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PPG INDUSTRIES, INC. / ONE GATEWAY CENTER / PITTSBURGH, PENNSYLVANIA 15222

December 3, 1971

Dr. Kenneth D. Johnson
Manufacturing Chemists Association
1825 Connecticut Avenue, N. W.
Washington, D. C. 20009

Re: Trace Impurities in Vinyl Chloride Monomer

Dear Dr. Johnson:

The information you requested in your letter dated November 19, 1971 is as follows:

1. Production process - EDC cracking
2. Raw material source - Hydrocarbon cracking
3. Assay - Typical 99.99%
4. Identified impurities:

		Method
a.	1,2 dichloroethane	- < 5 ppm Chromatograph
b.	Acetaldehyde	- < 1 ppm Dinitrophenyl Hydrazine Reagent
c.	Water	- < 50 ppm Karl Fischer
d.	Propylene	- < .1 ppm Chromatograph
e.	Peroxides	- < .05 ppm Reduced Phenolphthalein
f.	Propadiene	- < .1 ppm Chromatograph
g.	2-chloropropene-1	- < .1 ppm Chromatograph
h.	Acetylene	- < 1 ppm Chromatograph
i.	Methylacetylene	- < .1 ppm Chromatograph
j.	Methyl chloride	- < 30 ppm Chromatograph
k.	Ethyl chloride	- < 50 ppm Chromatograph
l.	Butene-1	- < .1 ppm Chromatograph
m.	1,3-butadiene	- < 10 ppm Chromatograph
n.	Vinyl Acetylene	- < 2 ppm Chromatograph

Yours very truly,

Zeb G. Bell, Jr., Sc.D.
Director Environmental Control

/hab

Cc : G. J. Lazarchik
L. F. Sargent
R. E. Widing

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VINYL CHLORIDE MONOMER IMPURITIES (1971)

1. MANUFACTURING PROCESS:

Catalytic reaction of Acetylene with Hydrogen Chloride

2. RAW MATERIALS:

Acetylene: thermal cracking of Hydrocarbon feed stock

Hydrogen Chloride: byproduct HCl from the chlorination of Hydrocarbon feed stock

3. VCM Purity:

Minimum	99.32%
Typical	99.67%
Maximum	99.80%

4. Impurities in the VCM:

Analytical technique: By vapor phase chromatography, detector with flame ionization. Ethyl-Hexyl Sebacate column. Sensitivity 1 ppm.

Impurities Detected:

<u>Substance</u>	<u>Minimum Con- centration ppm</u>	<u>Typical Con- centration ppm</u>	<u>Maximum Con- centration ppm</u>
Light ends (C3H6, C2H2...)	160	450	580
Isopentane	20	340	2300
n-Pentane	70	400	2000
Ethyl Chloride	0	0	Traces
2-Dichloropropene and Vinyl Bromide	10	40	200
Isopropyl Chloride	320	405	670
1-cis-Chloropropene	0	traces	traces
1-1-Dichloroethylene	traces	50	240
1-trans-Chloropropene	15	27	170
tert - Butyl Chloride	traces	2	150
n-Propyl Chloride	traces	5	130
Methylene Chloride	1	57	80
1-2-trans-Dichloroethylene	traces	13	50
1-1-Dichloroethane	100	1240	1500
1-2-Dichloropropene	traces	traces	5
1-2-cis-Dichloroethylene	traces	traces	10
Carbon Tetra Chloride	traces	traces	40
Chloroform	traces	traces	3
1-2 Dichloroethane	50	125	300
Trichloroethylene	traces	traces	150

600ppm

VINYL CHLORIDE

TANK #9016

11-29-71

Methane	NIL
Ethylene & Ethane	NIL
Propane	NIL
Propylene	NIL
Isobutane	NIL
n-Butane	NIL
Acetylene	NIL
Butane - 1	TRACE (0.5 PPM)
Unid.	NIL
Allene	NIL
Cis-Butene-2	NIL
Unid.	NIL
Butadiene	TRACE
Methyl Acetylene	NIL
Methyl Chloride	4 PPM
Vinyl Chloride	99.9995%
Ethyl Chloride	NIL
Unid.	NIL
Acetaldehyde	NIL
Vinyl Acetylene	NIL
1,1-Dichloroethylene	NIL
Acetone	NIL
Unid.	NIL
1,1-Dichloroethane	NIL
Unid.	NIL
1,2-Dichloroethane	NIL

Instrument - GC-5 (Beckman)
 Flame Ionization VFA
 Column - 25% IGE PAL CO 88 on
 Firebrick 1"x25'

VINYL CHLORIDE ANALYSIS

	Ethylene Base	Acetylene Base
Ethane	<u>NIL</u>	<u>NIL</u>
Ethylene	<u>NIL</u>	<u>NIL</u>
Propane	<u>NIL</u>	<u>NIL</u>
Propylene	<u>NIL</u>	<u>NIL</u>
Isobutane	<u>2 ppm</u>	<u>20 ppm</u>
Acetylene	<u>NIL</u>	<u>NIL</u>
n-Butane	<u>NIL</u>	<u>44 ppm</u>
Butane-1	<u>NIL</u>	<u>14 ppm</u>
Allene	<u>1 ppm</u>	<u>NIL</u>
Butene 2	<u>4 ppm</u>	<u>NIL</u>
Methyl Acetylene	<u>13 ppm</u>	<u>19 ppm</u>
Methyl Chloride	<u>11 ppm</u>	<u>NIL</u>
Ethyl Chloride	<u>22 ppm</u>	<u>NIL</u>
2 Chloropropene	<u>NIL</u>	<u>35 ppm</u>
Vinyl Acetylene	<u>19 ppm</u>	<u>NIL</u>
2 Chloropropane	<u>NIL</u>	<u>NIL</u>
1,1-Dichloroethylene	<u>NIL</u>	<u>NIL</u>
Acetone	<u>NIL</u>	<u>NIL</u>
1,1-Dichloroethane	<u>NIL</u>	<u>NIL</u>
1,2-Dichloroethane	<u>NIL</u>	<u>91 ppm</u>
Total Impurities	<u>72 ppm</u>	<u>223 ppm</u>

GAS CHROMATOGRAPHIC ANALYSIS 5-67

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