Aroclor Analytical Methods

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ANALYTICAL LABORATORY INVESTIGATION # 4

AROCLOR 1242 - AFTER-CORROSION CHLORIDES

Purpose

Determine cause of differences between Anniston, WGK, and General Electric laboratories in estimation of After-Corrosion Chlorides.

Method

1. Direct contact was made by telephone with Hudson Falls laboratory to obtain exact procedure followed in corrosion test and determination of chlorides. Procedure of WGK laboratory was observed at time of visit in June. Further details were established by telephone.

2. Complaint samples were returned to Anniston. They were checked by both Anniston and GE procedures for corrosion stability and after-corrosion chlorides.

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SUMMARY

AFTER CORROSION CHLORIDES

AROCLOR 1242

Test Sample (Original Cl^-)	Corrosion Treatment	Repeat Chloride Test	ppm Cl^-
Lot 501 (.1)	500 flask	Anniston	<.1
			<.1
	250 flask	GE	0.1
	General Electric Testing		0.3, 0.3, 0.4
	WGK Testing		<.1
Lot 502 (.1)	500 flask	(Anniston	<.1, <.1
		(GE	<.1
	250 flask	(Anniston	<.1
		(GE	0.2, 0.2
	General Electric Testing		0.2, 0.2, 0.3
	WGK Testing		0.2, 0.2
Lot 508 (<.1)	250 flask	(Anniston	<.1
		(GE	0.2, 0.3
	General Electric Testing		0.2, 0.4
	WGk Testing		<.1
Lot 512 (<.1)	250 flask	GE	0.1
	General Electric Testing		0.3, 0.3
Lot 506 (<.1)	250 flask	GE	.1
	General Electric Testing		<.1, 0.2, 0.3 (F.E.)(H.F.)(Pitt.)
Lot 510 (<.1)	General Electric Testing		0.3
Lot 515 (<.1)	General Electric Testing		0.3
Lot 516 (<.1 GE Test)	General Electric Testing		<.1, <.1
Lot 505 (<.1)	General Electric Testing		<.1
	WGK Testing		<.1

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Summary

1. The following summarizes the procedures followed and the magnitude of after-corrosion chlorides obtained:

Corrosion Test	A-C Chlorides Found	Chloride Determination
GE - WGK Method 250 cc flask 200 cc sample (300 g) 210°C for 6 hours	HIGH	GE - WGK Method equal weights Aroclor and water double extraction with water wash water extract with ether develop turbidity with silver observe Tyndall beam
Anniston Method (See Note (1)) 500 cc flask 300 grams 210°C for 6 hours	Low Low	Anniston Method 200 g Aroclor - 50 cc water single hot extraction with water wash water extract with ether develop turbidity with silver observe against standards with transmitted light

Note (1) Anniston corrosion method is identical to the General Electric 1945 procedure. The change in flask size was made in 1947 without the knowledge of the Anniston laboratory.

Note (2) Low chlorides (0.1 ppm or below) were obtained with all combinations of corrosion test and chloride determination except that specifying the 250 cc reaction flask and the Tyndall beam detection.

2. Comparative results of Hudson Falls, Pittsfield, and WGK all using the same procedure gave data ranging from <0.1 to 0.4 on the same material. General Electric laboratories disagreed to the extent that Fort Edward accepted Lot 506 with <0.1 while Hudson Falls and Pittsfield rejected it with 0.2 ppm and 0.3 ppm, respectively.

3. Work done in 1947 comparing the General Electric chloride determination with the Anniston method indicated that they were in agreement. It also showed that the Anniston method was more consistent and free of error.

Conclusions

1. To duplicate General Electric values in After-Corrosion Chlorides, it will be necessary to use a 250 cc reaction flask in the corrosion test and to follow the Tyndall beam detection method.

2. There is no explanation for the pronounced effect of the change in flask sizes upon the corrosion stability. One hypothesis might be the effect of free space in the larger flask in vaporizing chlorides from the hot Aroclor.

3. The Tyndall beam detection method is best used as a specification limit test at 0.1 ppm chlorides. At this point the beam is only faintly visible. At higher concentrations, the intensity of the beam is difficult to estimate, making comparisons with standards unreliable in these ranges. The method is greatly affected by dust, lint, minute air bubbles, finger prints on the test tube, etc. The beam intensity increases rapidly with time, requiring close time control, especially at the 0.1 ppm point where the beam is almost invisible.

4. For measurement of chlorides formed by thermal decomposition, an entirely different procedure should be developed. It should retain all chlorides formed and measure them by a more reliable technique.

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