



**DISCHARGE DATA
SUMMARY REPORT**

2016

INTRODUCTION

H&M always believe health and environment protection are both crucial in making great fashion. To create a more sustainable future, we always need to consider how to minimize the usage of hazardous chemicals in manufacturing process. In this regard, we are ambitious to commit the elimination of using hazardous chemical in supply chain by 2020.

Since 2012, H&M has been monitoring the chemical discharge situation of factories in different countries. In the study, 11 priority chemical groups (121 analytes) are tested in incoming water and discharged waste water every year. Discharge result would be disclosed in public accessible platform, the Institute of Public and Environmental Affairs (IPE), www.ipe.org.cn.

In 2015, we carried out this study in six production countries : **Bangladesh, Cambodia, China, India, Indonesia, Vietnam**. In this summary report, there are two parts with action plan discussed. The first part includes the discharge result analysis for 2015 data while the second part includes the discharge result analysis for data collected from 2012 to 2015.



METHODOLOGY

Objective : To study if 11 priority chemical groups are released in discharged water from factory

STEP:

Collection of environmental samples by BVCPS¹







11 Priority Chemical tests performed on collected water samples by BVCPS

Report issued on results of collected water samples

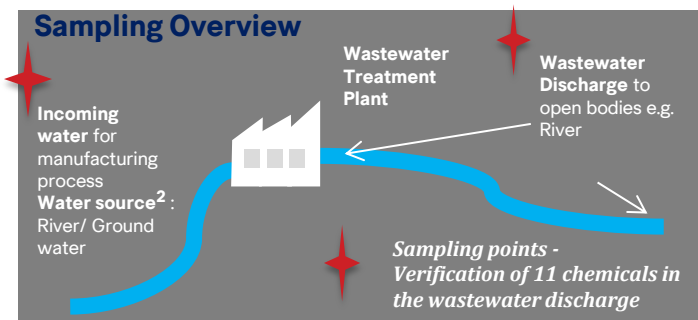
Disclose the discharge results on IPE platform

Service Provider: Bureau Veritas Consumer Products Service (BVCPS)

Factory Location **No. of Factory involved in 2015**

Bangladesh		26
Cambodia		5
China		19
India		6
Indonesia		2
Vietnam		1

Total : 59



Sampling time

Between 2:00 – 5:00 pm, factory under normal operation

11 Priority Chemicals³ :

1. Alkylphenols (APs) & Alkylphenol Ethoxylates (APEOs)
2. Azo Dyes
3. Brominated and Chlorinated Flame Retardants
4. Chlorinated solvents
5. Chlorobenzenes
6. Chlorophenols
7. Organotin
8. Phthalates
9. Short Chain Chlorinated Paraffins (SCCPs)
10. Total heavy metal
11. Perfluorinated Chemicals (PFCs)

1. Sampling method was according to international standards. For details, please see Appendix A.

2. The sources of incoming water for manufacturing processes were often river or ground water. These sources are different from the sources used for domestic/ drinking uses.

3. List of analytes is included in Appendix B

METHODOLOGY

STEP:

Collection of environmental samples by BVCPS 1

11 Priority Chemical tests performed on collected water samples by BVCPS

Report issued on results of collected water samples

Disclose the discharge results on IPE platform

Public Disclosure Platform

Institute of Public & Environmental Affairs (IPE)



Data Disclosure Step in uploading discharge result in IPE

- Factory fill in Detox form provided by IPE
- Filled Detox form was verified by BVCPS before uploading to IPE platform by factory
- All 59 production units had been uploaded the discharge data in IPE platform (http://www.ipe.org.cn/pollution/discharge_detox.aspx)

DISCHARGE RESULT ANALYSIS 2015

OVERVIEW – 2015 WATER TEST RESULT

In the study, 121 analytes(11 chemical groups) were tested in both incoming and waste water samples. **36** analytes (**10** chemical groups) were detected in waste water samples, in which **24** of these analytes (**9** chemical groups) were detected in incoming water sample as well.

Graph 1 : Number of analytes detected and not-detected in water sample

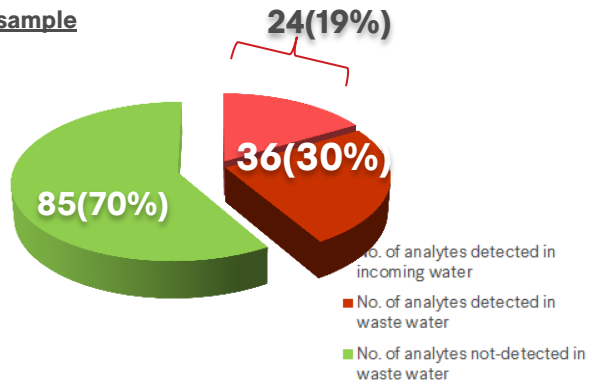


Table 1 : Chemical groups detected in water

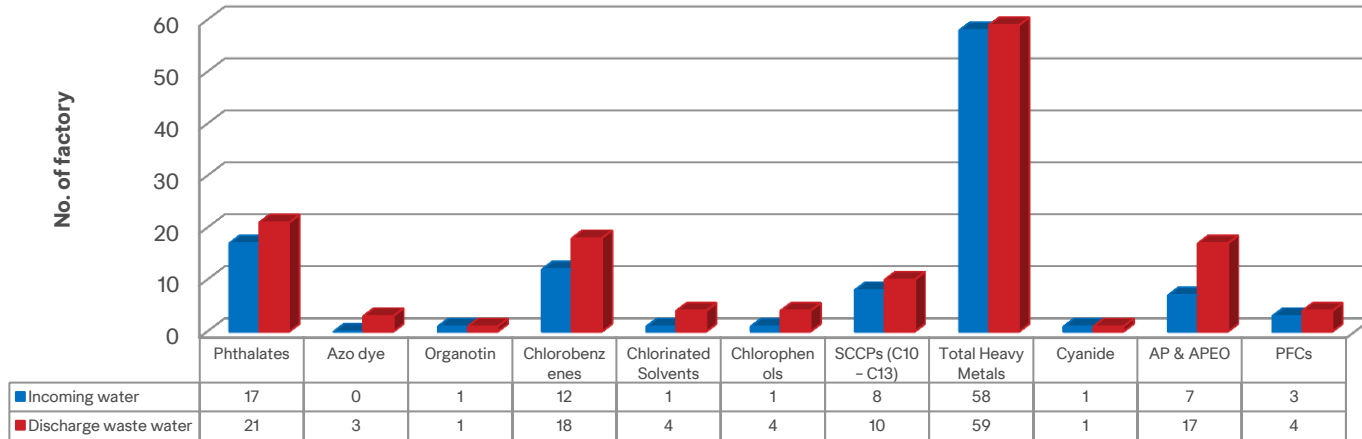
WATER SAMPLE	Incoming Water	Waste Water
Chemical groups detected	1. Phthalates	1. Phthalates
	2. Organotin	2. Azo dyes
	3. Chlorobenzenes	3. Organotin
	4. Chlorinated Solvents	4. Chlorobenzenes
	5. Chlorophenols	5. Chlorinated Solvents
	6. SCCP (C10 - C13)	6. Chlorophenols
	7. Total Heavy Metals	7. SCCP (C10 - C13)
	8. AP & APEO	8. Total Heavy Metals
	9. PFCs	9. AP & APEO
		10. PFCs

From the obtained results,

- Azo Dyes group was detected only in waste water samples. It implies its application in manufacturing processes.
- 24 analytes were found in both incoming and waste water samples. It implies the origin pollution problem in water source.

OVERVIEW – 2015 WATER TEST RESULT

Graph 2 : The presence of chemical groups in factories



The presence of detected chemical groups in factories are shown in graph 2. We could see :

- i. Phthalates, Chlorobenzene and Heavy Metal were commonly detected in both incoming and discharged water samples.
- ii. Phthalates, Chlorobenzenes and Heavy Metals were also the three major chemical groups found in discharged water samples.
- iii. Flame Retardant group was not found in both incoming and waste water samples.

2015 DISCHARGE WATER RESULT COMPARISON WITH LOCAL LEGISLATION

Table 2 : Comparison of 2015 discharge water result with local legislation

Chemical Analytes	China		India		Cambodia		Vietnam		Indonesia	
	Limit *	Detected **	Limit *	Detected **	Limit *	Detected **	Limit *	Detected **	Limit *	Detected **
Dibutyl phthalate (DBP)	0.20	0.02 #	NA	0.00	NA	ND	NA	ND	NA	ND
Chlorobenzene	0.20	0.00	NA	0.04	NA	ND	NA	ND	NA	ND
1,2-Dichlorobenzene	0.40	ND	NA	ND	NA	ND	NA	ND	NA	ND
1,3-Dichlorobenzene, 1,4-Dichlorobenzene	0.40	0.01 #	NA	0.00	NA	ND	NA	ND	NA	ND
Chloroform	0.30	ND	NA	ND	NA	ND	NA	ND	NA	ND
Carbon Tetrachloride	0.03	ND	NA	ND	NA	ND	NA	ND	NA	ND
Trichloroethylene	0.30	ND	NA	ND	NA	ND	NA	ND	NA	ND
Tetrachloroethylene	0.10	ND	NA	ND	NA	ND	NA	ND	NA	ND
Pentachlorophenol	5.00	ND	NA	0.21	NA	ND	NA	ND	NA	ND
Total Arsenic (As)	0.50	0.01	0.20	0.00	0.1	0.00	0.05	0.00	NA	ND
Total Cadmium (Cd)	0.10	0.00	2.00	0.00	0.1	0.00	0.01	0.00	NA	0.00
Total Mercury (Hg)	0.05	ND	0.01	ND	NA	0.00	0.01	0.00	NA	ND
Total Lead (Pb)	1.00	0.02#	0.10	0.01	NA	0.00	0.10	0.01	NA	ND
Total Nickel (Ni)	1.00	0.01#	3.00	0.08	NA	0.01	0.20	ND	NA	0.00
Total Copper (Cu)	0.50	0.01	3.00	0.03	NA	0.06	2.00	0.03	NA	0.02
Total Zinc (Zn)	2.00	0.26#	5.00	0.13	NA	0.24	3.00	0.02	NA	0.01
Total Chromium (Cr)	1.50	0.01#	2.00	0.06	NA	0.03	NA	0.00	1	ND
Total Manganese	2.00	0.98#	2.00	0.14	1	0.05	0.50	0.10	NA	0.59
Chromium VI	0.50	ND	0.10	ND	NA	ND	0.05	ND	NA	ND
Cyanide	0.50	ND	0.20	ND	0.2	ND	0.07	ND	NA	ND

* Refer to appendix C for relevant country legislation

** The value is the highest detected concentration in discharged water samples in each country

Waste water sample was not treated by waste water treatment plant

Unit : parts per million (ppm) ND : Not Detected NA : Not Applicable

The highest detected amount of each analyte in this study was applied for the comparison with local waste water discharged legislation limits.

All obtained results were lower than local legislation in

- China
- India
- Cambodia
- Vietnam
- Indonesia



2015 DISCHARGE WATER RESULT COMPARISON WITH LOCAL LEGISLATION

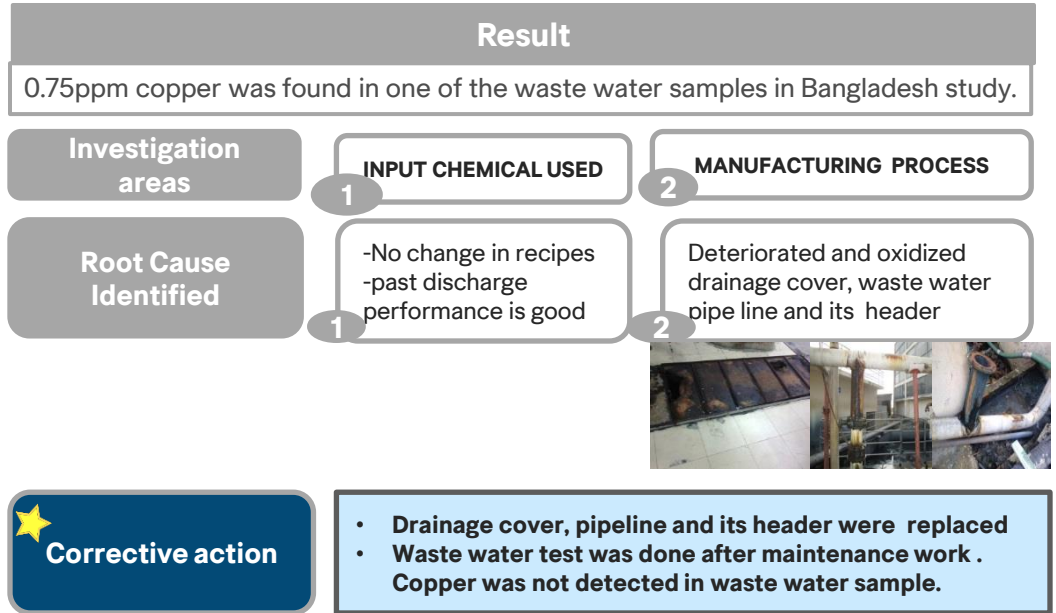
Table 2 : Comparison of 2015 discharge water result with local legislation

Chemical Analytes	Bangladesh	
	Limit *	Detected **
Dibutyl phthalate (DBP)	NA	ND
Chlorobenzene	NA	ND
1,2-Dichlorobenzene	NA	ND
1,3-Dichlorobenzene, 1,4-Dichlorobenzene	NA	0.00
Chloroform	NA	ND
Carbon Tetrachloride	NA	ND
Trichloroethylene	NA	ND
Tetrachloroethylene	NA	ND
Pentachlorophenol	NA	ND
Total Arsenic (As)	0.20	0.00
Total Cadmium (Cd)	0.50	0.00
Total Mercury (Hg)	0.01	ND
Total Lead (Pb)	0.10	0.01
Total Nickel (Ni)	1.00	0.01
Total Copper (Cu)	0.50	0.75
Total Zinc (Zn)	5.00	1.00
Total Chromium (Cr)	0.50	0.04
Total Manganese	5.00	3.23
Chromium VI	0.10	ND
Cyanide	0.10	0.04

* Refer to appendix C for relevant country legislation

**The value is the highest detected concentration in discharged water samples in each country

Unit : parts per million (ppm) ND : Not Detected NA : Not Applicable



DISCHARGE RESULT ANALYSIS 2012 - 2015

2012-2015 DISCHARGE RESULT OVERVIEW

Background

Period of year : **2012-2015**

Average number of test trials per analyte : **140**

Production countries involved :

Bangladesh, Cambodia, China, India, Indonesia, Vietnam



Detected in both incoming and discharge water sample



Detected in discharge water sample only

ND

Not Detected in both incoming and discharge water sample

Table 3 : The presence of chemical groups from 2012-2015

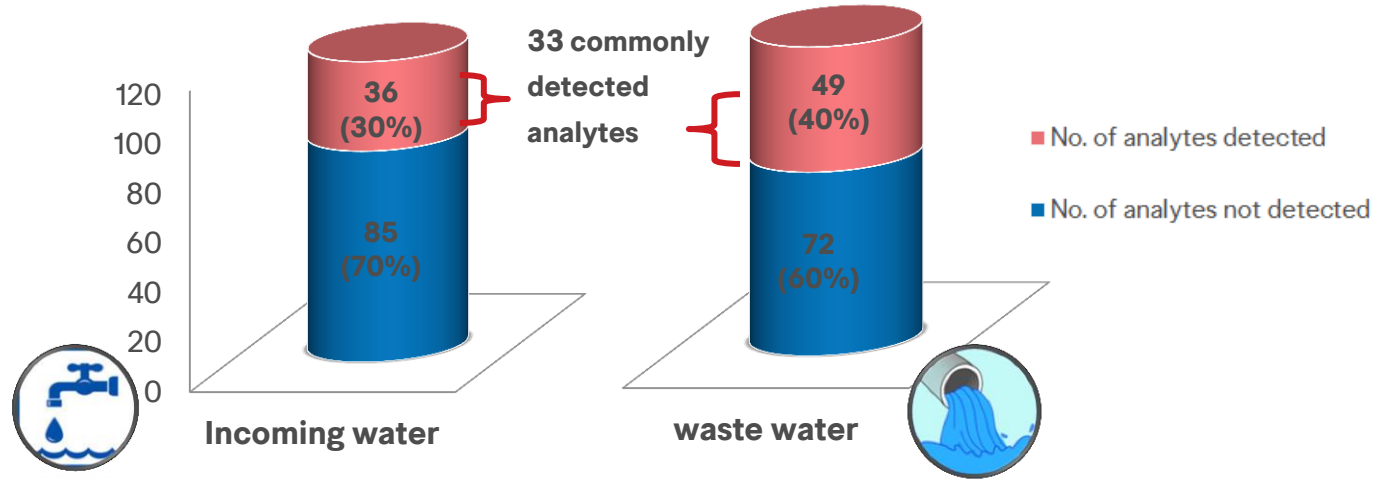
	2012	2013	2014	2015
No. of factory involved	11	23	50	59
1 Phthalates				
2 Flame Retardants	ND	ND	ND	ND
3 Azo Dyes				
4 Organotin Compounds	ND			
5 Chlorobenzenes				
6 Chlorinated Solvents	ND	ND		
7 Chlorophenols	ND	ND		
8 Short Chain Chlorinated Paraffins (SCCPs) (C10 - C13)				
9 Total Heavy Metals				
10 Alkylphenols (APs) & Alkylphenol Ethoxylates (APEOs)	ND			
11 Perfluorinated Chemicals (PFCs)	ND	ND	ND	

The presence of chemical groups in 2012-2015 data is shown in table 3. From the result overview :

1. In both incoming and discharge water samples, the number of detected chemical groups was more in 2015 than in 2012
2. Flame Retardant was not detected in H&M production sites based on these 4 years data.
3. Azo dye was detected in waste water sample only, this is the chemical group which has been generated in manufacturing processes.
4. Phthalates, Chlorobenzenes, SCCPs and Heavy Metals were the 4 chemical groups which were detected in both incoming and discharge water samples in every year. This implies that some analytes in these chemical groups might originally come from incoming water source.

2012-2015 DISCHARGE RESULT OVERVIEW

Graph 3: No. of analytes detected and not-detected in water sample



In these 4 year data analysis, we could see

1. The percentage of not-detected analytes in incoming water was 70% only. This implies that the original water source is already polluted.
2. **49** out of 121 analytes were found in waste water sample. Among these detected 49 analytes, **33** analytes were also commonly detected in incoming water samples.

CONCLUSION

- In 2015, 36 chemical analytes (out of 121 chemical analytes) were detected in discharged water sample, in which 24 out of 36 chemical analytes (67%) were found also in incoming water.
Taking all 4 year result data into account, 49 chemical analytes (out of 121 chemical analytes) were detected in discharged water sample, in which 33 out of 49 chemical analytes (67%) were also found in incoming water. This implies that incoming water keeps on as one of the major sources for hazardous chemicals detected in discharged water sample.
- In 2015 result data, high amount of copper was detected in one of the waste water samples in Bangladesh study. The root cause was identified in the manufacturing maintenance. It implies that beside input chemical control, a comprehensive chemical management in factory is also important for supply chain
- Throughout the 4 year result analysis, flame retardant was not found in all water samples in H&M production sites.
- Among all 11 chemical groups, Azo dye group was detected in discharged water samples only in these 4 year results , indicating its actual usage in manufacturing processes.

OUR ACTION

We care about the global environment and health throughout our value chain. To make it happen, we have to work closely with key players like our suppliers and industry stakeholders. H&M will continue the hard work so as to keep the synergy within the industry.

- Secure the technical competence level in our supplier chain
- Work closely with our suppliers to develop good chemical management systems
- Develop measurement tool within industry to evaluate supplier's chemical management performance
- Enhance collaboration with chemical industry to find best available chemicals (Positive lists) to substitute the hazardous chemicals
- Encourage the substitution of hazardous chemicals by promoting and publishing the lists of best available chemicals (Positive Lists) in our supplier portal and company websites (<http://sustainability.hm.com/en/sustainability/commitments/use-natural-resources-responsibly/chemicals.html>)
- Keep our Manufacturing Restricted Substances List (MRSL) up-to-date in order to ensure the comprehensiveness of the zero-discharge scheme
- Enhance our transparency of hazardous chemical discharge by encouraging more factories to disclose their chemical discharge data in public platforms



APPENDIX

APPENDIX A : STANDARD PROCEDURE FOR ENVIRONMENTAL SAMPLING

1. US EPA Guidelines – Regulatory monitoring and testing Water and wastewater sampling
2. Australia EPA (Victoria) Guideline – Sampling and Analysis of Waters, Wastewaters, Soils and Wastes.
3. ISO 5667-3, Water Quality – Sampling – Part 3: Guidance on the preservation and handling of water samples
4. ASTM D3976-92 (Reapproved 2010) – Standard Practice for preparation of Sediment Samples for Chemical Analysis

APPENDIX B : LIST OF CHEMICAL ANALYTES

No.	Chemical Group	Name of Chemical Analytes	CAS No.
1	Phthalates	Butyl benzyl phthalate (BBP)	85-68-7
2		Dibutyl phthalate (DBP)	84-74-2
3		Di-2-ethylhexyl phthalate (DEHP)	117-81-7
4		Di-n-octyl phthalate (DNOP)	117-84-0
5		Di-iso-nonyl phthalate (DINP)	28553-12-0 & 68515-48-0
6		Di-iso-decyl phthalate (DIDP)	26761-40-0 & 68515-49-1
7		Dimethyl phthalate (DMP)	131-11-3
8		Diethyl phthalate (DEP)	84-66-2
9		Di-n-propyl phthalate (DPRP)	131-16-8
10		Di-iso-butyl phthalate (DIBP)	84-69-5
11		Di-cyclohexyl phthalate (DCHP)	84-61-7
12		Di-n-hexyl phthalate (DnHP)	84-75-3
13		Dinonyl phthalate (DNP)	84-76-4
14		Di-iso-octyl phthalate (DIOP)	27554-26-3
15		Dimethoxyethyl phthalate (DMEP)	117-82-8
16	Brominated Flame Retardants	Polybromobiphenyls (PBBs)	Various
17		Tris(2,3-dibromopropyl) phosphate (TRIS)	126-72-7
18		Polybromodiphenyl ethers (PBDEs)	Various
19		Tetrabromobisphenol A (TBBPA)	79-94-7
20		Bis(2,3-dibromopropyl) phosphate	5412-25-9
21		Hexabromocyclododecane (HBCDD)	3194-55-6
22		2,2-Bis(bromomethyl)-1,3-propanediol (BBMP)	3296-90-0
23	Chlorinated Flame Retardants	Tris(2-chloroethyl) phosphate (TCEP)	115-96-8
24		Tris(1,3-dichloro-isopropyl) phosphate (TDCP)	13674-87-8

APPENDIX B : LIST OF CHEMICAL ANALYTES

No.	Chemical Group	Name of Chemical Analytes	CAS No.
25	Aromatic Amines in Azo Colorants	4-Aminodiphenyl	92-67-1
26		Benzidine	92-87-5
27		4-Chloro-o-toluidine	95-69-2
28		2-Naphthylamine	91-59-8
29		o-Aminoazotoluene	97-56-3
30		5-nitro-o-toluidine	99-55-8
31		4-Chloroaniline	106-47-8
32		4-Methoxy-m-phenylenediamine	615-05-4
33		4,4'-Diaminodiphenylmethane	101-77-9
34		3,3'-Dichlorobenzidine	91-94-1
35		3,3'-Dimethoxybenzidine	119-90-4
36		3,3'-Dimethylbenzidine	119-93-7
37		4,4'-Methylenedi-o-toluidine	838-88-0
38		o-Cresidine	120-71-8
39		4,4'-Methylene-bis-(2-chloraniline)	101-14-4
40		4,4'-Oxydianiline	101-80-4
41		4,4'-Thiodianiline	139-65-1
42		o-Toluidine	95-53-4
43		4-Methyl-m-phenylenediamine	95-80-7
44		2,4,5-Trimethylaniline	137-17-7
45		o-Anisidine	90-04-0
46		4-Aminoazobenzene	60-09-3
47		2,4-Xylidine	95-68-1
48	2,6-Xylidine	87-62-7	
49	Aniline	62-53-3	

No.	Chemical Group	Name of Chemical Analytes	CAS No.	
50	Organotin Compounds	Monobutyltin (MBT)	Various	
51		Dibutyltin (DBT)		
52		Diocetyl tin (DOT)		
53		Tributyltin (TBT)		
54		Triphenyltin (TPhT)		
55		Tricyclohexyltin (TCyHT)		
56		Triocetyl tin (TOT)		
57		Tripropyltin (TPT)		
58	Chlorobenzenes	Chlorobenzene	108-90-7	
59		1,2-Dichlorobenzene	95-50-1	
60		1,3-Dichlorobenzene, 1,4-Dichlorobenzene	541-73-1, 106-46-7	
61		1,2,3-Trichlorobenzene	87-61-6	
62		1,2,4-Trichlorobenzene	120-82-1	
63		1,3,5-Trichlorobenzene	108-70-3	
64		1,2,3,4-Tetrachlorobenzene	634-66-2	
65		1,2,3,5-Tetrachlorobenzene, 1,2,4,5-Tetrachlorobenzene	634-90-2, 95-94-3	
66		Pentachlorobenzene	608-93-5	
67		Hexachlorobenzene	118-74-1	
68		Chlorinated Solvents	1,2-Dichloroethane	107-06-2
69			1,1-Dichloroethylene	75-35-4
70	Methylene Chloride		75-09-2	
71	cis-1,2-Dichloroethylene		156-59-2	
72		trans-1,2-Dichloroethylene	156-60-5	

APPENDIX B : LIST OF CHEMICAL ANALYTES

No.	Chemical Group	Name of Chemical Analytes	CAS No.
73	Chlorinated Solvents	Chloroform	67-66-3
74		1,1,1-Trichloroethane	71-55-6
75		Carbon Tetrachloride	56-23-5
76		Trichloroethylene	79-01-6
77		1,1,2-Trichloroethane	79-00-5
78		1,1,1,2-Tetrachloroethane	630-20-6
79		Tetrachloroethylene	127-18-4
80	Chlorophenols	Pentachlorophenol	87-86-5
81		2,3,4,5-Tetrachlorophenol	4901-51-3
82		2,3,4,6-Tetrachlorophenol	58-90-2
83		2,3,5,6-Tetrachlorophenol	935-95-5
84		2,4,6-Trichlorophenol	88-06-2
85		2,3,5-Trichlorophenol	933-78-8
86		2,4,5-Trichlorophenol	95-95-4
87		3,4,5-Trichlorophenol	609-19-8
88		2,3,4-Trichlorophenol	15950-66-0
89		2,3-Dichlorophenol	576-24-9
90		3,4-Dichlorophenol	95-77-2
91		2,4-Dichlorophenol	120-83-2
92		2,5-Dichlorophenol	583-78-8
93		2,6-Dichlorophenol	87-65-0
94		3,5-Dichlorophenol	591-35-5
95		2-Chlorophenol	95-57-8
96		3-Chlorophenol	108-43-0
97	4-Chlorophenol	106-48-9	

No.	Chemical Group	Name of Chemical Analytes	CAS No.
98	Short Chain Chlorinated Paraffins	Short Chain Chlorinated Paraffins	85535-84-8
99	Heavy Metals	Arsenic (As)	Various
100		Cadmium (Cd)	
101		Mercury (Hg)	
102		Lead (Pb)	
103		Antimony (Sb)	
104		Cobalt (Co)	
105		Nickel (Ni)	
106		Copper (Cu)	
107		Zinc (Zn)	
108		Chromium (Cr)	
109		Manganese (Mn)	
110	Chromium VI		
111	Cyanide (CN-)		
112	Alkylphenols & Alkylphenol Ethoxylates	Octylphenol (OP)	Various
113		Nonylphenol (NP)	
114		Octylphenoethoxylates (OPEOs)	
115		Nonylphenoethoxylates (NPEOs)	
116	Perfluorinated Chemicals	Perfluorooctanoic acid (PFOA)	335-67-1
117		Perfluorooctane sulphonates (PFOS)	2795-39-3
118		Perfluoro-n-hexanoic acid (PFHxA)	307-24-4
119		Perfluorohexane sulphonates (PFHxS)	3871-99-6
120		Perfluorobutanoic acid (PFBA)	375-22-4
121		Perfluorobutane sulphonates (PFBS)	29420-49-3

APPENDIX C : REFERENCES

1. *Discharge standards of water pollutant for dyeing and finishing of textile industry, GB 4287-2012*
2. *Integrated wastewater discharge standard, GB 8978-1996*
3. *The Environment Conservation Rules, 1997*
4. *The Environment (Protection) Rules, 1986*
5. *Industrial waste water – Discharge standards, TCVN 5945:2005*
6. *Cambodia SUB-DECREE on WATER POLLUTION CONTROL-1999*
7. *Indonesia PERGUB DKI 69-2013*