



PVC

1.

¹

PVC

(PVC)

가 ,

34

1960

가

PVC

2005

300

PVC

2,700

/ , 84 /

(recycling)

²

PVC

가



1980
1982
1986
1990
1991
1986

UMIST

()
()
()



1993
1996
1996
2001
2002

()
()



1986
1994
1999
1986~

Claude Bernard Lyon 1

()
()
()
()



1975
1977
1983
1975
1980
1983

()
()
()

가

PVC Recycling Technology

(Jae Heung Lee, Jong Chan Won, Yoon Hwan Lee, and Kil - Yeong Choi, Advanced Materials Division, Korea Research Institute of Chemical Technology, 100 Jang - Dong, Yuseong - Gu, Daejeon 305 - 600, Korea)

가 가 , 가 , 가
가 PVC
가 PVC
가 PVC
가 PVC

PVC PVC

2. PVC

2.1 PVC IMF 가 1 2001
1998 55 가 84 IMF LG ,
73 / , 50 /
40 .

2.2

1. PVC

(:)

	1997	1998	1999	2000	2001
	1,080	1,089	1,157	1,203	1,210
	36	15	26	26	30
	1,116	1,104	1,183	1,229	1,240
	861	554	798	820	839
	255	550	384	409	401
	1,116	1,104	1,182	1,229	1,240

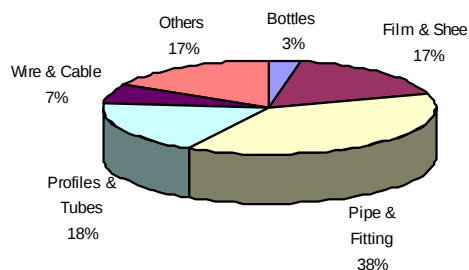
2. PVC

(:)

	1998	1999	2000	2001	2002	2003
	2,412	2,477	2,590	2,736	2,878	3,021
	2,391	2,489	2,590	2,735	2,878	3,024
가		4.1%	4.1%	5.6%	5.2%	5.1%

2 1997 2000
4.1% 5% 2001 2004
PVC 1998 2,391
2001 2,735 4.8%
2003 3,024 5%
1
16 kg/ , 2 kg/ , 1 kg/
12 kg/ .

2001 PVC PVC PVC
61% 28% . 1 PVC
Pipe & Fitting 가
38% 1,033
2001~2004
Pipe & Fitting
(
7% 가
7%) 4.9% .
3 , ,



1. 2001 PVC

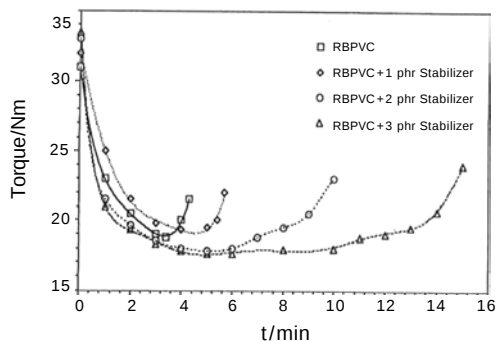
3. 2000 PVC (:)

Bottles	165	156	50
Film & Sheet	1,113	458	285
Injection	143	310	
Pipe & Tubing	1,715	6,280	621
Window	1,292	566	134
Fabrics	217	436	151
Flooring	305	1,225	68
Siding		2,136	67
Wire & Cable	472	670	185
Others	395	1,963	118
Export		390	746
	5,817	14,590	2,425

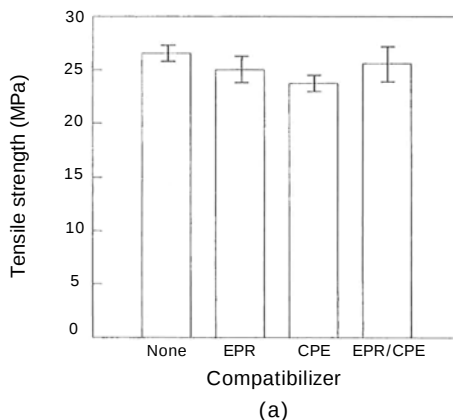
Pipe & Fitting PVC 가 . PVC
 , , / , PVC
 (siding), PVC
 / PVC
 pipe, , 가 ,
 ,
 3.4 3.2
 PVC - , 3
 ,
 3. PVC , PVC 가 가
 PVC 가 가 가 가
 , PVC , PVC
 , PVC 가
 , PVC 가
 , , , , 가
 5 PVC
 3.1 PVC 가
 , PVC
 PVC 가
 , PCB, , , board, , PVC가 dash -
 , PVC
 가 , hydrocyc -
 75 PVC PVC lone, gravity table, ,
 가 ,
 가 가 PE 가 PVC
 , PE PVC 가 PVC 가
 2 PVC 가 PVC
 PVC 가 PVC
 PVC 가
 PVC 가
 가 , 가
 가
 , PVC, PP, PVC
 PE

가 가
가 DTST (dynamic thermal stability time) 4
DTST 가 , 가 가
가 5
PP, HDPE, PVC, PS
가
가
가
PVC

PE, PP, PS
PVC
4 HDPE/PP/PVC 3 CPE
(chlorinated polyethylene), EPR (ethylene-propylene rubber) 1/1 (w/w)
가 8
4 CPE, EPR, CPE/EPR 1/1
가
가 EPR 가 가
가
PE
PVC
가



3. PVC 가 가
melting



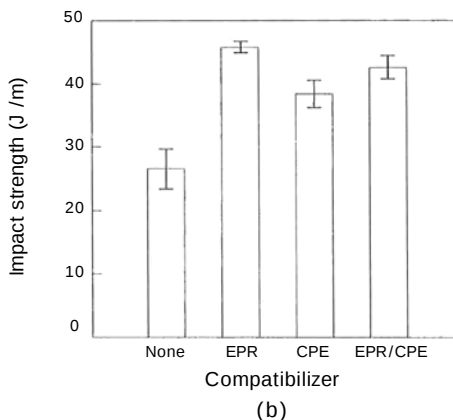
4. PVC 가 DTST

(:sec)

Temperature ()	n = 20 rpm	n = 50 rpm	n = 100 rpm
180	765	405	205
200	436	250	119
220	180	130	68

5. PVC

(phr)	T = 180			T = 220		
	(%)	(MPa)	(MPa)	(%)	(MPa)	(MPa)
0	10	51	925	9	50	880
1	12	53	940	11	52	895
2	14	54	955	13	53	905



4. HDPE/PP/PVC(8/1/1)
(a), (b)

가 , 가 , PVC/PE 가

가 가

가 , CPE,⁹ ethylene - propyl - ene - diene rubber (EPDM),^{10,11} styrene - bu - tadiene - styrene terpolymer (SBS),¹⁰ natural rubber (NR),¹⁰ ethylene - vinyl acetate co - polymer (EVA),^{12,13} ionomer¹³ 가

dicumyl peroxide 가

가

.^{14 - 16} 5 PVC/PE (50/50) 가 가

EVA1 (VA:25 wt%), EEA (ethylene ethylacrylate copolymer), EEA - MMA (ethylene ethylacrylate - graft - methyl - methacrylate copolymer)가

2 가 가

.¹⁷ 6 가

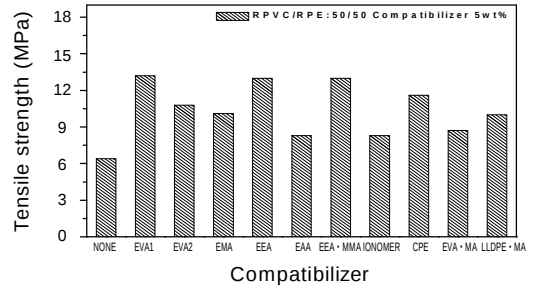
가

EVA 가

가

가 EEA(ethyl - ene acrylic acid copolymer) 가

가가



5. PVC/PE

4.1.2

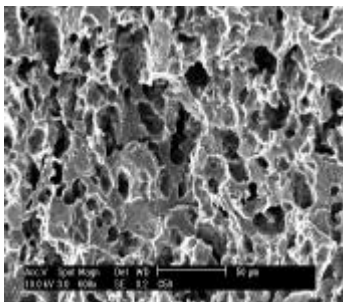
PVC , (fit - ting), “ (cradle - to - grave)” (voluntary commitment) European Council of Vinyl Manu - facture (ECVM)

2005 PVC 50%

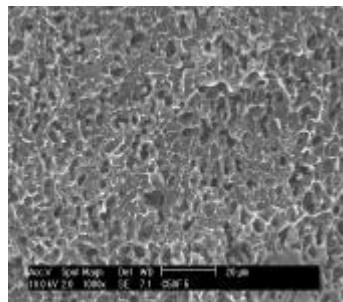
PVC 가 Solvay Plastics

2001 2 7 PVC 가 Vinylloop[®]

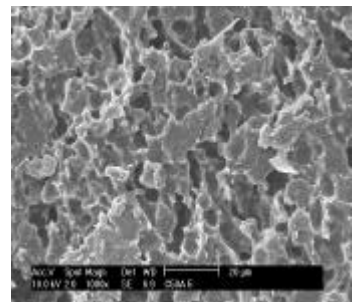
Ferrara 10 cm closed loop , MEK (methyl ethyl ketone)¹⁸



(a)

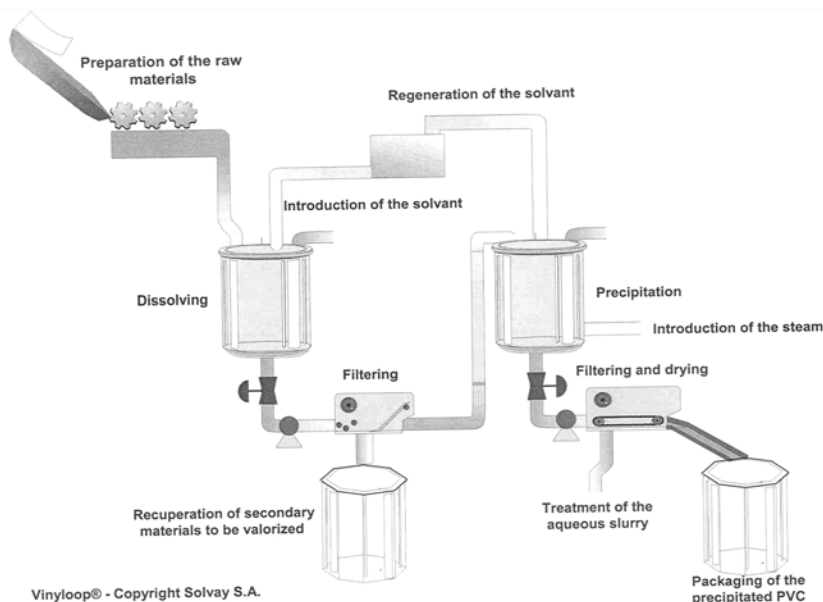


(b)

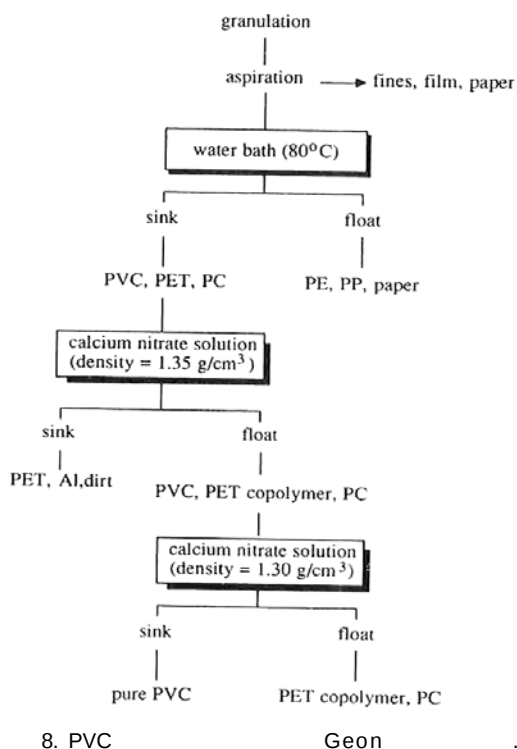


(c)

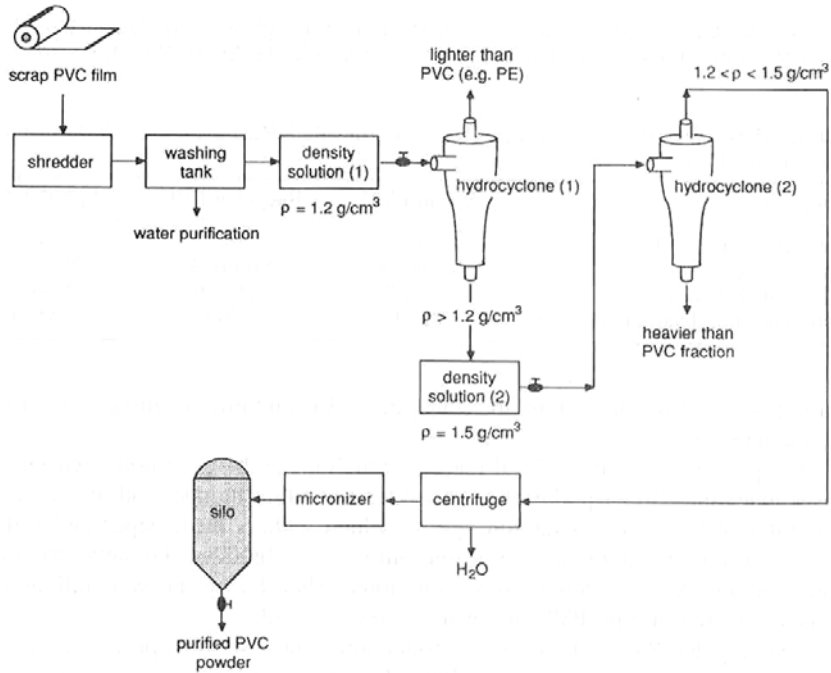
6. PVC/PE 가 SEM . (a) PVC/ PE (50/50), (b) PVC/ PE/EVA (47.5/47.5/5), (c) PVC/ PE/EEA (47.5/47.5/5).



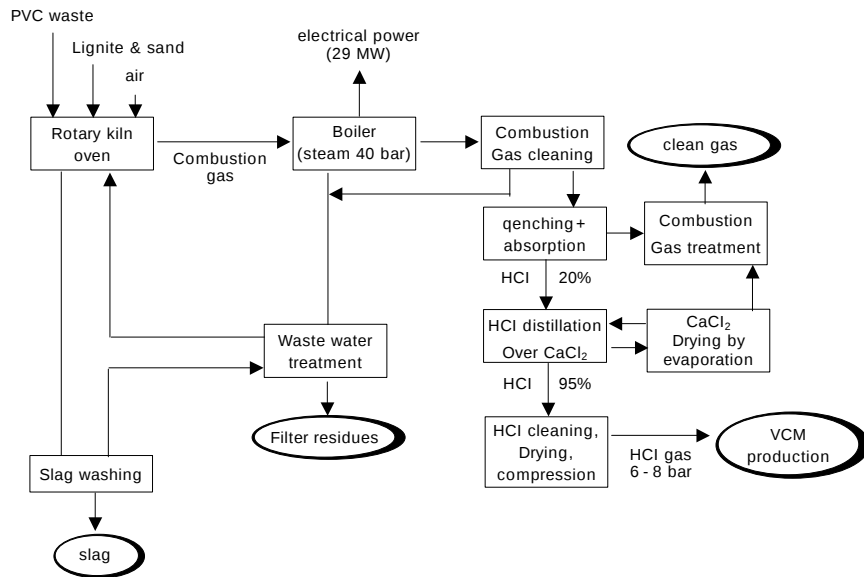
7. Vinylloop® PVC (Solvay Plastics).



PVC
350 μ m PVC
Geon PVC
8 (cal -
cium nitrate)
density bath
5
Hoechst 9 가
hydrocyclones
PVC
5
4.2
Wacker Chemie
PVC HCl
(10)
HCl slag
Iserlohn & Hamburg () closed-loop
salt cycle (11)
ethylene HCl
PVC 5
Linde
1,400~1,500 bath
PVC 가
feedstock recycling
19
Yoshioka group 12 PVC



9. Hoechst 가 PVC



10. PVC HCl

150~260
ated NaOH

oxygen -

PVC

PVC

4.3 PVC

가



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PE

PVC

가

PVC

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