

Monsanto

FROM (NAME & LOCATION)

St. Louis - General Office

DATE

March 17, 1969

CC:

SUBJECT

REGIONAL WATER QUALITY
CONTROL BOARD

REFERENCE

Their letter to you of March 7
from Mr. Fred H. Dierker

TO

TO

H. S. Bergen - HBERG

*Hold
This card*

About Aroclor used in the dielectric area, we respond to items 4, 5, 6, and 7 of Mr. Dierker's letter as follows:

- 4) The solubility of Aroclor in tap water at 25°C. is as follows:

<u>Product</u>	<u>Solubility in Water</u>
Aroclor 1242	203 $\pm$ 10 ppm
Aroclor 1248	106 $\pm$ 14 ppm
Aroclor 1254	50 $\pm$ 2 ppm

Exhibit C

Although the solubility of Aroclor 1260 has not been determined, the above data certainly serves to indicate that the more highly chlorinated Aroclors such as 1260 are the least soluble in water. Accordingly, it is quite reasonable to say that the solubility of Aroclor 1260 in water would be significantly lower than 50 ppm.

- 5) Aroclor 1242 and a small amount of Aroclor 1254 are used in hermetically sealed capacitors. The hermetically sealed can construction is of aluminum, mild steel, and stainless steel. These capacitors are used imbedded in asphalt in fluorescent lighting systems. They are used for power factor correction on utility lines. They are also used as motor run capacitors for air conditioning systems.

Attached are the specifications for Aroclors 1242, 1254, 1248, and 1260, which describes the physical properties of these materials.

Aroclor 1260, and to a lesser extent Aroclors 1242 and 1254, are used as components in transformer fluids of the askarel type. In general, the amount of Aroclor used in the transformers fluid ranges from 45 percent to 60 percent.

DSW 201090

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On the West Coast in 1968, about 300,000 pounds of Aroclor was contained in the transformer askarel fluid used in that region to make transformers.

These askarel transformers are also hermetically sealed, non-breathing apparatus. Very little of the fluid is used to replace spent fluid. Askarel transformer failure that would require replacement of the fluid is very rare. For example, the Edison Electric Institute found that the incident of such failure is in the range of 0.05 percent.

- 6) No Aroclor capacitors are made on the West Coast.

Transformer manufacturers on the West Coast who handle Aroclor containing fluid include:

Federal Pacific - Santa Clara, California
Hill Magnetics - Redwood City, California
H. K. Porter - Bellmont, California
Sierra Transformer - Redwood City, California
Spokane Transformer - Spokane, Washington

- 7) In the normal use of capacitor or transformer fluid containing Aroclor, Monsanto advises the capacitor and transformer manufacturers to avoid breathing vapors that would be emitted from the fluid if it were heated to elevated temperatures. Monsanto also advises the user of the fluids to avoid continuous contact with the skin. If clothing becomes saturated, the workman is advised to launder it before wearing it again. If there has been spillage on the skin, it should be removed by washing with soap and water. Normal, ordinary good housekeeping practice is recommended.

Normal filtration of the fluid as done in the electrical industry has not presented health hazard provided that ordinary normal cleanliness is followed.

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The amount of Aroclor dielectric fluid discarded is indeed relatively small. However, such relatively small amounts have been discarded in drums by removal to dumping areas. In rare instances, when a significant amount has become available for disposal, Monsanto practices having the fluid sent back to our plant for reworking and reuse in non-electrical areas.

We would suggest answering Mr. Dierker's questions about Aroclor dielectrics in accordance with the above.

As he also seeks our views on PCB materials used in non-electrical areas such as hydraulic fluid, heat transfer media, plastics, etc., may I assume that you have asked people handling those areas to submit their views?


P. G. Benignus

/ecd
Enclosures

DSW 201092

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AROCLOR 1242 (Trichlorobiphenyl)
Specification Properties - September 27, 1962

<u>PROPERTY</u>	<u>TYPICAL</u>
Visc. at 37.8°C. (ASTM D88-56)	82 - 92 seconds Saybolt Universal
Specific Gravity at 25/15.5°C. (ASTM D1810)	1.381 - 1.392
Color, APHA	50 max.
Condition	Clear
Acidity, mg. KOH/g. (ASTM D974, D664)	0.01 max.
Pour Point, °C. (ASTM D97-57)	-14 or lower
Inorganic Chlorides (ASTM D1821)	0.05 ppm. max.
Refractive Index at 25°C. (ASTM D1807)	1.6240 - 1.6260
Distillation Range (ASTM D20-56)	
°C. corrected for stem and barometric pressure	10% 325 min. 90% 360 max.
Water content (ASTM D1533-60)	35 ppm. max
Resistivity, 100°C. 500 volts DC at 0.1 inch gap. (ASTM D1169)	500 X 10 ⁹ ohm-cm. min.
Dielectric constant, 100°C. at 1,000 cycles (ASTM D924-49)	4.7 to 4.9
Flash Point, Cleve. open cup (ASTM D92-57)*	170° to 200°C.
Fire Point*	None to boiling point
Sulfates (ASTM D117-31)*	None
Fixed Chlorine Content (Carius)*	43 ± 0.5%
Specific Heat at 25°C.*	0.29
Evaporation at 100°C. for 6 hrs.*	0.4% max.
Dielectric strength (ASTM D877-49) at 25°C. KV min.*	35
Hydrolyzable Chlorine Compounds, (ASTM D1820-61) ppm. chlorides, max.	0.5
Thermal Stability (ASTM D1936) ppm. chlorides, max.	0.4
Coefficient of Thermal Expansion* (ASTM D1903)	0.00068 cc./cc./°C.

*Not determined unless by special request.

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AROCLOR 1248

PROPERTY

Visc. @ 54.4°C. (ASTM D-88)
Spec. Grav. @ 65/15.5°C.
(ASTM D-287)
Color, APHA
Condition
Acidity, mg. KOH/g.
Pour Point °C. (ASTM D-97)
Refrac. Index @ 20°C.
Dist. Range (ASTM D-20)

Water Content, ppm.
Resis. 100°C. 500 v D.C.
@ 0.1" gap
Dielectric Constant, 100°C.
1000 cycle
Dielectric Strength 25° C.*
Flash Point, (C.O.C.)*
Fixed Chlorine (Carius)*
Specific Heat @ 25° C.*

TYPICAL

73-80, sec. Saybolt Univer.
1.404-1.414
100 max.
Clear
0.01 max.
-7
1.630-1.631
343 - 373°C.

35
500 x 10⁹ ohm-cm, min.
4.6
35 KV min.
193°C.
47.5 - 48.5%
0.27

*Not determined unless by special request.

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STLCOPCB4059158

AROCOR 1254 (Pentachlorobiphenyl)
Specification Properties - September 27, 1962

<u>PROPERTY</u>	<u>TYPICAL</u>
Visc. at 98.9°C. (ASTM D88-56)	44 - 48 secs. Saybolt Universal
Specific Gravity at 65/15.5°C. (ASTM D1810)	1.495 - 1.505
Color, APHA	50 max.
Condition	Clear
Acidity, mg. KOH/g. (ASTM D974, D664)	0.01 max.
Pour Point °C. (ASTM D97-57)	7 - 12
Inorganic Chlorides, ppm. (ASTM D1821)	0.05 max.
Refractive Index at 25°C. (ASTM D1807)	1.6370 - 1.6390
Distillation Range (ASTM D20-56)	10% 366 - 378°C.
Corrected for stem and barometric pressure.	50% 371 - 383°C.
	90% 378 - 394°C.
Water Content, ppm. (ASTM D1533-60)	35 max.
Resistivity 100°C., 500 v. D. C. at 0.1" gap (ASTM D1169)	500 X 10 ⁹ ohm-cm., min.
Dielectric Constant, 100°C. 1000 cycles (ASTM D924-49)	4.15 - 4.35
Dielectric Strength 25°C.* (ASTM D877)	35 KV., min.
Burn Point (ASTM D92)*	Higher than 350°C.
Sulfates (ASTM D117-31)*	None
Fixed Chlorine Content (Carius)*	55 ± 0.5%
Evaporation at 100°C. for 6 hours*	0.4% max.
Specific Heat at 25°C. *	0.26
Hydrolyzable Chlorine Compounds, (ASTM D1820-61) ppm. chlorides, max.	1.0
Thermal Stability (ASTM D1936) ppm. chlorides, max.	0.5
Coefficient of Thermal Expansion* (ASTM D1903)	0.00066 cc./cc./°C.

*Not determined unless by special request.

DSW 201095

STLCOPCB4059159

AROCLOR 1260

PROPERTY

Visc. at 98.9°C. (ASTM D88)
Specific Gravity at 90°C. /
15.5°C. (ASTM D287)
Color, APHA
Condition
Acidity, mg. KOH/g.
Pour Pt., °C. (ASTM D97)
Inorganic Chlorides, ppm.
Refractive Index, 25°C.
Distillation Range (ASTM D20)
Corrected for stem and
barometric pressure
Corrosion

Water content, ppm.
Resistivity, 100°C. 500 volts
at 0.1" gap
Dielectric Strength 50°C.*
Dielectric Strength 100°C.*
Dielectric Constant 100°C.
at 1000 cycles*
Burn Pt. (ASTM D92)*
Sulfates (ASTM D117-31)*
Fixed chlorine content (Carius)*
Evaporation at 100°C. for 6 hrs.*
Stability*

Specific Heat at 25°C.*

TYPICAL

72 - 78 seconds Saybolt Univ.

1.555 - 1.566
150 max.
Clear
0.01 max.
25 - 34
0.10 max.
1.6455 - 1.6470
10% 385 - 398°C.
50% 390 - 404°C.
90% 400 - 420°C.
After heating with aluminum for
6 hrs. at 210°C. $\pm$ 10°C., the
aluminum must not be corroded
either on visual or weight in-
spection and the Aroclor 1260
should meet the following specs:

Color, APHA	150 max.
Free Chlorides, ppm.	0.10 max.
Acidity, mg. KOH/g.	0.01 max.
Condition	Clear
35 max.	

500 x 10⁹ ohm-cm., min.
30 KV., min.
30 KV., min.
3.6 - 3.8

Higher than 350°C.

None

60 $\pm$ 0.5%

0.2% max.

There shall be no liberation of
chlorine or chlorides when the
material is heated at 100°C. in
a glass vessel in contact with
air for periods of at least one
month.

0.23

*Not determined unless by special request.

DSW 201096

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