P. G. Benignus - St. Louis

November 4, 1970

→ H. S. Bergen
T. L. Gossage

Aroclor 1242
M. Tsukashima MMK
Chf. Eng. Yokkaichi Plant

J. R. SAVAGE - JSAVA
R. H. MUNCH - QHKENY
W. R. RICHARD - WRICH

It was a pleasure to have Tsukashimasan visit us today at St. Louis. The following interesting things were gathered from his remarks.

Our Aroclor process calls for "take-over" distillation from 0.5% lime. To improve the thermal stability of the power factor to a level as good as Kaneclor 300, the Yokkaichi plant distilled from 0.2% lime plus 0.2% attapulgus earth. A quantity of 84 metric tons of Aroclor 1242 was distilled from 200 Kg of earth plus 180 Kg of lime. These materials were added - one half at the start of the distillation and one half near the middle of the run which consisted of 17 batches of Aroclor. The quality of the initial portions of the distilled Aroclor was high. Then it decreased as the distillation continued, thru subsequent batches. This reflects the variable nature of this quality. The best batch had a power factor of 1.4% at 100c and 50 Hz after heating 72 hours at 210°C. This compares with a value of 2.3% for Kaneka 300, as detesmined at Yokkaichi, also after heating for 72 hrs. at 210°C.

Mr. Tsukashima indicated learning recently that Kaneka distill from a mixture of caustic soda and lime. The Yokkaichi research laboratory tried thiswwith good results, but the plant has not yet had opportunity to try it. (There is a safety hazard with caustic soda)

It was related that Kaneka makes a special grade of Kaneka 300 for Matsushita. Matsushita is secretive about this and it is not clear whether they use this special grade (exclusive of Aroclor bought from MC) for all their other Aroclor capacitors or if for only a portion of their normal capacitor production.

Earlier it was indicated that the material obtained in the initial portion of the distillation is the best quality. Accordingly, we wonder whether the special high quality KC 300 is indeed material from the early part of the distillation, captured to satisfy the special requirements at Matsushita.

Our Japanese associates believe that Kaneka sell this special KC 300 to Matsushita at 17.0¢/lb. and that they offer to supply material at 14.0¢/lb. to Matsushita in competition

DSW 200107

STLCOPCB4058171

with MC Aroclor to meet Matsushita's needs for our Aroclor 1242aas requested by USA importers of capacitors made by Matsushita.

Mr. Tsukashima said that Kaneka's "old process" did not fractionate. He does not know whether "new" Kaneclor 300 employs fractionation. He feels certain that Kaneka does not have a fractionation column, as we plan for MCS 1016.

Kaneka use ferric chloride or iron powder catalyst. They do their final purification with attapulgus earth using batch treatments and filter presses - similar to our process, before we adopted the Porocel column.

In any event Matsushita thus far has rejected all MMK samplings and use our MC Aroclor 1242 only for capacitors exported to the USA and continue their contention that Kaneka 300 at higher temperature is better and more consistent than Monsanto's Aroclor 1242, whether from MMK, Anniston or WGK.

In the following tabulation we take liberty to include two samples of Aroclor 1242 from MCL to dramatically show Matsushita's contentions about the relatively poor quality of some of Monsanto's Aroclor. However, we also show having found from time to time some Monsanto material that looks just as good as some of the Kaneka 300.

Indeed Dr. Munch emphasizes that this thing is a highly variable factor. It appears that Kenaka have learned to police it - whereas we have not, because we have not before encountered the need to do so.

The variability of this phenomina (and we mention that the entire test procedure is outside the framework of the official specifications for capacitor Aroclor 1242) is illustrated in the following comparative tabulation:

Comparative Tabulation of Power Factor at 100°C and 50 or 60 Hz. After Heating For 72 or 100 Hrs. at 210°C

A. Data From Yokkaichi (MMK) comparing Aroclor 1242 distilled from .2% lime and .2% Attupulgus clay - against Kaneclor 300

	Initial	After Heating 72 hrs. at 210°C
MMK (Lot 04239)	0.02%	1.4%
KC 300	0.1	2.3

B. Data from Dr. Munch's Laboratory on Four Different Lots of KC 300

	Initial	After Heating 100 hrs. at 210°C
1	0.32%	1.5
2	0.06	0.8
3	0.3	0.7
4	0.09	3.4

DSW 200108

STLCOPCB4058172

C. Data from Dr. Munch's laboratory on Samples from Anniston, Including Lot No. AL-1008 Rejected by Matsushita; Sample of MCS 1015; Sample From WGK and Two Samples From MCL (Newport)

	Initial	After Heating 100 hrs. at 210°C
Anniston	0.16%	1.8%
Anniston Lot AL 1008	0.2	9.0%
MCS 101y	0.01	3.4
WGK	0.1	3.0
MCL	0.3	70.0
MCL	0.03	60.0

One can see why Matsushita contend that the thermal stability of the power factor of Kaneka 300 looks relatively superior. On this basis their rejection of Anniston's Lot AL 1008 is apparent.

Even more obvious is the relatively poor quality of the two samples from MCL. We know that MCL had been operating at full or over capacity to fill orders. Historically, at such times the Aroclor quality has usually decreased, even noticeably within the framework of the official specifications, which do not include this thermal stability - power factor evaluation, as developed only in Japan.

Finally the tabulation shows that some lots made at Anniston compare quite well against Kaneka 300, and the same probably holds for some of the production at WGK.

Dr. Munch emphasizes that this quality is highly variable and to comprehensively probe our production and that of Bayer and Prodelec as well as Kaneka would require an enormous testing program.

The question at this time is whether using 0.2% of earth during the distillation effectively solves this problem under average operating conditions. While we all hope that the views of our Japanese associates about this are valid, we feel that much more experience is needed to establish the full value of the earth addition. In general earth functions as an adsorbent and its effectiveness is inversely proportional to the temperature, i.e. it loses efficiency at higher temperatures.

Likewise in the case of Kaneka's operation we wonder whether the use of a small amount of strong base, such as caustic soda serves alone to solve the problem.

What we do know is that the Aroclor process operation is quite empirical and is to a large degree dependent on the operator, at a given time.

DSW 200109

STLCOPCB4058173

We are left to wonder about the degree of special policing during operation that may be employed by Kaneka to produce, capture and isolate the special quality required by Matsushita.

On this point we were impressed by Mr. Tsukashima's remarks that the material from the early stages of the take-over distillation is of the highest quality and that subsequent material (batches) are of lower quality.

If this is true then to capture this segment of material will require changing the operating procedure. This may well be what Kaneka has done to obtain their "special" KC 300.

It would seem more desirable if quality control hardware could be incorporated in the process lines to monitor this problem. This brings up the possible value of efficient fractional distillation and draws attention to MCS 1016 made so far in the pilot plant. About this the thermal stability of the power factor of MCS 1016 at 3.4% is not as good as three samples of Kaneka 300, it is at the same level as a fourth sample of KC 300 and it is not as good as one sample of Anniston material. Yet MCS 1016 looks reasonably good. It is far better than some other regular Monsanto production.

In conclusion, what our Japanese associates have done using earth is interesting, but further study and trials (to date only 2 runs have been made) seem needed to confirm its function and reliability.

Mr. Tsuhashima has sent a sample of the MMK Aroclor 1242 with power factor of 1.4% after heating for 72 hours at 210°C. A similar sample is being sent to Dr. Munch. From a commercial point of view to consummate a package deal with Matsushita to purchase Aroclor 1242 from MMK as well as from MC it is essential that Matsushita approve MMK's Aroclor. The commercial goal is to get Kaneka out of the picture and to not merely replace MC Aroclor with MMK Aroclor at a low price and Monsanto's market share limited to the capacitors made by Matsushita for export to the USA. This explains why at the present stage I have not called Ray Clark at Electronic Components to convince him that the quality of MMK Aroclor is as good as the quality of Monsanto's USA material. First, we should learn whether now Matsushita will accept MMK Aroclor for their non-export needs. For this reason regardless whether the earth does it or if it is operating control and batch isolation we all hope that MMK has now been able to come up with Aroclor meeting the Matsushita thermal stability - power factor requirements to allow competing with Kaneka 300. This would allow MMK to get 17¢/lb. instead of 14¢/lb. in the domestic market at Matsushita.

DSW 200110

Paul G. Benignus

STLCOPCB4058174