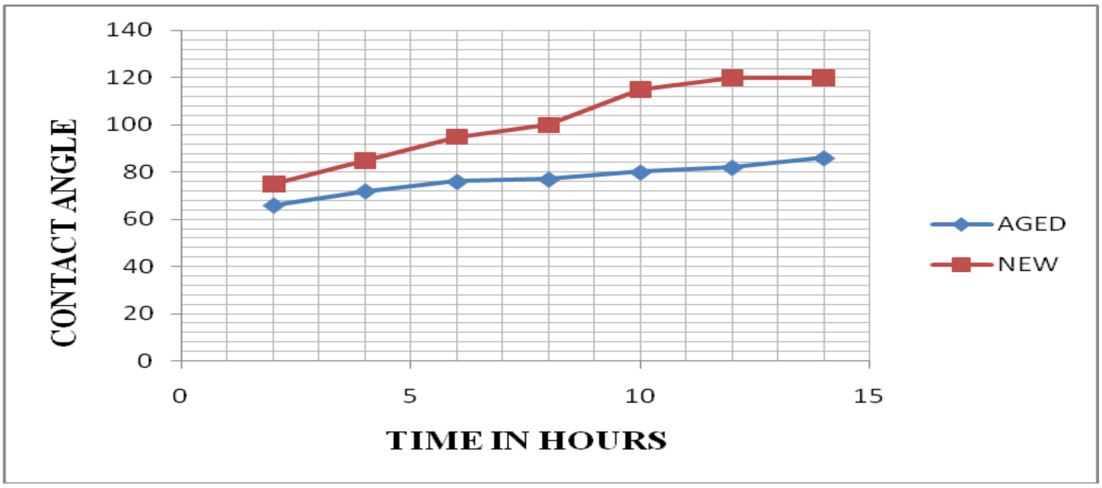

Figure 3.1.Field aged samples of RTV at 25°C

Table 3.2.Field aged samples of RTV at 28°C

Sr. No.	Time in hours	Contact Angle , Aged	Contact Angle , New
1	2	70	80
2	4	75	90
3	6	80	96
4	8	85	115
5	10	88	120
6	12	90	128
7	14	92	132

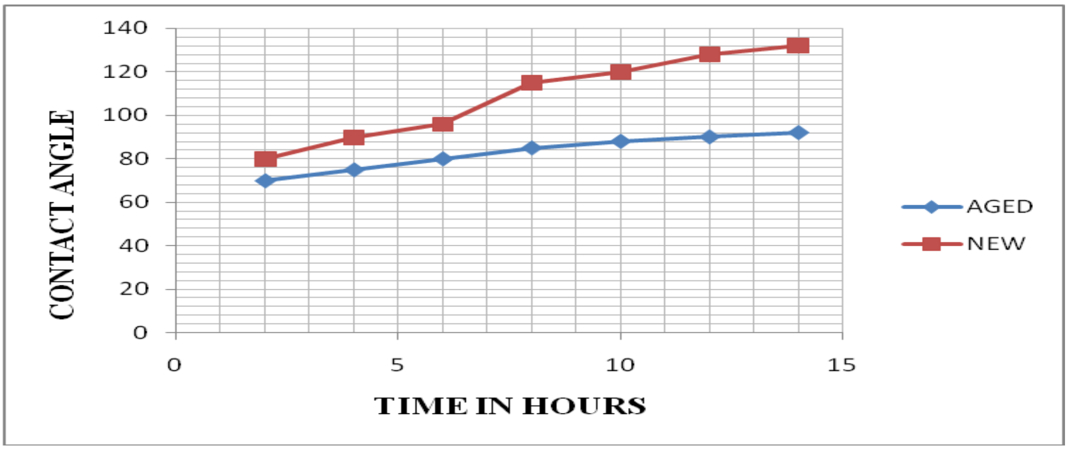

Figure 3.2.Field aged samples of RTV at 28°C

Table 3.3.Field aged samples of RTV at 32°C

Sr. No.	Time in hours	Contact Angle , Aged	Contact Angle , New
1	2	76	90
2	4	80	94
3	6	89	114
4	8	94	120
5	10	100	131
6	12	105	135
7	14	110	131

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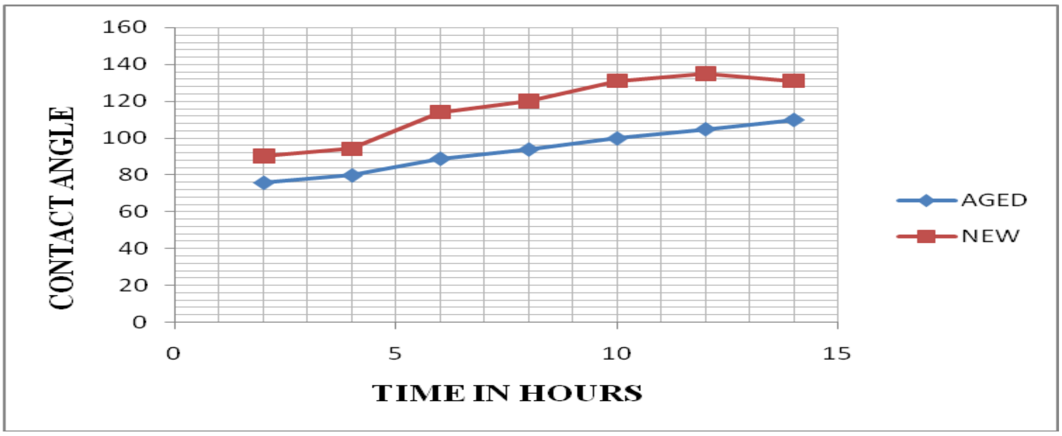

Figure 3.3.Field aged samples of RTV at 32°C

Table 3.4.Field aged samples of RTV at 35°C

Sr. No.	Time in hours	Contact Angle , Aged	Contact Angle , New
1	2	75	92
2	4	80	94
3	6	90	115
4	8	94	120
5	10	100	131
6	12	105	135
7	14	110	135

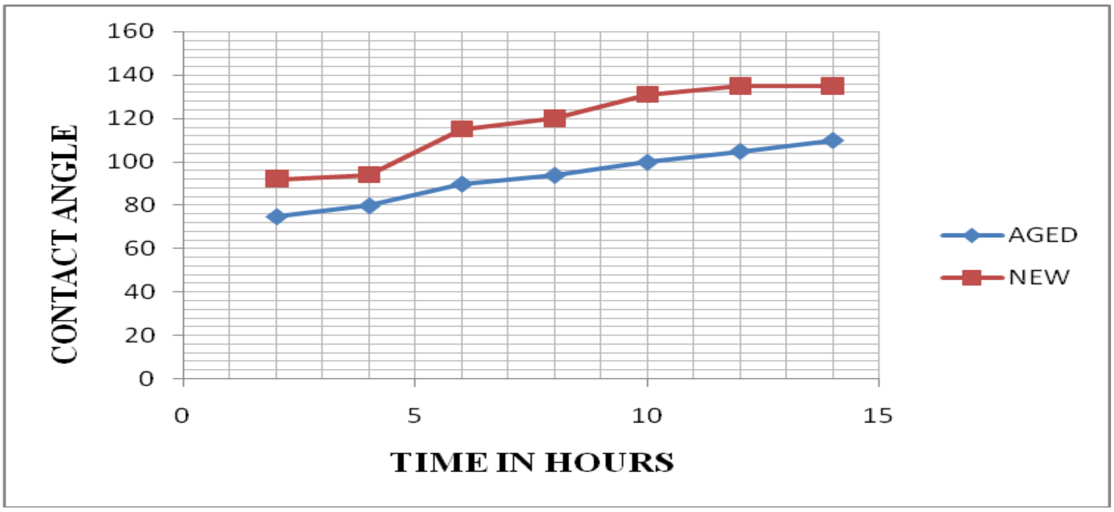

Figure 3.4.Field aged samples of RTV at 35°C

Table 3.5.Field aged samples of RTV at 38°C

Sr. No.	Time in hours	Contact Angle , Aged	Contact Angle , New
1	2	80	90
2	4	85	95
3	6	89	115
4	8	94	120
5	10	100	131
6	12	105	135
7	14	110	140

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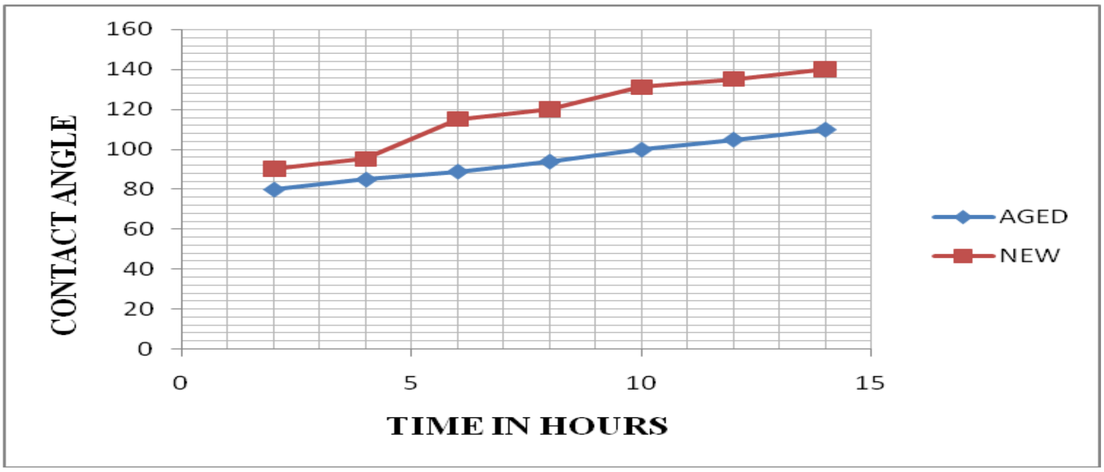

Figure 3.5.Field aged samples of RTV at 38°C

Table 3.6.Field aged samples of RTV at 42°C

Sr. No.	Time in hours	Contact Angle , Aged	Contact Angle , New
1	2	82	92
2	4	85	94
3	6	89	114
4	8	94	125
5	10	100	132
6	12	105	135
7	14	115	141

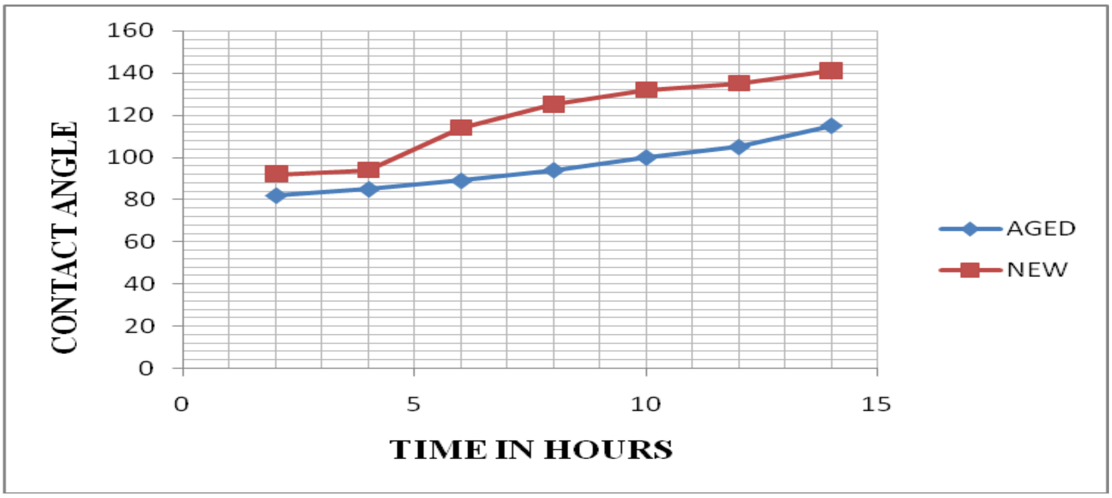

Figure 3.6.Field aged samples of RTV at 42°C

Table 3.7.Field aged samples of RTV at 45°C

Sr. No.	Time in hours	Contact Angle , Aged	Contact Angle , New
1	2	85	95
2	4	88	100
3	6	89	114
4	8	94	120
5	10	110	135
6	12	115	152
7	14	120	145

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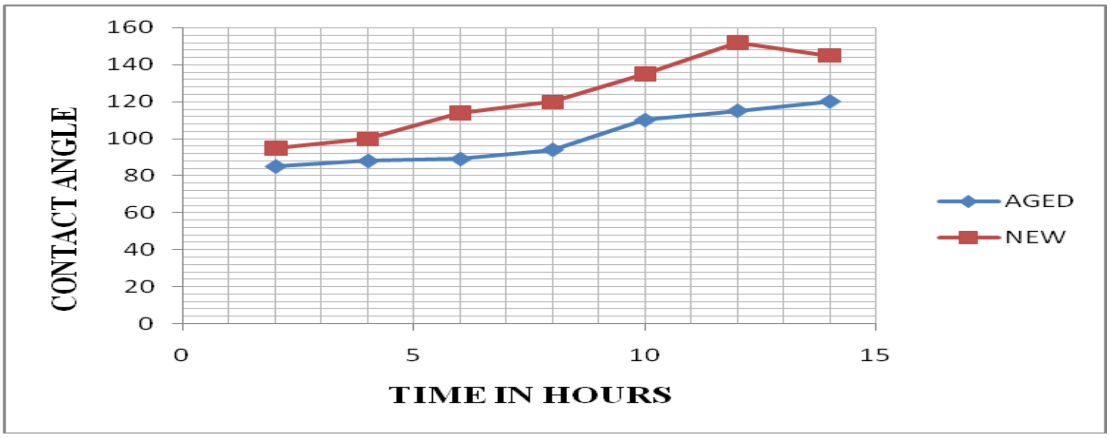

Figure 3.7.Field aged samples of RTV at 45°C

4. CONCLUSION

1. Find out the contact angle; new have 152 at 12 Hours. Operating at 45°C.

2. Suspension insulators became saturated with pollutants within 4 to 6 months .The pollutant layer has been measured to be up to 5mm thick.

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