

Appendix A. Detailed information of benzene contents in PDPs investigated from 1974 to 2012 in Korea

No	Years	Reporting year	Year of bulk analysis	Industry	PDP type 1	PDP type 2	Analytical method	Calculating method	Number of samples	Min, %	AM, %	Max, %	Reference
1	<1980	1975	1974	NI	Thinner	Thinner	Fractional distillation	Volume ratio	1	5.4	5.4	5.4	Ro, 1975
2	<1980	1975	1974	NI	Thinner	Thinner	Fractional distillation	Volume ratio	1	6.0	6.0	6.0	Ro, 1975
3	<1980	1975	1974	NI	Thinner	Thinner	Fractional distillation	Volume ratio	1	6.6	6.6	6.6	Ro, 1975
4	<1980	1975	1974	NI	Thinner	Thinner	Fractional distillation	Volume ratio	1	12.0	12.0	12.0	Ro, 1975
5	<1980	1975	1974	NI	Thinner	Thinner	Fractional distillation	Volume ratio	1	24.4	24.4	24.4	Ro, 1975
6	<1980	1975	1974	NI	Thinner	Thinner	Fractional distillation	Volume ratio	1	26.8	26.8	26.8	Ro, 1975
7	<1980	1975	1974	NI	Thinner	Thinner	Fractional distillation	Volume ratio	1	26.0	26.0	26.0	Ro, 1975
8	<1980	1975	1974	NI	Thinner	Thinner	Fractional distillation	Volume ratio	1	4.0	4.0	4.0	Ro, 1975
9	<1980	1975	1974	NI	Thinner	Thinner	Fractional distillation	Volume ratio	1	6.6	6.6	6.6	Ro, 1975
10	<1980	1975	1974	NI	Thinner	Thinner	Fractional distillation	Volume ratio	1	9.8	9.8	9.8	Ro, 1975
11	<1980	1975	1974	NI	Thinner	Thinner	Fractional distillation	Volume ratio	1	14.6	14.6	14.6	Ro, 1975
12	<1980	1975	1974	NI	Thinner	Thinner	Fractional distillation	Volume ratio	1	23.0	23.0	23.0	Ro, 1975
13	<1980	1975	1974	NI	Thinner	Thinner	Fractional distillation	Volume ratio	1	4.0	4.0	4.0	Ro, 1975
14	<1980	1975	1974	NI	Thinner	Thinner	Fractional distillation	Volume ratio	1	7.0	7.0	7.0	Ro, 1975
15	1981~1999	1995	1995	NI	Gasoline	Gasoline	GC MSD	Volume ratio	1	1.0	1.0	1.0	Shin, 1995
16	1981~1999	1997	1997	Production of rubber tires and tubes	Others	Release agent	GC MSD	Volume ratio	1	0.3	0.3	0.3	OSHRI, 2013
17	1981~1999	1997	1997	Production of rubber tires and tubes	Solvent	Solvent	GC MSD	Volume ratio	1	0.3	0.3	0.3	OSHRI, 2013
18	1981~1999	1997	1997	Production of rubber tires and tubes	Solvent	Solvent	GC MSD	Volume ratio	1	0.4	0.4	0.4	OSHRI, 2013
19	1981~1999	1998	1998	Retreading of rubber tires	Solvent	Solvent	GC MSD	NI	1	0.3	0.3	0.3	OSHRI, 2013
20	1981~1999	1998	1998	Retreading of rubber tires	Solvent	Solvent	GC MSD	NI	1	0.3	0.3	0.3	OSHRI, 2013
21	1981~1999	1998	1998	Retreading of rubber tires	Solvent	Solvent	GC MSD	NI	1	0.2	0.2	0.2	OSHRI, 2013
22	1981~1999	1998	1998	Retreading of rubber tires	Solvent	Solvent	GC MSD	NI	1	0.2	0.2	0.2	OSHRI, 2013

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23	1981~1999	1998	1998	Retreading of rubber tires	Solvent	Solvent	GC MSD	NI	1	0.0	0.016	0.0	OSHRI, 2013
24	1981~1999	1998	1998	Retreading of rubber tires	Solvent	Solvent	GC MSD	NI	1	0.2	0.2	0.2	OSHRI, 2013
25	1981~1999	1998	1999	Manufacture of leathers	Others	Accelerant	GC MSD	NI	1	0.9	0.9	0.9	OSHRI, 2013
26	1981~1999	1998	1999	Manufacture of leathers	Coating materials	Coating materials	GC MSD	NI	1	0.7	0.7	0.7	OSHRI, 2013
27	1981~1999	1998	1999	Manufacture of leathers	Hardener	Hardener	GC MSD	NI	1	2.0	2.0	2.0	OSHRI, 2013
28	1981~1999	1998	1999	Manufacture of leathers	Solvent	Solvent	GC MSD	NI	1	1.0	1.0	1.0	OSHRI, 2013
29	1981~1999	1998	NI	NI	Thinner	Thinner	GC FID, GC MSD	Volume ratio	3	0.6	1.4	2.8	Paik et al., 1998
30	1981~1999	1998	NI	NI	Thinner	Thinner	GC FID, GC MSD	Volume ratio	1	56.7	56.7	56.7	Paik et al., 1998
31	1981~1999	1998	NI	NI	Thinner	Thinner	GC FID, GC MSD	Volume ratio	1	0.3	0.3	0.3	Paik et al., 1998
32	1981~1999	1998	NI	NI	Thinner	Thinner	GC FID, GC MSD	Volume ratio	1	1.3	1.3	1.3	Paik et al., 1998
33	1981~1999	1998	NI	NI	Thinner	Thinner	GC FID, GC MSD	Volume ratio	1	23.3	23.3	23.3	Paik et al., 1998
34	1981~1999	1998	NI	NI	Thinner	Thinner	GC FID, GC MSD	Volume ratio	1	0.1	0.1	0.1	Paik et al., 1998
35	1981~1999	1999	1999	Maintenance and repair services of motor vehicles	Hardener	Hardener	GC MSD	Volume ratio	1	1.8	1.8	1.8	OSHRI, 2013
36	1981~1999	1999	1999	Maintenance and repair services of motor vehicles	Thinner	Thinner	GC MSD	Volume ratio	1	1.0	1.0	1.0	OSHRI, 2013
37	1981~1999	1999	1999	Manufacture of insulated wires and cables	Adhesive	Adhesive	GC MSD	Volume ratio	1	0.3	0.3	0.3	OSHRI, 2013
38	1981~1999	1999	1999	Manufacture of insulated wires and cables	Ink	Ink	GC MSD	Volume ratio	1	0.5	0.5	0.5	OSHRI, 2013
39	1981~1999	1999	1999	Manufacture of insulated wires and cables	Ink	Ink	GC MSD	Volume ratio	1	0.2	0.2	0.2	OSHRI, 2013
40	1981~1999	1999	1999	Shipbuilding	Coating materials	Coating materials	GC MSD with head space	Volume ratio	1	0.0	0.01	0.0	OSHRI, 2013
41	1981~1999	1999	1999	Shipbuilding	Thinner	Thinner	GC MSD with head space	Volume ratio	1	0.0	0.01	0.0	OSHRI, 2013

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42	1981~1999	1999	1999	Shipbuilding	Thinner	Thinner	GC MSD with head space	Volume ratio	1	0.0	0.03	0.0	OSHRI, 2013
43	1981~1999	1999	1999	Shipbuilding	Thinner	Thinner	GC MSD with head space	Volume ratio	1	0.0	0.02	0.0	OSHRI, 2013
44	1981~1999	2000	1997	Oil stations for transportation equipment	Gasoline	Gasoline	GC FID	Weight ratio	1	3.9	3.9	3.9	Song et al., 2000
45	1981~1999	2000	1997	Oil stations for transportation equipment	Gasoline	Gasoline	GC FID	Weight ratio	1	2.9	2.9	2.9	Song et al., 2000
46	1981~1999	2000	1997	Oil stations for transportation equipment	Gasoline	Gasoline	GC FID	Weight ratio	1	3.9	3.9	3.9	Song et al., 2000
47	1981~1999	2000	1997	Oil stations for transportation equipment	Gasoline	Gasoline	GC FID	Weight ratio	1	5.9	5.9	5.9	Song et al., 2000
48	1981~1999	2000	1997	Oil stations for transportation equipment	Gasoline	Gasoline	GC FID	Weight ratio	1	2.1	2.1	2.1	Song et al., 2000
49	1981~1999	2000	1997	Oil stations for transportation equipment	Gasoline	Gasoline	GC FID	Weight ratio	1	4.4	4.4	4.4	Song et al., 2000
50	1981~1999	2000	1997	Oil stations for transportation equipment	Gasoline	Gasoline	GC FID	Weight ratio	1	2.5	2.5	2.5	Song et al., 2000
51	>=2000	2000	2000	Manufacture of machinery and equipment	Thinner	Thinner	GC MSD	Relative abundance	1	2.1	2.1	2.1	OSHRI, 2013
52	>=2000	2000	2000	Manufacture of motor vehicles	Gasoline	Gasoline	NI	Volume ratio	1	4.0	4.0	4.0	OSHRI, 2013
53	>=2000	2001	2000	Washing and dry cleaning services	Solvent	Solvent	GC MSD	Volume ratio	1	1.28	1.28	1.28	Roh et al., 2001
54	>=2000	2002	2000	Waste treatment and disposal services	Others	Waste	NI	NI	2	9.5	10.1	10.8	OSHRI, 2013
55	>=2000	2002	2002	Manufacture of other sounding equipment	Adhesive	Adhesive	GC MSD	Relative abundance	1	0.1	0.13	0.1	OSHRI, 2013
56	>=2000	2002	2002	Manufacture of other sounding equipment	Adhesive	Adhesive	GC MSD	Relative abundance	1	5.66	5.66	5.66	OSHRI, 2013
57	>=2000	2002	2002	Shipbuilding	Coating materials	Coating materials	GC MSD	Relative abundance	1	0.1	0.05	0.1	OSHRI, 2013
58	>=2000	2002	2002	Shipbuilding	Thinner	Thinner	GC MSD	Relative abundance	1	0.0	0.01	0.0	OSHRI, 2013
59	>=2000	2002	2003	Production of kitchen utensils	Coating materials	Coating materials	GC MSD	NI	1	0.0	0.01	0.0	OSHRI, 2013

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60	>=2000	2002	2003	Production of kitchen utensils	Coating materials	Coating materials	GC MSD	NI	1	0.0	0.01	0.0	OSHRI, 2013
61	>=2000	2002	2003	Production of kitchen utensils	Thinner	Thinner	GC MSD	NI	1	0.0	0.03	0.0	OSHRI, 2013
62	>=2000	2002	2003	Transportation	Coating materials	Coating materials	GC MSD	Relative abundance	1	0.1	0.05	0.1	OSHRI, 2013
63	>=2000	2002	2003	Transportation	Coating materials	Coating materials	GC MSD	Relative abundance	1	0.1	0.08	0.1	OSHRI, 2013
64	>=2000	2002	2003	Transportation	Thinner	Thinner	GC MSD	Relative abundance	1	0.0	0.03	0.0	OSHRI, 2013
65	>=2000	2003	2002	Manufacture of motor vehicles	Thinner	Thinner	GC MSD	NI	2	0.00027	0.002	0.007	Lee et al., 2003
66	>=2000	2003	2002	Manufacture of motor vehicles	Thinner	Thinner	GC MSD	NI	2	0.00018	0.001	0.004	Lee et al., 2003
67	>=2000	2003	2002	Petroleum refineries	Gasoline	Gasoline	GC FID	NI	1	6.0	6.0	6.0	OSHRI, 2013
68	>=2000	2003	2002	Petroleum refineries	Raw material	Raw material	GC FID	NI	1	10.0	10.0	10.0	OSHRI, 2013
69	>=2000	2004	2004	Construction	Coating materials	Coating materials	NI	Volume ratio	1	0.1	0.08	0.1	OSHRI, 2013
70	>=2000	2004	2004	Construction	Coating materials	Coating materials	NI	Volume ratio	1	0.0	0.02	0.0	OSHRI, 2013
71	>=2000	2004	2004	Construction	Thinner	Thinner	NI	Volume ratio	1	0.0	0.02	0.0	OSHRI, 2013
72	>=2000	2005	2005	Maintenance and repair services of motor vehicles	Solvent	Solvent	GC MSD	Relative abundance	1	9.0	9.0	9.0	OSHRI, 2013
73	>=2000	2005	2005	Manufacture of electronic components	Printing agent	Printing agent	GC MSD	Relative abundance	1	30.1	30.1	30.1	OSHRI, 2013
74	>=2000	2005	2005	Manufacture of electronic components	Printing agent	Printing agent	GC MSD	Relative abundance	1	0.3	0.3	0.3	OSHRI, 2013
75	>=2000	2005	2005	Manufacture of electronic components	Thinner	Thinner	GC MSD	Relative abundance	1	0.7	0.7	0.7	OSHRI, 2013
76	>=2000	2005	2006	Manufacture of machinery and equipment	Thinner	Thinner	NI	Relative abundance	1	0.7	0.7	0.7	OSHRI, 2013
77	>=2000	2005	2006	Refueling station	Gasoline	Gasoline	NI	Volume ratio	1	1.0	1.0	1.0	OSHRI, 2013
78	>=2000	2006	2004	NI	Thinner	Thinner	GC MSD	NI	1	0.3	0.3	0.3	Kim et al., 2006
79	>=2000	2006	2004	NI	Thinner	Thinner	GC MSD	NI	1	1.2	1.2	1.2	Kim et al., 2006
80	>=2000	2006	2004	NI	Thinner	Thinner	GC MSD	NI	1	0.3	0.3	0.3	Kim et al., 2006
81	>=2000	2006	2004	NI	Thinner	Thinner	GC MSD	NI	1	0.5	0.5	0.5	Kim et al., 2006
82	>=2000	2006	2006	Manufacture of lubricating oil	Raw material	Raw material	NI	Volume ratio	1	1.1	1.1	1.1	OSHRI, 2013

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83	>=2000	2006	2006	Printing	Diluent	Diluent	GC FID, GC MSD	Volume ratio	7	0.01	0.07	0.25	OSHRI, 2013
84	>=2000	2007	2007	Manufacture of basic iron and steel	Coating materials	Coating materials	GC MSD	Relative abundance	1	0.2	0.2	0.2	OSHRI, 2013
85	>=2000	2007	2007	Manufacture of basic iron and steel	Coating materials	Coating materials	GC MSD	Relative abundance	1	0.2	0.2	0.2	OSHRI, 2013
86	>=2000	2007	2007	Manufacture of basic iron and steel	Coating materials	Coating materials	GC MSD	Relative abundance	1	0.3	0.3	0.3	OSHRI, 2013
87	>=2000	2007	2007	Manufacture of basic iron and steel	Thinner	Thinner	GC MSD	Relative abundance	1	0.1	0.07	0.1	OSHRI, 2013
88	>=2000	2007	2007	Manufacture of leathers	Adhesive	Adhesive	NI	Relative abundance	1	0.4	0.4	0.4	OSHRI, 2013
89	>=2000	2007	2007	Manufacture of motor vehicles	Coating materials	Coating materials	GC MSD	Weight ratio	1	0.0	0.003	0.0	OSHRI, 2013
90	>=2000	2007	2007	Shipbuilding	Coating materials	Coating materials	NI	Relative abundance	1	1.3	1.3	1.3	OSHRI, 2013
91	>=2000	2007	2007	Shipbuilding	Coating materials	Coating materials	GC MSD with head space	Relative abundance	1	0.0	0.04	0.0	OSHRI, 2013
92	>=2000	2009	2009	Maintenance and repair services of motor vehicles	Cleaning products	Cleaning products	NI	Relative abundance	1	0.2	0.2	0.2	OSHRI, 2013
93	>=2000	2009	2009	Maintenance and repair services of motor vehicles	Thinner	Thinner	NI	NI	1	1.7	1.7	1.7	OSHRI, 2013
94	>=2000	2009	2009	Manufacture of electronic components	Thinner	Thinner	GC MSD	Relative abundance	1	0.0	0.02	0.0	OSHRI, 2013
95	>=2000	2009	2009	Manufacture of electronic components	Thinner	Thinner	GC MSD	Relative abundance	1	0.0	0.02	0.0	OSHRI, 2013
96	>=2000	2010	2010	Electric power generation	Others	Fuel	GC MSD	Relative abundance	1	0.6	0.6	0.6	OSHRI, 2013
97	>=2000	2010	2010	Printing	Cleaning products	Cleaning products	GC MSD	Weight ratio	1	1.5	1.5	1.5	OSHRI, 2013
98	>=2000	2011	2008	Production of rubber tires and tubes	Solvent	Solvent	NI	NI	1	0.5	0.5	0.5	OSHRI, 2013
99	>=2000	2011	2011	Manufacture of motor vehicles	Gasoline	Gasoline	NI	Weight ratio	2	0.44	0.5	0.65	OSHRI, 2013
100	>=2000	2011	2011	Manufacture of motor vehicles	Thinner	Thinner	NI	Weight ratio	1	0.008	0.008	0.008	OSHRI, 2013
101	>=2000	2011	2011	Manufacture of motor vehicles	Thinner	Thinner	GC FID, GC MSD	Weight ratio	1	0.015	0.015	0.015	OSHRI, 2013
102	>=2000	2011	2011	Manufacture of motor vehicles	Thinner	Thinner	GC FID, GC MSD	Weight ratio	1	0.002	0.002	0.002	OSHRI, 2013
103	>=2000	2011	2011	Manufacture of motor vehicles	Thinner	Thinner	GC FID, GC MSD	Weight ratio	1	0.008	0.008	0.008	OSHRI, 2013

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104	>=2000	2011	2011	Petroleum refineries	Others	Ethyl benzene	GC MSD	Weight ratio	1	0.1	0.1	0.1	OSHRI, 2013
105	>=2000	2011	2011	Petroleum refineries	Others	Toluene	GC MSD	Weight ratio	1	0.1	0.1	0.1	OSHRI, 2013
106	1981~1999	2012	1996	Manufacture of motor vehicles	Others	Anti-rusting oil	GC MSD	NI	1	1.1	1.1	1.1	OSHRI, 2013
107	>=2000	2012	2002	Manufacture of motor vehicles	Coating materials	Coating materials	NI	Volume ratio	8	0.00018	0.0018	0.007	OSHRI, 2013
108	>=2000	2012	2012	Manufacture of motor vehicles	Diluent	Diluent	NI	NI	1	0.0	0.0026	0.0	OSHRI, 2013
109	>=2000	2012	2012	Manufacture of motor vehicles	Gasoline	Gasoline	NI	NI	1	0.9	0.9	0.9	OSHRI, 2013
110	>=2000	2012	2012	Manufacture of motor vehicles	Gasoline	Gasoline	GC FID, GC MSD	Weight ratio	1	0.0	0.03	0.03	OSHRI, 2013
111	>=2000	2012	2012	Manufacture of motor vehicles	Thinner	Thinner	GC MSD	NI	1	0.0	0.001	0.0	OSHRI, 2013
112	>=2000	2012	2012	Manufacture of motor vehicles	Thinner	Thinner	NI	NI	1	0.1	0.1	0.1	OSHRI, 2013

NI: no information, GC: gas chromatography, MSD: mass spectrometric detector, FID: flame ionized detector