

STRICTLY
CONFIDENTIAL

ETHYL CORPORATION
Medical Department
Baton Rouge, Louisiana

INDUSTRIAL HYGIENE SURVEY
of
Baton Rouge Plant

Preliminary Survey of Materials and Processes
in
PVC OPERATIONS

I. General

The sector of the Ethyl Baton Rouge Plant designated as PVC Operations is principally involved in converting vinyl chloride monomer (VCM), produced by the Hydrocarbon Area, to polyvinyl chloride of both the "suspension" and "emulsion" types. The area also produces a special oxygen-barrier type resin (Barex) for Sohio under contract.

A simplified lay-out of the plant is attached as Figure 1. This plot shows the Reactor Building, with its batteries of kettles, and also designates the areas for finishing, compounding, and warehousing. Figure 2 provides a simplified flow diagram, beginning with monomer, and showing the finishing stages of the "suspension" type resin. Finishing operations on the emulsion "resin" are shown in Figure 3.

Three lists of materials, originally compiled for various purposes, are attached. These are being reconciled into a common list, and MSD sheets are going to be available for most of the items. (A substantial revision of the lists has been necessitated by a recent switch of items in the product mixes of the Tiptonville and Baton Rouge plants). A fourth list shows raw materials used in Barex manufacture.

For present purposes the operations may be divided into five areas: Polymerization, Suspension Resin Finishing, Emulsion Resin Finishing, Resin Compounding, and Barex Resin Manufacture.

The writer had the benefit of a briefing by Henry Smith, Superintendent of these operations, and also of Wilbur Paulk, Mike Hopkins, and George Johnston who guided me through the various parts of the plant. Bob Callander described the Barex operations.

II. Principal Materials (Raw Material, Product, By-product, Supportive)

The materials mentioned below are only illustrative. As the attached lists show, hundreds of materials, including dyes and additives, are used in producing resin products. A large fraction of the products are produced and/or compounded to customer specifications. And many of the polymerization recipes themselves are proprietary. Accordingly the following sections of this report are intended to serve simply as a rough outline and guide to assist an in-depth study of the situations with which the hygienists need to become familiar.

Suspension Polymerizations

The suspension polymerization kettles are designated with an (S) in the circles at the left of Figure 1. Those four in the cross-hatched lower box are newer and larger vessels.

Most suspension polymerizations are run at pressures above 100 psi, ranging to about 240 psi. A typical reactor charge will consist of:

- 1) Suspending agent, e.g. "Alkatex", (polyvinyl alcohol)
- 2) Catalyst, e.g. dodecanoyl peroxide, or X-16, or both. X-16 is a proprietary catalyst prepared on-site.
- 3) The charge of vinyl chloride under pressure
- 4) Antifoam (silicone)
- 5) Short-stop, e.g. para-benzoquinone in chloroform or acetone.

The kettle is heated to begin the reaction, but chill water is then circulated to absorb the reaction heat.

Emulsion Polymerizations

These reactions are usually run at lower pressure, e.g. 100 psi. A typical charge will contain:

- 1) Emulsifiers. Various soaps, (all purchased). Calsolene (ICI), a sulfonated oleate. Myristic acid plus ammonia. "Sipex" soaps. Triton N-361.

- 2) Isopropanol
- 3) Antifoam
- 4) Vinyl chloride charge
- 5) 10% ammonia or 1% ammonia or 25% caustic
(Allied chemical) for pH control
- 6) Shortstop, e.g. benzoquinone in chloroform or acetone

Polymerization Operations - General

Chill Water. Water is cooled by two Freon-11, and one F-12-charged units for use around the jacketed reaction kettles, and also to cool some solution make-up tanks.

De-ionized water is required in the polymerizations. Water from drilled wells is de-ionized in:

- 3 cation exchangers
- 3 anion exchangers, and then
- 2 mixed-bed exchangers

The beds are regenerated by caustic and sulfuric acid.

Vinyl chloride recirculation. The flow diagrams trace the movement of VCM. After a polymerization reaction is complete, the kettle is depressurized, then de-gassed under reduced pressure. This unreacted fraction of monomer is sent to the holder shown in Figure 2. The stored gas is compressed and fractionated in a stripper, where the non-condensables (mainly nitrogen, with some monomer) are vented. The condensed monomer is returned to the storage feed tanks. (An incinerator is planned for disposal of this waste).

Suspension Resin Finishing

De-gassing. The slurry of resin is discharged into a de-gassing tank (see Figure 2), where vacuum pumps boil out the reacted monomer, by-product gases, and atmospheric gas (essentially nitrogen). These flow to a gasholder. The gases are later compressed and the non-condensables stripped out and vented. (See planned incinerator).

Centrifuging. The slurry is centrifuged to separate the suspension resin from the mother liquors. The resin drops into a rotary dryer. The aqueous effluent has a generally clear appearance, and appeared quite free from odor. It contains all the chemicals which do not enter the reaction, of course, plus by-products. This water is discharged into a sump and open ditch leading to one of the ponds. No analysis was available.

Drying. In a rotary dryer, the resin is blown with air filtered and heated by steam (from Gulf States Utilities). The moist air exhaust is discharged through chimneys on the roof. Besides water, the discharge contains relatively low proportions of VCM and other organic volatiles. (The moisture shows up in the form of fog on occasional winter days).

Emulsion Resin Finishing

These operations are shown in the diagram of Figure 3. Emulsion resin particles are very much finer than suspension resin, with size in the range of 30-50 microns. (These products are intended mainly for shipment as the powders to purchasers for use in making battery separators and many types of coatings.

Drying. The emulsion from the autoclaves passes through screens to 1) storage tanks to 2) pumps feeding the 3) spray dryers. In these dryers, filtered and steam-heated air flashes off the water scattered by a spinning disc. The powder is dropped out and conveyed in a blast of filtered air to cyclones which separate the product and drop it onto screens which reject oversize particles.

The air from the cyclones contains some powder, and this is removed by dacron bag filters (500 bags). The air is discharged at the roof. (Since no liquid was separated by centrifuging or filtering, the discharge air from the emulsion dryers contains all the water, as well as all the volatiles from the polymerization process).

(Occasionally a bag bursts and a cloud of resin powder billows up at roof level. This event is not monitored by equipment, and is detected only when someone catches it by eye).

The product passing the screens goes to bagging equipment.

Grinding. For some purposes the finished emulsion resin is still too coarse, and the product is fed to a grinder to produce a powder which meets customer specifications.

Resin Compounding

Most of Ethyl's PVC compounding operation uses suspension resin. (Supplies of the resin are kept stored in a silo. For any particular recipe a weighed batch of resin is mixed with any of many varieties of dyes, plasticizers, processing aids, etc. (see list at end of this report) and fed into a ribbon blender. (Most of the additives are received in bags or drums). The mixture goes to a heater, and is then formed into hunks, or "bricks". These bricks go to a roll mill, where they are formed into a sheet and then cut into strips. The strips are cut into "dice". Shipment is made in bags, large boxes, or 180,000 lb. capacity rail cars.

Ethyl makes Barex for Sohio under a contract with limited term. Sohio is now building a Barex plant, and they have licensed a Swiss company (Lonza) to produce the resin. Much of Ethyl's product is shipped to Vinyl Plastics, Inc., who extrudes a packaging grade film. Oscar Mayer is a principal customer for this.

As many as 28 raw materials go into Barex manufacture. (See attached list.) The process is complicated, and involves several steps. The recipe calls for a number of pre-blends to be made up.

In principle, Barex is made by preparing a nitrile elastomer latex which is stored temporarily for use in the second step. In the next step two other monomers are grafted onto the backbone of the elastomeric polymer. The final product is coagulated into short, white strands, and is shipped in this form. Much of the process information is proprietary, and for industrial hygiene purposes it should be necessary here only to identify the raw materials and understand their roles in the operation.

Nitrile rubber latex. A soap is prepared from Emersol fatty acid and potassium hydroxide. Other ingredients:

Stabilizers and Antioxidants

Polyguards and Naugards

(Uniroyals' Nos. 401, 402, 403, 404.

MSDs on request through Sohio. These substances remain in the product).

Catalyst, dry: DuPont VA 20-64.

Monomers:

Acrylonitrile (tank truck)

Butadiene (tank truck)

Chelator: Versene

Daxad

Tertiary dodecyl mercaptan

This operation is conducted under pressure at slightly elevated temperature. Two or three batches can be prepared in one day. The 6 batches from 2 days operations ("one campaign") are adequate for making 40 to 60 batches of Barex resin, and are stored for this second step.

In the second step acrylonitrile and methyl acrylate are grafted onto the elastomer.

Other ingredients:

Potassium persulfate (catalyst)

Mercaptate O-43 (Chain transfer agent. Injected as reaction proceeds).

(Obtained from Evans or Carlyle)

Polyvinyl pyrrolidone

Monowet, as emulsifier. Also

Gafac.

After 6 batches have been accumulated in the second (graft) step, these emulsions are coagulated by the addition of an alum solution. The mixture is next extruded through a perforated disc into water kept at 180F, forming single wrinkled strands, roughly one inch long. These are screened, washed, screened, washed, and finally dried.

By-products. The autoclaves are de-gassed under vacuum, and the exhaust vented at the roof. The major organic effluent from the latex operations is butadiene.

About 85-90% of the monomers used in the Barex plant goes into the product. The waste water from the first screening is hauled away in tank trucks by Rollins Environmental (Div. of Rollins International). This liquid contains a lower aqueous phase containing about 5% of unreacted monomers, and for disposal is biologically treated. The upper, organic phase-mostly monomers plus low polymers-is burned by Rollins.

The exhaust from the final drying of the resin contains some monomer vapor.

The wash waters (produced after the first screening) go to the ditch. These contain some Monowet, some monomer, and some of the resin.

III. General Notes

1. Waste PVC. The plant produces considerable material which is either particle oversized, or suspended in effluents, or below grade. Where possible, the off-grade and off-size material is sold. Floor sweepings and other solids go to landfill. Large amounts of material accumulate in the settlings of ponds. The ponds are periodically drained, and settled wastes hauled to landfill.
2. Autoclave Clean-up. The walls of the PVC autoclaves are purged with high-pressure water after every resin batch is discharged. The wash water flows to the ditch and pond, carrying PVC scrappage.

Attachments:

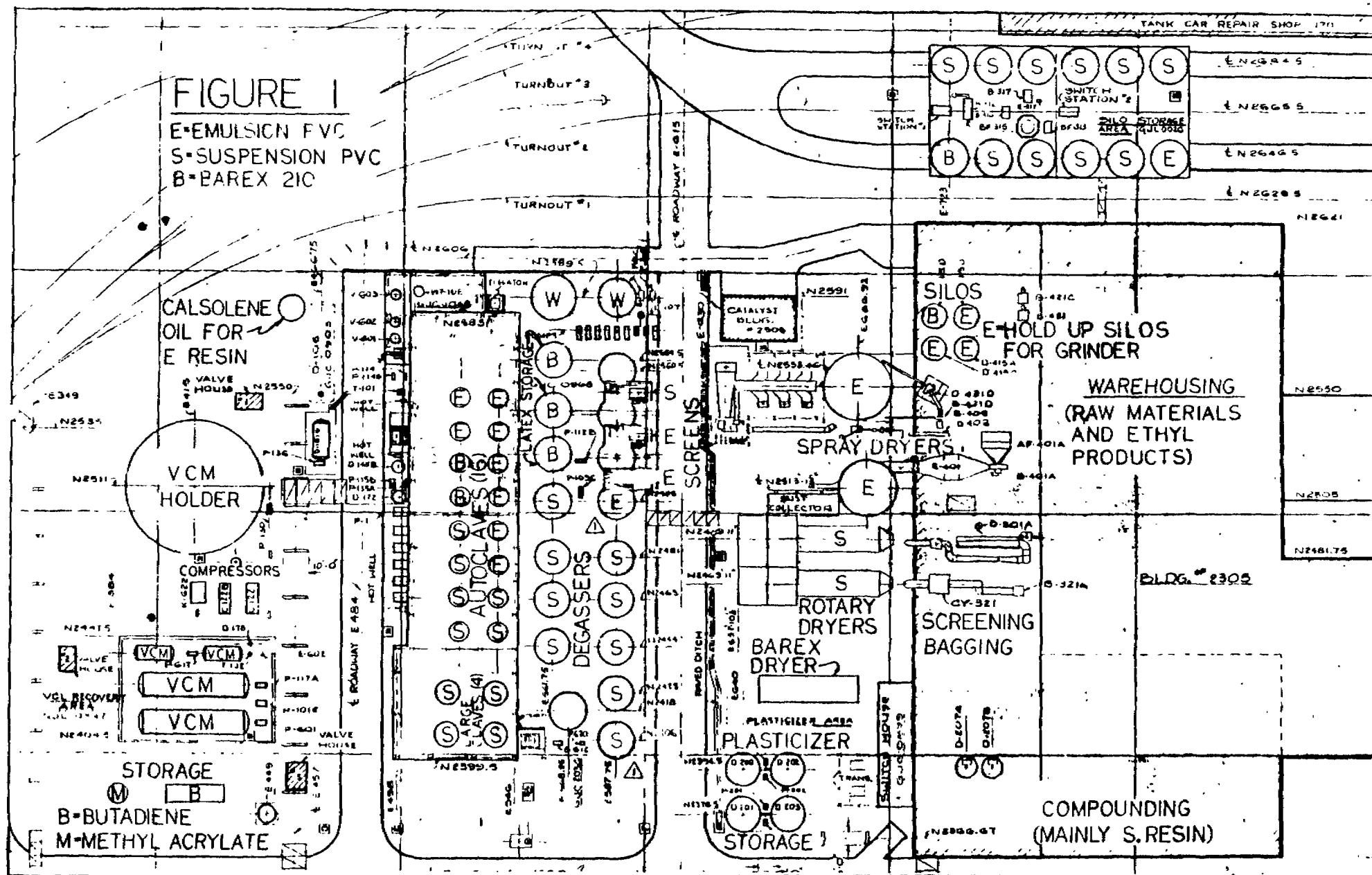
Figures 1 to 4

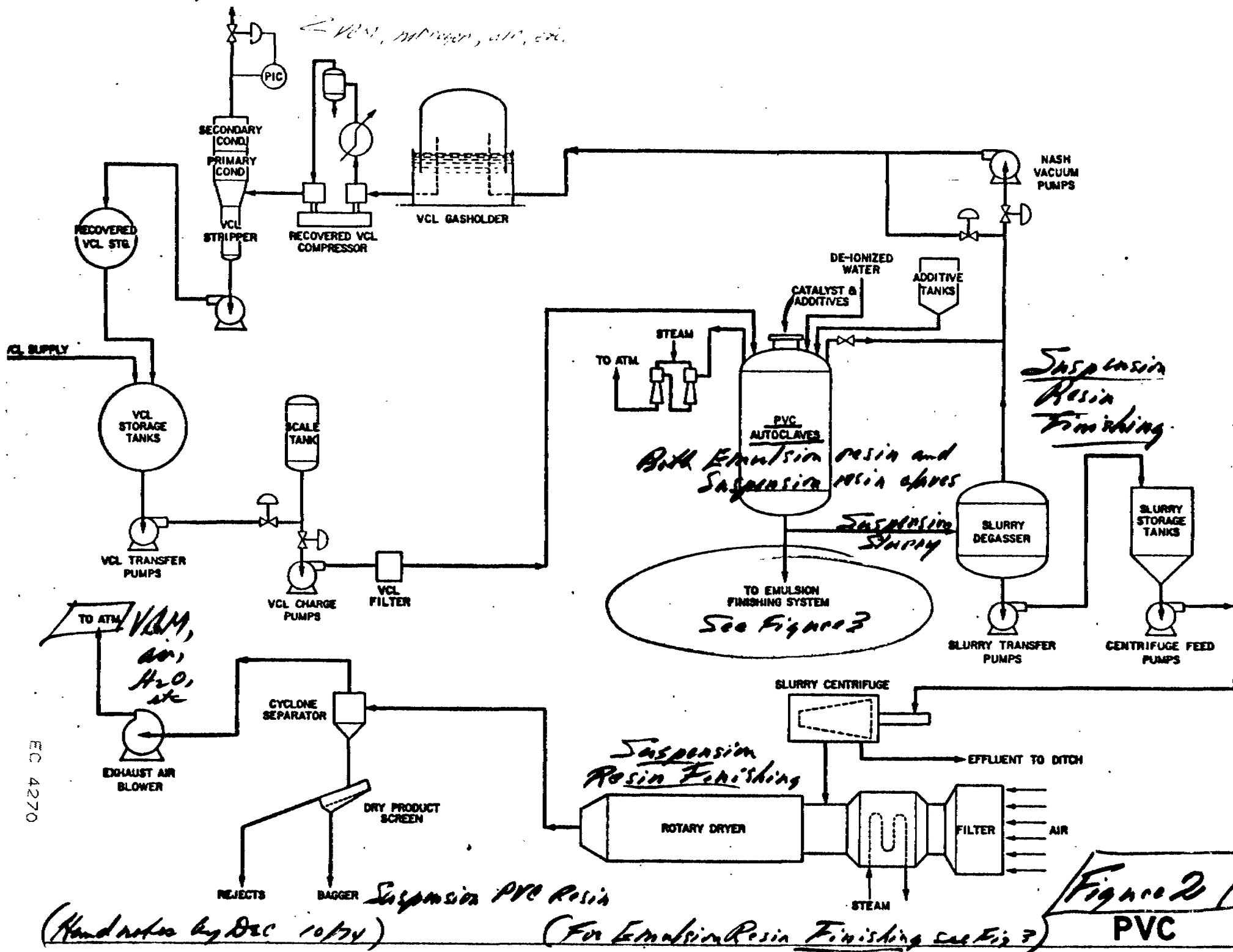
Lists 1 to 4

D.E. Cooper
October, 1974

FIGURE 1

E=EMULSION FVC
S=SUSPENSION PVC
B=BAREX 21C





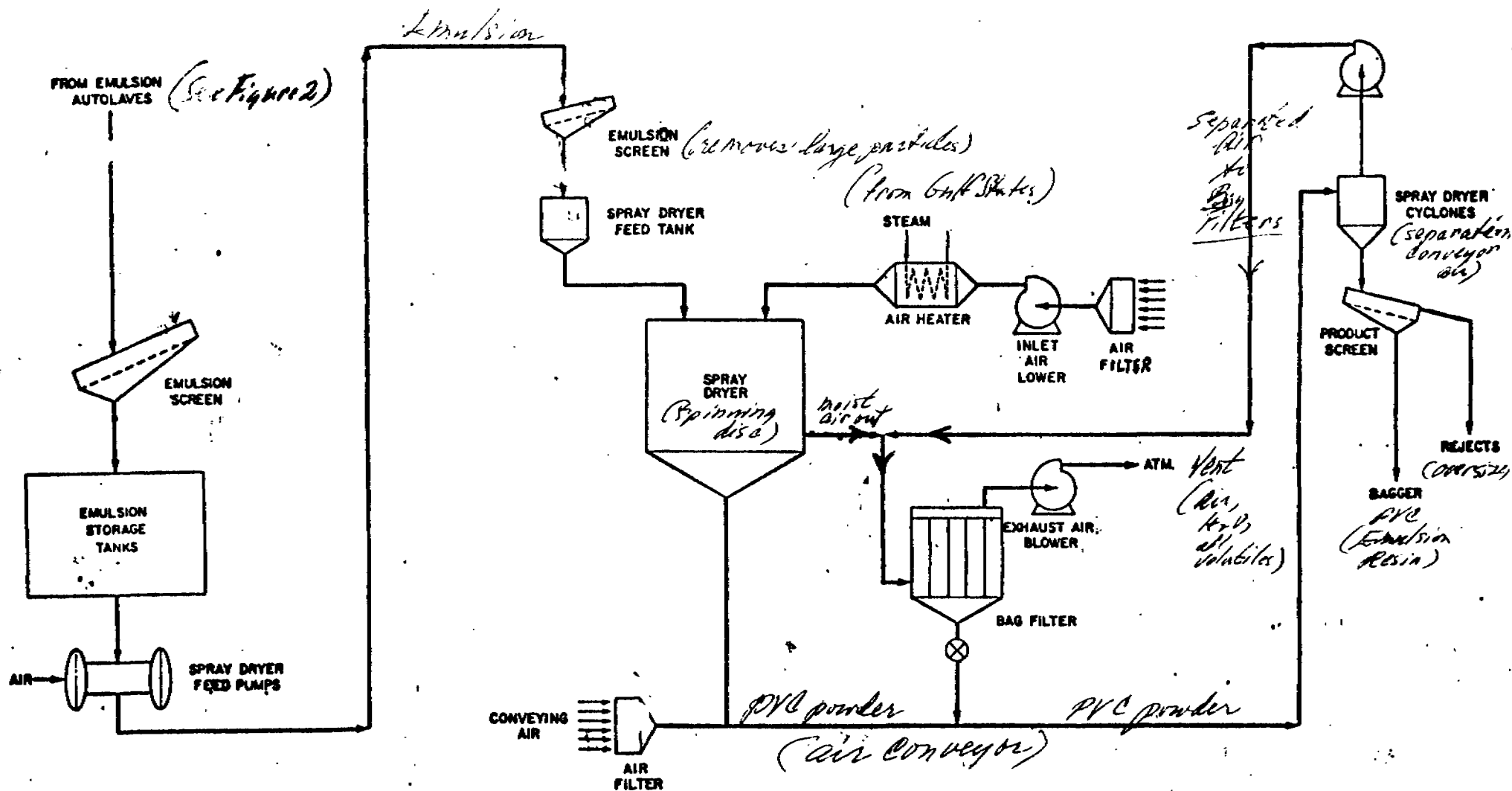
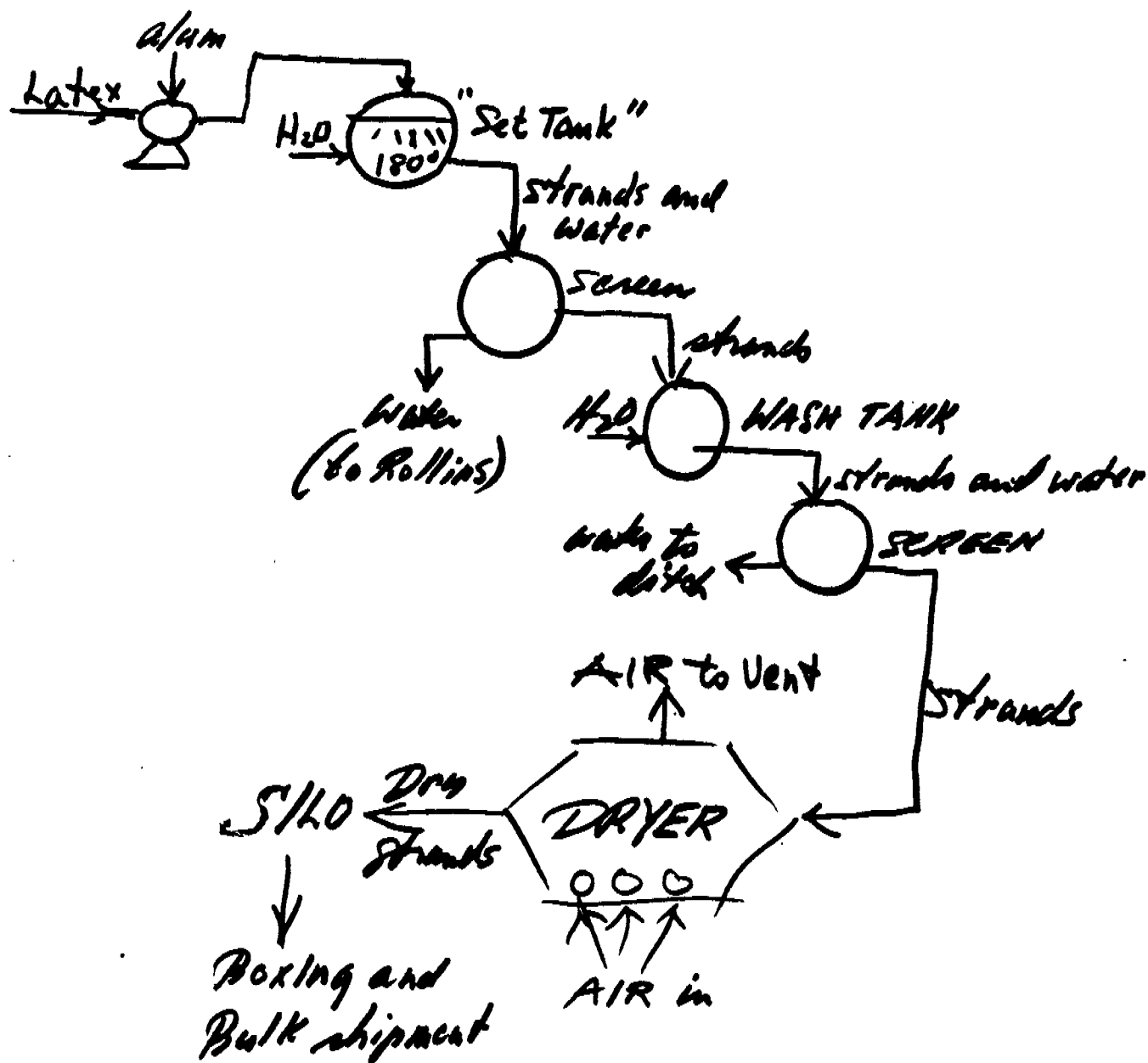


FIGURE 3

(Hand notes by J.E.C. 10/74)

EMULSION FINISHING SYSTEM

Figure 4
BAREX FINISHING



D.E. Cooper Oct. 1974
(Sketch from sketch R.E. Callander, Jr.)

MATERIALS used in
COMPOUNDING AREA*

Serial Series Code (see list in following pages)

0001	Supplementary polymers
1000	Plasticizers
2000	Fillers (modify opacity, color, wear, etc.)
3000	"Special", esp. fireproofing agents, etc.
4000	Stabilizers
5000	Lubricant additives - internal and external
6000	Pigments (organic and inorganic)
7000	Impact strength and modifiers

*This list is partially obsolete, and needs both additions and deletions, due especially to switches in Tiptonville and B.R. product mixes.

RAW MATERIALS AND MISCELLANEOUS SUPPLIES - PVC AREA

Mainly for Compounding. List No. 1

DAC 10/1/74

Code	Name	State	Chemical Composition
0011	Styron 685-26-7	solid	styrene acrylonitrile polymer
0012	Tyrl 867-21 Natural 7	solid	styrene acrylonitrile polymer
1008	DOP	liquid	di-2-ethylhexyl phthalate
1013	DIDP	liquid	di-isodecyl phthalate
1023	Drapex 4.4	liquid	ethyl epoxy tallate
1026	Cerechlor 42	liquid	hydrocarbon secondary plasticizer
1028	Cerechlor S-52	liquid	"
1079	Santicizer 160	liquid	butyl benzyl phthalate
1083	DOA	liquid	di-2-ethylhexyl adipate
1107	Epoxol 7-4	liquid	Epoxidized soya oil
1175	Epoxol 8-2B	liquid	Epoxidized polyester
2019	Celite 263	solid	aerated silica
041	Atomite	solid	calcium carbonate
2042	Winnofil S	solid	coated calcium carbonate
2047	Omyabsh	solid	" "
2054	Fiberglass	solid	spun glass
2055	PPG Fiberglass	solid	" "
2057	Desertalc 57	solid	sodium aluminum silicate
2058	P-414	solid	chopped fiberglass
2059	P-413	solid	" "
3147	Jayflex 205	liquid	hydrocarbon plasticizer
4009	CH-55	liquid	tris-nonyl phenyl phosphite
4020	Advastab E-82	liquid	epoxy phosphite mixture
4021	BC-103A	liquid	Barium cadmium mixture
4025	TM-303	liquid	organo polymeric tin
4032	Tinuvin P	solid	substituted phenol
4035	Mark 356	liquid	Barium Cadmium Zinc

Code	Name	State	Chemical Composition
4049	Mark C	liquid	diphenyl iso-octyl phosphite
4056	Mark WS	solid	barium cadmium/pentaerythritol
4063	Mark OIM	solid	modified barium cadmium organo soap
4081	Cardinal No. 1	liquid	di butyl tin dilaurate
4086	Cardinal 10	liquid	butyl tin mercaptide
4088	Cardinal 2 AYA	solid	proprietary tin
4113	Cardinal Clear 54	liquid	organo polymeric tin
4114	Mark 152	paste	calcium zinc stearate/soybean oil
4115	Mark 577A	solid	calcium/zinc
4129	Irganox 1076	solid	substituted phenol
4130	Ferro 1827	solid	barium cadmium soap
4142	Ferro 904	liquid	diphenyl isooctyl phosphite
4154	Scotch Laddie 810	solid	tribasic lead sulphate
4156	Scotch Laddie w/Kaydol	solid	tribasic lead sulphate/22% mineral oil
4172	T-31	liquid	tin thio glycolate
4200	DiBasic Lead Stearate	solid	
4210	Tri Base EXL	solid	tribasic lead sulphate
4211	Synpro 530	liquid	barium cadmium soap
4219	Mark 417	solid	calcium zinc
4220	Tribase LPC	solid	Modified tribasic lead
4221	Plastiflow LPC	solid	lead stearate lubricant
4223	Mark 734-A	liquid	barium cadmium
4232	Irganox 1010	solid	substituted phenol
4233	McGregor 918 or Scotch Laddie	solid	tribasic lead phthalate
5006	Glyco RP	liquid	glycerol ricinoleate
5018	Acrax C	solid	ethylene bis stearamide
5023	Aldo MSD	solid	glycerol monostearate
5027	Wax E Powder	solid	montan wax

Code	Name	State	Chemical Composition
5028	Wax OF Flakes	solid	saponified montan wax
5036	Calcium Stearate	solid	
5037	Stearic Acid	solid	
5044	Aldo MO	liquid	glycerol mono oleate
5047	Aldosperse 0-9	liquid	poly oxy ethylene mono-oleat
5051	Kaydol	liquid	mineral oil
5059	Sodium Stearate	solid	
5064	MS-2 Resin	solid	cumerone indene
5066	Aldo S-932	solid	amide wax
5068	Wax PA-190	solid	polyethylene wax
5073	Advawax 165	solid	paraffin hydrocarbon wax
5075	629 A Wax	solid	polyethylene wax
6002	UB Blue 59-4967	solid	aluminum silicate
6007	Lakeoline Violet 1	solid	alumina salt
6008	Apex 8003 Aluminum	solid	powdered aluminum
6010	R-500 or R-100	solid	titanium dioxide
6011	R-101	solid	"
6012	RT-791-D Violet	solid	Quinacridone
6014	Ti Pure R-900	solid	titanium dioxide
6015	RF-1 or RF-2	solid	"
6023	FDC Violet	solid	alumina salt
6025	Drakenfeld 10024	solid	titanium/antimony/zinc
6026	Sun Yellow Sea	solid	modified nickel
6029	Amer 1162 Yellow	solid	chromium oxide
6030	Amer 1166 Yellow	solid	Iron oxide
6031	Amer 1167 Brown	solid	"
6032	Amer 1198 Black	solid	Tar derivative
6035	Amer Yellow 1206	solid	Azoic

Code	Name	State	Chemical Composition
6036	Amer 1204 Yellow	solid	Chromium derivative
6039	1484 Maroon	solid	Azoic red
6040	X-2541 Yellow	solid	chromium
6044	M.B. 1049 Black	solid	tar derivative
6045	Amer Orange 1026	solid	Molybdate
6046	Amer 1050 Blue	solid	phthalocyanine
6047	Amer Yellow 1056	solid	chromium derivative
6049	1058 Green	solid	phthalocyanine
6050	IMP X-2944 Perm. Green	solid	chromium oxide
6052	FDC Green 1100	solid	alumina salt
6054	3300 Blue 18	solid	phthalocyanine blue
6060	Reynolds 50 Paste	paste	aluminum/mineral oil
6064	14-4008 Hosta Perm.	solid	Dioxazine carbazole
6071	Raven 15 Carbon Black	solid	tar derivative
6072	Molacco H Black	solid	" "
6075	UMB Blue 4725	solid	Iron derivative
6076	Tinapol PCR	solid	hydroxy benzophenone
6077	10369 Brown	solid	chrome/iron/titanium
6080	UB 0008 Violet	solid	Iron derivative
6081	V 5100 Dark Buff	solid	Iron/chrome/zinc
6082	Ferro V-5101	solid	Iron/chrome/zinc
6084	X-2263 Golden Yellow	solid	Cadmium
6085	10380 Grass Green	solid	Chromium
6086	X-2315 Deep Yellow	solid	Cadmium
6087	X-2272 Primrose 11	solid	"
6089	R-103C 115 Red	solid	obsolete
6090	R-103C 114 Orange	solid	"
6091	R-103C 113 Orange	solid	"

Code	Name	State	Chemical Composition
6094	Monarch 74 Black	solid	tar derivative
6096	Violet ZIRS	solid	proprietary
6098	YT 562D Green Gold	solid	diarylide
6103	V-5102 Brown	solid	Iron/chrome/zinc
6104	FDC Violet 1	solid	Alumina salt
6107	Drakenfeld 10383	solid	chromium/Iron/Zinc Antimony
6109	Ky-788D	solid	chromium
6114	Ky-781D	solid	"
6118	Amer 50 M Red 1828 R1	solid	azoic
6120	Drakenfeld 10382 Brown	solid	Chromium/Iron/Zinc
6123	Mapico Tan 15	solid	Iron oxide
6124	Mapico Brown 421	solid	" "
6126	Mapico Red 477	solid	" "
6127	X-2925 Monark Blue g	solid	phthalocyanine
6128	YE 421D Orange	solid	molybdate
6129	Y-469-D Yellow	solid	chromium
6131	Raven 30 Powder	solid	tar derivative
6134	Cromoplital Yellow 3G Tone	solid	organic color pigment (chemical comp. unknown)
6136	TiO ₂ Cr 800 PG	solid	titanium dioxide
6138	Amer Cyan. Blue 55-3750	solid	phthalocyanine
6139	KR-980 D	solid	Molybdate/Chrome
7002	K-120N	solid	acrylic polymer
7003	Blendex 575	solid	acrylonitrile-butadiene styrene terpoly
7071	Nevadine LX-509	solid	camerone indene
7072	Piccolastic D-125	solid	polystyrene
8001	Blendex 301	solid	Acrylonitrile butadiene styrene terpoly
8002	Blendex 401	solid	" " "
8017	Blendex 311S	solid	" " "

90/11/12
Product Area Supplier

NO. 2 - P. 1

Adogen 58	Ashland Chemical Co.
Advastab T-340	Cincinnati Milacron
Advastab TM-181S	Cincinnati Milacron
Alcotex 72.5L	Revertex, Ltd.
Antifoam 60	General Elec. Co.
Barium Stearate	Snythetic Pr. -Americhem
Blendex 436	Marbon Chemical
Butyl Benzyl Phthlate BBP	Hatco Chemical
Butyl Stearate	Emery Industries
Butyl Diol 1, 3	Celanese Chemical
CPE 3614	Dow Chemical
Cadmium Stearate	Synthetic Products
Calcium Chl. anhy. reagent 12 mesh CX 150	AWC, Inc.
Calcoline Oil HSA	ICI America
Colloid 987	Colloids, % Chem. Soln.
Copper Sulfate pent.	McKesson Chemical
Dibutyl Tin Laurate	Cincinnati Milacron
Diocetyl Adipate DOA	Monsanto Chemical Eastman Chemical U.S.S. Chemical
Di-basic lead stearate DS-107	National Lead Co.
Diocetyl Azelate DOZ	Ashland Chemical
Diocetyl Phthlate DOP	Ashland Chemical
Drapex 4.4	Argus Chemical Co.
DM-7704	M&T Chemicals

Product	Supplier	Rec'd
Electrocarb 105	Hammond Lead Co.	
Epoxidized Soya Oil	Ashland Chemical	
Epoxol 9-5	Swift & Co.	
Glycomul L	Glyco Chemical	
Glycosperse 05	Glyco Chemical	
Kane Ace B-18A1	Mitsui & Co. Kaneka America	
Kane Ace PA-11	Mitsui & Co.	
Kaydol Mineral Oil	Witco Chemical	
LX-509	Neville Chemical	
M&T T-66	M&T Chemicals	
M&T 7888	M&T Chemicals	
M&T 8494	M&T Chemicals	
Mark 152	Argus Chemical	
Mark 417	Argus Chemical	
Mark 734A	Argus Chemical	
Mark 971	Argus Chemical	
Mark 292	Argus Chemical	
Mark 1911	Argus Chemical	
Multiflex MM	Diamond Shamrock	
Myristic acid 1499	Kortman & Schultz	
Parabenzobquinone	Eastman Chemical Pr.	
Pluronic L-62	Southern Solvents	
RF Titanium Dioxide	New Jersey Zinc	
Synpron 1115	Synthetic Products	
Synpron 1314	Synthetic Products	
Synpron 1169	Synthetic Products	

List 2-p.2

LIST 2-PT

Pproduct	Supplier		
RT-791-D violet	E.I. Dupont		
YE-421-D orange	E.I. Dupont		
Y496-D yellow	E. I. Dupont		
K0786-D Kroler orange	E. I. Dupont		
Y-488D Yellow	E. I. Dupont		
V-5102 brown	Ferro Corp.		
V-5100 dark buff	Ferro Corp.		
Drak. 10383	Hercules, Inc.		
Drak. 10324 amber brown	Hercules, Inc.		
Imp. Red X-2327	Hercules, Inc.		
Primrose yellow X2272	Hercules, Inc.		
Kristalex 3085	Hercules, Inc.		
Lakolene violet #1	H. Kohnstamm		
Iron Oxide brown 420D	Reichard-Coulston		
50M violet conc. 1963R1-	Synthetic Products		
Ultramarine blue 4959-00	Whittaker, Clark, Daniels		

CODE

MATERIAL

COMPOUND RAW MATERIALS

DATE

9-24-74

T

	KAYDO1	TANK	DIT 1/2			
	DOP	TANK	81 + 23			48
	DAPOL 18	TANK	31 + 7 3/4			25
2042	WINDO FILS		55# Bg	119 + 128	1595	15
	D+DP		DIT 3			
4032	TIMONIN P		112# DR	24	(1@ 35#)	2
4056	MARK W.S.		200# DR	12	(1@ 34)	24
4067	MARK 229		500# DR	20		10
4086			400# DR	27		10
4088	AYA		150# DR	6	(1@ 15#)	9
4172	T-31		450# DR	114 + 43 + 44		51
4235	T-31		450# DR			
4239	MARK 1492		40# DR	1 + 1		
4241	SYNPRON 1169		50# DR	14 + 4 + 5 + 10		1
4244	SYNPRON 1003		450# DR	2 + 1 + 44	2625	23
4245	SYNPRON 1023		500# DR	1 + 8	172	46
4247	ELECTROCARB No 105		50# Bg	382		19
5018	ACRILWAX C		50# Bg	17 + 15 + 7		11
5023	AIDOL MSD		200# DR	17		3
5035	ALUMINUM STEARATE		25# Bg	13 + 160 + 25	(22@ 50# G)	6
5036	CALCIUM STEARATE		25# Bg	18 + 336		9
5047	ALDOSOLSE D-9		350# DR	38	(1@ 155) (1@ 256) (1@ 96#)	17
5051	KAYDO1		405# DR	1 + 20 + 7 + 16	(1@ 425#)	14
5073	ADA WAX 165		405# DR	(6@ 25# G)	(4 + 8 + 8 + 1 @ 50#)	3

list 2 p. 2

CODE	MATERIAL	COMPOUND RAW MATERIALS			DATE 9-24-74	T.
6012	RT 791 D. Violet	100# DR	1+1	(1@49)(1@35)		3
6015	RF 2	50# Bg	3+220+120		2800	19.9
6025	DARKNEFIELD 10324	250# DR	6	(1@100#)		1.1
6026	SUN "C" Yellow	250	4	(1@40#)(2@80)(2@55)		1.3
6032	Americhem 1198 Bk	100# DR	(2@250#)	(1@200)(1@212)(1@232)		6
6044	Master Batch Bk	250# DR	10+3+1	(1@49)(1@62)(1@50#)		3.1
6072	Molaco Bk	100# DR	4+3	(1@22#)		7
6081	V500 DARK BUFF	200# DR	5	(1@150#)		1.1
6178	Y421 D Orange	50# Bg	3			1
6179	K1167 D Yellow	50# Bg	10			5
6124	MAPICO BROWN 421	50# Bg	34+35			3.3
6126	MAPICO Red 477	50# Bg	18			9
6130	999 Black	50# Bg				
6131	RAVEN 30 Powder	100# DR	58@25#			1.4
6132	Y488 D Yellow	50# Bg				
6133	K0786 D	50# Bg	8	(1@21#)		4
6136	CR 800 PB	50# Bg	181	(1@25#)		9.0
6143	MAPICO 1100	50# Bg	13+40+6	(1@27#)		2.9
6144	Super Spectra	50# Bg	3+16+5	(1@12 1/2#)		1.2
6155	UMB BLUE 4725	50# Bg	25+9	(1@27#)(1@55)		1.7
6161	Y-758 D	50# Bg	29+7+40	(1@44#7oz)		3.8
6163	RAVEN Black		(28@60#)	(10@40#)		1.6
7002	K120 N (20 Bg Per Pallet)	50# Bg	280+20		1340	16
7004	KANE ACE PAH	50# Bg				
7071	NEVADINE LX 509	50# Bg	240		1665	17.1

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CODE	MATERIAL	COMPOUND	RAW MATERIALS	DATE
8001	Blendex 301	50# Bg	58	9-24-75
8002	Blendex 401	50# Bg		
8017	Blendex 311	40# Bg	238	
8020	Km 229 (20Bg Pallet)	50# Bg	68	
8021	Blendex 201	50# Bg	26+17	
8026	KANC Acc BIBA	50# Bg	9+37+540	620
8028	CPE	50# Bg	180	
8031	Km 641 (20Bg Pallet)	35# Bg	220+64	
8033	Blendex 436	40# Bg	102	
11-0903	Resin Bags		6000+1000+4000	
11-0904	Compounding Bags		12000+500+800+500	
11-0910	PRINTED B/P		480+5+5+29	
16X904	(BAREX) B/PK, Plain		15+2+2+4	

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15 CODE	MATERIAL	COMPOUND	RAW MATERIALS	DATE	9-24-75
1001	LAUROYL PEROXIDE	100# Dr.	29	(2 @ 50#)	3
1002	COPPER SULFATE	100# Pg.	3	(3 @ 3#) (2 @ 10#)	
1003	SODIUM SULFITE	100# Bg.	7		37
1004	AMMONIUM PERSULFATE	250# Dr.	20		154
1006	CALCIUM HYDROXIDE	100# Dr.	49		32
1007	HYDROGEN PEROXIDE	490# Dr.	3		20
1008	X-16 ETHYL CHLOROFORM	465# Dr.	1 + 24	(1 @ 100#)	14
3001	ALCOTEX	224# Dr.	32		1576
3004	AMMONIA	375 Dr.			1445
3005	STEARIC ACID (Emersol 132)	50# Bg.			
3006	MYRISTIC ACID	50# Pg.	80 + 13	(1 @ 48#) (1 @ 4#)	600
3008	METHYLOHL METHOHL	50# Bg.	4		
4000	COLLOIDS ANTIFOAM	400# Dr.	7		400
4002	ANTIFOAM 60 FG-60	450# Dr.	7		130
4005	ETHYL PALMITATE	375# Dr.	18		760
4009	PLURONIC	460# Dr.	37		460
4010	CLASOLENE OIL	475# Dr.	4 + 4 + 11		89,100 8475
4011	SIPEX UB	460# Dr.	25		2000
4014	TRITON X-300	415# Dr.	12		
4015	SIPEX TDS	460# Dr.	6		
4016	ISOPROPANOL	355# Dr.	1	(2 @ 361#)	
4017	CALC. CHLORIDE	5# Bottle	19		8

				10% ammonia		Amm. Persulfate		Alcotex			Calsolene Oil Tank	50% Caustic
128 A	128 B	128 C	128 D	142 A	142 B	159 A	159 B	129 A	129 B	126 D		

Materials used
in manufacture

BAROX 210

List #

DATE

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CODE								
6X101	ACRYON						135,000	13
6X102	METHYL						67,200	6
6X103	BUTADIENE						31,580	3
6X201	VAZO 64	10# Drms	42					
6X202	T-DDM	390# Drms	8+1+1					3
6X203	FATTY ACID SOAP	50# Pgs	15					
6X204	DAXAD 11	100# Drms	1+1					
6X205	VERSENE 223	550# Drms	1					
6X206	PVP K-30	100# Drms	96				30	9
6X207	VERSENE	550# Drms	12+34					25
6X301	MERCAPTAN 6-43	500# Drms	55+10					32
6X302	POTASSIUM PERMANGANATE	100# Bgs	(2 @ 300#)	(1 @ 75#)	(1 @ 200#)	50		
6X401	POTASSIUM HYDROXIDE	660# Drms	3				110	2
6X402	POLYCAPRONE	425# Drms	37+40				800	33
6X403	NAUGARD 141P	100# Drms	1+2+17+19+16				230	2
6X404	EMERSOL 233L	410# Drms	27				160	16
6X405	ETEC 1000							
6X406	ALUM solution (Schaffner - 50%)						26,380	2
6X304	GAFAC	460# Drms	62					2
6X901	MEHQ inhibitor							
6X902	PENNSTOP RC-1866	36# Drms	1+1					
6X903	ANTIFOAM FQ-10	440# Drms	6					2
6X904	BULK PAKS							
6X905	BTM 01							
6X303	MONOWAX MO7	500# DR	1+4+16+14				2400	19
6X203	Fatty Acid Soap Linseed	400# DR	1					
							440,890	