Hohenstein Laboratories Bangladesh Limited • 122/1 Love Road • Tejgaon I/A • Dhaka-1208

Mahmud Fabrics and Finishing Limited
419, Ulushara, Baraipara, Kaliakoir
Gazipur-1750
Bangladesh.

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Business process.	Contact person	Our ref.	Date
	Kanta, Johny Yasmin	sbu/fah	27.08.2024

Report no. 24.0.40661

Client	:	Mahmud Fabrics and Finishing Limited
Contact person	:	Md. Prince Kawsar Ibney Jahid
Date of order	:	25/06/2024
Sampling Date	:	30/06/2024
Period of Testing	:	30/06/2024 to 18/07/2024
Person in-charge of sampling	:	Md Mahidur Rahman ZDHC sampler ID: ZDHC-A-24-E-C001068-R40B8-D9CC2
Sampling Method	:	☐ Spot sampling ☒ Composite sampling
Weather condition sampling period	:	☐Dry ☒Sunny ☐Overcast ☐Foggy ☐Rainy ☐Others
Type of discharge	:	☒Direct ☐Indirect ☐ZLD
Type of Treatment	:	☒With pretreatment ☐Without pretreatment
Sampling period	:	10.00 am to 4.30pm
Testing material	:	☒Wastewater ☒Sludge
Sampling	:	☒Performed by Hohenstein ☐Self
Cross check sample taken by Customer.	:	☐Yes ☒No
Aim of Testing	:	Analysis of wastewater according to the ZDHC wastewater guidelines (Version 2.1, November 2022)
Local Legal standard name	:	The environmental Conservation Rules, 2023; Government of the Peoples Republic of Bangladesh; Ministry of Environment, Forest, and climate change

The report comprises 18 pages

TESTING MATERIAL

General information

Effluent treatment Plant (ETP) / facility		
GPS Location	Latitude	24.031059
	Longitude	90.250364

Untreated Wastewater (on-site assessment)				
Color Impression	:	Black		
Turbidity	:	☒ Not turbid	☐ Turbid	
Odor	:	☐ Odorless	☒ Slight	☐ Pungent
Foaming	:	☒ Not Visible	☐ Visible	

Treated Wastewater (on-site assessment)				
Color Impression	:	Light black		
Turbidity	:	☒Not turbid	☐Turbid	
Odor	:	☒Odorless	☐Slight	☐Pungent
Foaming	:	☒Not Visible	☐Visible	

Sludge (on-site assessment)		
Identification, Designation of the sampling point		
Color Impression	:	Black
Odor	:	☐ Odorless ☒Slight ☐Pungent
Physical State	:	☐ Liquid ☐Paste ☐Semi-Solid ☒Solid ☐Other

Collected Sample (on-site Preservation)

TERMS OF USE

The results relate only to the samples examined. The measurement uncertainty of the method is already considered while determining limit values, unless otherwise noted. This report must only be reproduced in full and not in extract form. Use of the report in advertising or the publication of free interpretations of the results is only allowed with the express permission of Hohenstein. Only the authorized report is legally binding.
The accreditation applies for the methods listed in the annex to the certificate (accreditations see http://www.hohenstein.de/de/about_hohenstein/accreditation/accreditation.html) – marked(A) in the report."

List of Abbreviations

LOQ	=	Limit of quantification	-:	=	test not conducted
n.d	=	Not detectable	f	=	On-site tested
n.a	=	Not Applicable	#	=	Test Subcontract at ISO 17025:2017 Accredited Lab
RL	=	Reporting Limit			

SUMMARY OF TEST RESULT

Table 1	Test	Untreated wastewater
1A	Alkylphenols (AP) and Alkylphenol Ethoxylates (APEOs)	Meets
1B	o-Phenyl phenol (OPP)	Meets
1B	Triclosan	Meets
1B	Permethrin	Meets
1C	Chlorinated Paraffins (SCCP)	Meets
1D	Chlorobenzenes and Chlorotoluene (COC)	Meets
1E	Chlorophenols (PCP)	Meets
1F	N, N-di-methyl formamide (DMFa)	Meets
1G	Carcinogenic Dyes	Meets
1H	Disperse Dyes	Meets
1I	Navy blue colorant	Meets
1J	Flame Retardants	Meets
1K	Glycols	Meets
1L	Halogenated Solvents	Meets
1M	Organotin Compounds	Meets
1N	Other/Miscellaneous chemicals	Meets
1O	Perfluorinated and Polyfluorinated Chemicals (PFCs)	Meets
1P	Phthalates	Meets
1Q	Polycyclic Aromatic Hydrocarbons (PAHs)	Meets
1R	Aromatic amines (Azo)	Meets
1S	UV Absorbers	Meets
1T	Volatile Organic Compounds (VOC)	Meets

Table 2	Heavy Metals parameters	Treated wastewater		
		Foundational	Progressive	Aspirational
01	Antimony (Sb)			Meets
02	Chromium (Cr)			Meets
03	Cobalt (Co)			Meets
04	Copper (Cu)			Meets
05	Nickel (Ni)			Meets
06	Silver (Ag)			Meets
07	Zinc (Zn)			Meets
08	Arsenic (As)			Meets
09	Cadmium (Cd)			Meets
10	Lead (Pb)			Meets
11	Mercury (Hg)			Meets
12	Chromium (VI)			Meets
13	Boron (Salt)	Report data, refer data		-
14	Barium (Ba)			-
15	Selenium (Se)			-
16	Tin (Sn)			-

Table 3	Conventional parameters	Treated Wastewater		
		Foundational	Progressive	Aspirational
01	Temperature difference [°C]			Meets
02	Total Suspended Solids (TSS)		Meets	
03	Chemical Oxygen Demand (COD)		Meets	
04	Total-Nitrogen (TN)		Meets	
05	Total-Phosphorus		Meets	
06	pH value			Meets
07	Colour (436 nm, 525 nm, 620 nm)		Meets	
08	Biochemical Oxygen Demand (BOD_5)	Meets		
09	Ammonium-N (as NH_4)	Meets		

10	Adsorbable Organic Halogen (AOX)	Meets		
11	HEM (Oil and Grease)	Meets		
12	Total Phenol			Meets
13	Total Dissolved Solid (TDS)			-
14	Wastewater Flowrate (m^3/day)			-
15	Persistent Foam			-
16	Dissolved Oxygen (DO)			-
17	Total chlorine			-
18	E.coli			Meets

Table 3	**Anions**	**Treated Wastewater**		
		Foundational	**Progressive**	**Aspirational**
01	Cyanide	Meets		
02	Chloride			-
03	Sulfide	Meets		
04	Sulfate			-
05	Sulfite	Meets		

Table 4	**Heavy Metals parameters**	**Sludge**	
		Total	**Leachate**
01	Antimony (Sb)	Meets	
02	Chromium (Cr)	Meets	
03	Cobalt (Co)	Meets	
04	Copper (Cu)	Meets	
05	Nickel (Ni)	Meets	
06	Silver (Ag)	Meets	
07	Zinc (Zn)	Meets	
08	Arsenic (As)	Meets	
09	Cadmium (Cd)	Meets	
10	Lead (Pb)	Meets	
11	Mercury (Hg)	Meets	
12	Chromium VI	Meets	
13	Boron (Salt)	Meets	
14	Barium (Ba)	Meets	
15	Selenium (Se)	Meets	
16	Tin (Sn)	Meets	

Table 4	**Sludge parameters**	**Sludge**
01	pH	-
02	Paint Filter Test	-
03	Fecal Coliform	Meets
04	% Solids	-
05	Cyanide	Meets
06	Alkylphenols (AP) and Alkylphenol Ethoxylates (APEOs)	Meets
07	Polycyclic Aromatic Hydrocarbons (PAHs)	Meets
08	Chlorotoluenes (only)	Meets

Sludge Disposal Pathways	
Pathway	**Disposal System**
☐A	Offsite Incineration at >1000°C
☐B	Landfill with Significant Control Measures
☒C	Building Products Processed at >1000°C
☐D	Landfill with Limited Control Measures
☐E	Offsite Incineration and Building Products Processed at <1000°C
☐F	Landfills with No Control Measures
☐G	Land Application

ANALYTICAL TEST REPORT

Table 1A. Alkylphenol (AP) and Alkylphenol Ethoxylates (APEOs) (for Untreated wastewater)

Method:	DIN EN ISO 18254-1/ DIN EN ISO 18857-2 (modified LC-MS/MS Determination)
LOQ:	0.5 µg/L

Substances	CAS-No.	RL (µg/L)	Sample Results
Nonylphenol (NP), mixed isomers	104-40-5 11066-49-2 25154-52-3 84852-15-3	5	n.d
Octylphenol (OP), mixed isomers	140-66-9 1806-26-4 27193-28-8	5	n.d
Octylphenol ethoxylates (OPEO)	9002-93-1 9036-19-5 68987-90-6	5	n.d
Nonylphenol ethoxylates (NPEO)	9016-45-9 26027-38-3 37205-87-1 68412-54-4 127087-87-0	5	n.d

Table 1B. o-Phenylphenol (+salts) (for Untreated wastewater)

Method:	BS EN 12673:1999, ISO 14154:2005; USEPA 8270E Solvent extraction, derivatization with KOH, acetic anhydride followed by GC-MS/MS
LOQ:	0.2 µg/L

Substances	CAS-No.	RL (µg/L)	Sample Results
o-Phenylphenol (+salts)	90-43-7	100	n.d

Table 1B. Triclosan (for Untreated wastewater)

Method:	BS EN 12673-1999 (modified solvent extraction, LC-MS/MS determination)
LOQ:	0.2 µg/L

Substances	CAS-No.	RL (µg/L)	Sample Results
Triclosan	3380-34-5	100	n.d

Table 1B. Permethrin (for Untreated wastewater)

Method:	ISO 14154 :2005 or solvent extraction without derivatization, LC-MS/MS determination
LOQ:	0.2 µg/L

Substances	CAS-No.	RL (µg/L)	Sample Results
Permethrin	Multiple	500	n.d

Table 1C. Chlorinated Paraffins (for Untreated wastewater)

Method:	SCCP & MCCP: ISO18219-2:2021&ISO 12010:2019 (solvent extraction, GC-NCI-MS/MS determination)
LOQ:	5 µg/L

Substances	CAS-No.	RL (µg/L)	Sample Results
Middle-chain chlorinated Paraffins (MCCP) (C14-C17)	85535-85-9	5	n.d
Short-chain chlorinated Paraffins (SCCP) (C10-C13)	85535-84-8	5	n.d

Table 1D. Chlorobenzenes and Chlorotoluene's (for Untreated wastewater)

Method:	Dichloromethane extraction followed by GC-MS/MS
LOQ:	0.01 µg/l

Substances	CAS-No.	RL(µg/L)	Sample Results
Mono chlorobenzene	108-90-7	0.2	n.d
1,2-Dichlorobenzene	95-50-1	0.2	n.d
1,3-Dichlorobenzene	541-73-1	0.2	n.d

1,4-Dichlorobenzene	106-46-7	0.2	n.d
1,2,3-Trichlorobenzene	87-61-6	0.2	n.d
1,2,4-Trichlorobenzene	120-82-1	0.2	n.d
1,3,5-Trichlorobenzene	108-70-3	0.2	n.d
1,2,3,4-Tetrachlorobenzene	634-66-2	0.2	n.d
1,2,3,5-Tetrachlorobenzene	634-90-2	0.2	n.d
1,2,4,5-Tetrachlorobenzene	95-94-3	0.2	n.d
Penta chlorobenzene	608-93-5	0.2	n.d
Hexa chlorobenzene	118-74-1	0.2	n.d
2-Chlorotoluene	95-49-8	0.2	n.d
3-Chlorotoluene	108-41-8	0.2	n.d
4-Chlorotoluene	106-43-4	0.2	n.d
2,3-Dichlorotoluene	32768-54-0	0.2	n.d
2,4-Dichlorotoluene	95-73-8	0.2	n.d
2,5-Dichlorotoluene	19398-61-9	0.2	n.d
2,6-Dichlorotoluene	118-69-4	0.2	n.d
3,4-Dichlorotoluene	95-75-0	0.2	n.d
3,5-Dichlorotoluene	25186-47-4	0.2	n.d
2,3,4-Trichlorotoluene	7359-72-0	0.2	n.d
2,3,6-Trichlorotoluene	2077-46-5	0.2	n.d
2,4,5-Trichlorotoluene	6639-30-1	0.2	n.d
2,4,6-Trichlorotoluene	23749-65-7	0.2	n.d
3,4,5-Trichlorotoluene	21472-86-6	0.2	n.d
2,3,4,5-Tetrachlorotoluene	76057-12-0	0.2	n.d
2,3,5,6-Tetrachlorotoluene	29733-70-8	0.2	n.d
2,3,4,6-Tetrachlorotoluene	875-40-1	0.2	n.d
Penta chlorotoluene	877-11-2	0.2	n.d

Table 1E. Chlorophenols (for Untreated wastewater)

Method:	DIN EN 12673:1999 (Solvent extraction, derivatization with KOH, acetic anhydride followed by GC-MS/MS)
LOQ:	0.2µg/l

Substances	CAS-No.	RL(µg/L)	Sample Results
2-Chlorophenol	95-57-8	0.5	n.d
3-Chlorophenol	108-43-0	0.5	n.d
4-Chlorophenol	106-48-9	0.5	n.d
2,3-Dichlorophenol	576-24-9	0.5	n.d
2,4-Dichlorophenol	120-83-2	0.5	n.d
2,5-Dichlorophenol	583-78-8	0.5	n.d
2,6-Dichlorophenol	87-65-0	0.5	n.d
3,4-Dichlorophenol	95-77-2	0.5	n.d
3,5-Dichlorophenol	591-35-5	0.5	n.d
2,3,4-Trichlorophenol	15950-66-0	0.5	n.d
2,3,5-Trichlorophenol	933-78-8	0.5	n.d
2,3,6-Trichlorophenol	933-75-5	0.5	n.d
2,4,5-Trichlorophenol	95-95-4	0.5	n.d
2,4,6-Trichlorophenol	88-06-2	0.5	n.d
3,4,5-Trichlorophenol	609-19-8	0.5	n.d
2,3,4,5-Tetrachlorophenol	4901-51-3	0.5	n.d
2,3,4,6-Tetrachlorophenol	58-90-2	0.5	n.d
2,3,5,6-Tetrachlorophenol	935-95-5	0.5	n.d
Pentachlorophenol	87-86-5	0.5	n.d

Table 1F. N, N-di-methyl formamide (DMFa) (for Untreated wastewater)

Method:	EPA8015, EPA8270 E (Analysis by GC-MS/MS)
LOD:	0.5µg/L

Substances	CAS-No.	RL(µg/L)	Sample Results
N, N-dimethylformamide (DMFa)	68-12-2	1000	n.d

Table 1G. Carcinogenic Dyes (for Untreated wastewater)

Method:	Liquid extraction, HPLC-MS/MS determination
LOQ:	0.1µg/L

Substances	CAS-No.	RL (µg/L)	Sample Results
Basic violet 3 with>0.1% of Michler´s Ketoneb	548-62-9	500	n.d
C.I. Acid Red 26	3761-53-3	500	n.d
C.I. Acid Violet 49	1694-09-3	500	n.d
C.I. Basic Blue 26 (with Michler's Ketone>0.1%)	2580-56-5	500	n.d
C.I. Basic Green 4 (Malachite Green Chloride)	569-64-2	500	n.d
C.I. Basic Green 4 (Malachite Green Oxalate)	2437-29-8	500	n.d
C.I. Basic Green 4 (Malachite Green chloride)	10309-95-2	500	n.d
C.I. Basic Red 9	569-61-9	500	n.d
C.I. Basic Violet 14	632-99-5	500	n.d
C.I. Direct Black 38	1937-37-7	500	n.d
C.I. Direct Blue 6	2602-46-2	500	n.d
C.I. Direct Red 28	573-58-0	500	n.d
C.I. Disperse Blue 1	2475-45-8	500	n.d
C.I. Disperse Blue 3	2475-46-9	500	n.d
Disperse Orange 11	82-28-0	500	n.d

Parameter hints:

*) **Acid Red 26**, **Direct Black 38**, **Direct Blue 6** and **Direct Red 28** have no value since no direct quantitative analysis is possible. May be included as a fission product in Table 1R: Restricted Aromatic Amines (Cleavable from Azo colourants)

Table 1H. Disperse (Allergenic) Dyes (for Untreated wastewater)

Method:	Liquid extraction, HPLC-MS/MS determination
LOQ:	0.1 µg/L

Substances	CAS-No.	RL (µg/L)	Sample Results
Disperse Blue 102	12222-97-8	50	n.d
Disperse Blue 106	12223-01-7	50	n.d
Disperse Blue 124	61951-51-7	50	n.d
Disperse Blue 26	3860-63-7	50	n.d
Disperse Blue 35	12222-75-2	50	n.d
Disperse Blue 35	56524-77-7	50	n.d
Disperse Blue 7	3179-90-6	50	n.d
Disperse Brown 1	23355-64-8	50	n.d
Disperse Orange 1	2581-69-3	50	n.d
Disperse Orange 3	730-40-5	50	n.d
Disperse Orange 37/59/76	13301-61-6	50	n.d
Disperse Red 1	2872-52-8	50	n.d
Disperse Red 11	2872-48-2	50	n.d
Disperse Red 17	3179-89-3	50	n.d
Disperse Yellow 1	119-15-3	50	n.d
Disperse Yellow 3	2832-40-8	50	n.d
Disperse Yellow 39	12236-29-2	50	n.d
Disperse Yellow 49	54824-37-2	50	n.d
Disperse Yellow 9	6373-73-5	50	n.d

Table 1I. Navy blue colorant (for Untreated wastewater)

Method:	Liquid extraction, HPLC-MS/MS determination
LOQ:	0.1µg/L

Substances	CAS-No.	RL(µg/L)	Sample Results
Component 1: $C_{39}H_{23}Cl\text{-}CrN_7O_{12}S_2Na$	118685-33-9	500	n.d
Component 2: $C_{46}H_{30}CrN_{10}O_{20}S_{23}Na$	Not allocated	500	n.d

Table 1J. Flame Retardants (for Untreated wastewater)

Method:	USEPA8270E, ISO 22032, USEPA 527 and USEPA 8321B (modified, solvent extraction, GC-MS/MS, and LC-MS/MS determination)
LOQ:	0.5µg/L

Substances	CAS-No.	RL(µg/L)	Sample Results
2,2-bis(bromomethyl)-1,3-propanediol (BBMP)	3296-90-0	25	n.d
Bis(2,3-dibromopropyl) phosphate (BIS)	5412-25-9	25	n.d
Deca bromodiphenyl ether (Deca BDE)	1163-19-5	25	n.d
Hexa bromocyclodecane (HBCDD)	3194-55-6	25	n.d
Octa bromodiphenyl ether (Octa BDE)	32536-52-0	25	n.d
Penta bromo diphenyl ether (Penta BDE)	32534-81-9	25	n.d
Poly bromo biphenyls (PBB)	59536-65-1	25	n.d
Tetra bromo bisphenol A (TBBPA)	79-94-7	25	n.d
Tris-(2-chloro-1-methylethyl) phosphate (TCPP)	13674-84-5	25	n.d
Tris (1-aziridinyl) phosphine oxide) (TEPA)	545-55-1	25	n.d
Tris (1,3-dichloro-isopropyl) phosphate (TDCP)	13674-87-8	25	n.d
Tris (2-chloroethyl) phosphate (TCEP)	115-96-8	25	n.d
Tris (2,3-dibromopropyl)-phosphate (TRIS	126-72-7	25	n.d
Deca bromobiphenyl (Deca BB)	13654-09-6	25	n.d
Dibromobiphenyls (DiBB)	Multiple	25	n.d
Octa bromobiphenyls (Octa BB)	Multiple	25	n.d
Di-bromopropylether	21850-44-2	25	n.d
Hepta bromodiphenyl ether (Hepta BDE)	68928-80-3	25	n.d
Hexa bromodiphenyl ether (Hexa BDE)	36483-60-0	25	n.d
Mono bromobiphenyls (Mono BB)	Multiple	25	n.d
Mono bromodiphenyl ethers (Mono BDEs)	Multiple	25	n.d
Nonabromobiphenyls (Nona BB)	Multiple	25	n.d
Nona bromodiphenyl ether (Nona BDE)	63936-56-1	25	n.d
Tetra bromodiphenyl ether (Tetra BDE)	40088-47-9	25	n.d
Tri bromodiphenyl ethers (TriBDEs)	Multiple	25	n.d
Boric acid	10043-35-3/11113-50-1	100	n.d
Diboron trioxide	12008-41-2	100	n.d
Disodium tetraborate anhydrous	1303-96-4/1330-43-4	100	n.d
Tetraboron disodium heptaoxide, hydrate	12267-73-1	100	n.d

Result value details:

[1)] value refers to elemental boron, not the salt (determined as total boron via ICP).

Table 1K. Glycols (for Untreated wastewater)

Method:	USEPA 8270E (modified: Liquid extraction SPE extraction, GC-MS determination)
LOQ:	6.0µg/L

Substances	CAS-No.	RL(µg/L)	Sample Results
2-ethoxyethanol	110-80-5	50	n.d
2-ethoxyethylAcetate	111-15-9	50	n.d
2-methoxyethanol	109-86-4	50	n.d
2-methoxyethylacetate	110-49-6	50	n.d
2-methoxypropylacetate	70657-70-4	50	n.d
Bis(2-methoxyethyl) ether	111-96-6	50	n.d
Ethylene glycol dimethyl ether	110-71-4	50	n.d
Tri ethylene glycol dimethyl ether	112-49-2	50	n.d

Table 1L. Halogenated Solvents (for Untreated wastewater)

Method:	USEPA 8260D (Headspace GC-MS)
LOQ:	1.0µg/L (wastewater)

Substances	CAS-No.	RL (µg/L)	Sample Results
1,2-Dichloroethane	107-06-2	1	n.d
Methylene chloride	75-09-2	1	n.d
Tetrachloroethylene	127-18-4	1	n.d
Trichloroethylene	79-01-6	1	n.d

Table 1M. Organotin Compounds (for Untreated wastewater)

Method:	DIN EN ISO 17353 (solvent extraction, GC-MS/MS determination)
LOQ:	0.01µg/L

Substances	CAS-No.	RL (µg/L)	Sample Results
Di propyl tin compounds (DPT)	Multiple	0.01	n.d
Mono, di and tri-butyl tin derivatives	Multiple	0.01	n.d
Mono, di-and tri-methyl tin derivatives	Multiple	0.01	n.d
Mono, di-and tri-octyl tin derivatives	Multiple	0.01	n.d
Mono, di-and tri-phenyl tin derivatives	Multiple	0.01	n.d
Tetra butyl tin compounds (TeBT)	Multiple	0.01	n.d
Tri propyl tin Compounds (TPT)	Multiple	0.01	n.d
Tetra octyl tin compounds (TeOT)	Multiple	0.01	n.d
Tri cyclohexyl tin (TCyHT)	Multiple	0.01	n.d
Tetra ethyl tin Compounds (TeET)	Multiple	0.01	n.d

Table 1N. Other/Miscellaneous chemicals (for Untreated wastewater)

Method:	Liquid extraction, LC-MS/MS/ICP-MS (For total Boron & Zinc)
LOQ:	0.10µg/L

Substances	CAS-No.	RL (µg/L)	Sample Results
AEEA[2-(2-aminoethylamino) ethanol]	111-41-1	500	n.d
Bisphenol A	80-05-7	10	n.d
Thiourea	62-56-6	50	n.d
Quinoline	91-22-55	50	n.d
Borate, zinc salt*	12767-90-7	100	n.d

*Limit refers to boron and zinc individually, not the salt.

Table 1O. Perfluorinated and Polyfluorinated Chemicals (PFCs) (for Untreated wastewater)

Method:	EN 12673-1999; EPA 8270 PFCs: LC-MSMS; FTOH: GCMS/MS
LOQ:	0.01µg/L

Substances	CAS-No.	RL (µg/L)	Sample Results
Perfluoro octane sulfonate (PFOS) and related substances, Perfluorooctanoic Acid (PFOA)	Multiple	0.01	n.d
Perfluoro octanoic acid (PFOA) related substances	Multiple	1.00	n.d

Table 1P. Phthalates (for Untreated wastewater)

Method:	ISO18856(modified: solvent extraction, GC-MS/MS determination)
LOQ:	0.5µg/L

Substances	CAS-No.	RL (µg/L)	Sample Results
1,2-benzene dicarboxylic acid, di-C6-8 branched and linear alkyl esters, C7-rich (DIHP)	71888-89-6 84777-06-0	10	n.d
1,2-benzene dicarboxylic acid, di-C7-11 branched and linear alkyl esters (DHNUP)	68515-42-4 68515-50-4	10	n.d
Bis(2-methoxyethyl) phthalate (DMEP)	117-82-8	10	n.d
Butyl benzyl phthalate (BBP)	85-68-7	10	n.d
Di-cyclohexyl phthalate (DCHP)	84-61-7	10	n.d
Di-iso-decyl phthalate (DIDP)	26761-40-0	10	n.d
Di-iso-octyl phthalate (DIOP)	27554-26-3	10	n.d
Di-isobutyl phthalate (DIBP)	84-69-5	10	n.d
Di-iso nonyl phthalate (DINP)	28553-12-0	10	n.d
Di-n-hexyl phthalate (DnHP)	84-75-3	10	n.d
Di-n-octyl phthalate (DNOP)	117-84-0	10	n.d
Di-n-pentyl phthalates	131-18-0	10	n.d
Di-n-propyl phthalate (DPRP)	131-16-8	10	n.d
Di (ethyl hexyl) phthalate (DEHP)	117-81-7	10	n.d
Di-butyl phthalate (DBP)	84-74-2	10	n.d
Di-ethyl phthalate (DEP)	84-66-2	10	n.d
Di-isopentyl phthalates	605-50-5	10	n.d
Di-nonyl phthalate (DNP)	84-76-4	10	n.d

Table 1Q. Polycyclic Aromatic Hydrocarbons (PAHs) (for Untreated wastewater)	
Method:	USEPA 8270E, DIN38407-39 Solvent extraction, GC-MS/MS determination
LOQ:	0.01µg/L

Substances	CAS-No.	RL (µg/L)	Sample Results
Acenaphthene	83-32-9	1	n.d
Acenaphthylene	208-96-8	1	n.d
Anthracene	120-12-7	1	n.d
Benzo [a] anthracene	56-55-3	1	n.d
Benzo [a] pyrene (BaP)	50-32-8	1	n.d
Benzo [b]fluoranthene	205-99-2	1	n.d
Benzo [e] pyrene	192-97-2	1	n.d
Benzo [g h i] perylene	191-24-2	1	n.d
Benzo [j] fluoranthene	205-82-3	1	n.d
Benzo [k] fluoranthene	207-08-9	1	n.d
Chrysene	218-01-9	1	n.d
Dibenzo [a, h] anthracene	53-70-3	1	n.d
Fluoranthene	206-44-0	1	n.d
Fluorene	86-73-7	1	n.d
Indeno [1,2,3- c, d] pyrene	193-39-5	1	n.d
Naphthalene	91-20-3	1	n.d
Phenanthrene	85-01-8	1	n.d
Pyrene	129-00-0	1	n.d

Table 1R. Aromatic amines (Azo) (for Untreated wastewater)	
Method:	Reduction step with sodium dithionite, solvent extraction EPA-8270 (both modified; HPLC-MS/MS determination)
LOQ:	0.05µg/L

Substances	CAS-No.	RL (µg/L)	Sample Results
2-naphthylamine	91-59-8	0.1	n.d
2-Naphthylammoniumacetate	553-00-4	0.1	n.d
2,4-xylidine	95-68-1	0.1	n.d
2,4,5-trimethylaniline	137-17-7	0.1	n.d
2,4,5-trimethylanilinehydrochloride	21436-97-5	0.1	n.d
2,6-xylidine	87-62-7	0.1	n.d
3,3'-dichlorobenzidine	91-94-1	0.1	n.d
3,3-dimethoxylbenzidine	119-90-4	0.1	n.d
3,3-dimethylbenzidine	119-93-7	0.1	n.d
4-aminoazobenzene	60-09-3	0.1	n.d
4-aminodiphenyl	92-67-1	0.1	n.d
4-chloro-o-toluidine	95-69-2	0.1	n.d
4-chloro-o-toluidiniumchloride	3165-93-3	0.1	n.d
4-chloroaniline	106-47-8	0.1	n.d
4-methoxy-m-phenylene di-ammonium sulphate;2,4-diaminoanisolesulphate	39156-41-7	0.1	n.d
4-methoxy-m-phenylenediamine	615-05-4	0.1	n.d
4-methyl-m-phenylenediamine	95-80-7	0.1	n.d
4,4-methylene-bis-(2-chloro-aniline)	101-14-4	0.1	n.d
4,4-methylenedi-o-toluidine	838-88-0	0.1	n.d
4,4-methylenedianiline	101-77-9	0.1	n.d
4,4-oxydianiline	101-80-4	0.1	n.d
4,4-thiodianiline	139-65-1	0.1	n.d
5-nitro-o-toluidine	99-55-8	0.1	n.d
6-methoxy-m-toluidine	120-71-8	0.1	n.d
Benzidine	92-87-5	0.1	n.d
o-amino azo toluene	97-56-3	0.1	n.d
o-anisidine	90-04-0	0.1	n.d
o-toluidine	95-53-4	0.1	n.d

Table 1S. UV Absorbers (for Untreated wastewater)	
Method:	USEPA 8270 ISO 22032, USEPA 527 and USEPA 8321 B. (Di chloromethane extraction, GC-MS/MS)
LOQ:	0.05mg/L

Substances	CAS-No.	RL (µg/L)	Sample Results
2-(2H-benzotriazol-2-yl)-4- (tert-butyl)-6-(sec-butyl) phenol (UV-350)	36437-37-3	100	n.d
2-(2H-benzotriazol-2-yl)-4,6- Di tert pentyl phenol (UV-328)	25973-55-1	100	n.d
2-benzotriazol-2-yl-4,6-di-tertbutylphenol (UV-320)	3846-71-7	100	n.d
2,4-Di-tert-butyl-6-(5-chlorobenzotriazole-2-yl) phenol (UV-327)	3864-99-1	100	n.d

Table 1T. Volatile Organic Compounds (VOC) (for Untreated wastewater)	
Method:	ISO 20595 (Headspace GC-MS)
LOQ:	1.0µg/L (wastewater)

Substances	CAS-No.	RL (µg/L)	Sample Results
Benzene	71-43-2	1	n.d
m-cresol	108-39-4	1	n.d
o-cresol	95-48-7	1	n.d
p-cresol	106-44-5	1	n.d
Xylene	1330-20-7	1	n.d
Toluene	108-88-3	1	n.d

Table 2. Heavy Metals parameters: (for Treated wastewater)	
Method:	ISO-17294, Chromium (VI)-ISO 18412
LOQ:	As per Below list

Metals	LOQ mg/L	Limit values according to ZDHC wastewater guidelines (mg/L unless otherwise noted)			Sample Results [mg/L]
		Cat.I	Cat.II	Cat.III	Treated wastewater
Antimony[2] (Sb)	0.0010	0.10	0.05	0.010	n.d
Chromium (Cr)	0.0010	0.20	0.10	0.050	n.d
Cobalt (Co)	0.0010	0.05	0.02	0.010	n.d
Copper (Cu)	0.0010	1.00	0.50	0.250	0.034
Nickel (Ni)	0.0010	0.20	0.10	0.050	n.d
Silver (Ag)	0.0010	0.10	0.05	0.005	n.d
Zinc (Zn)	0.0010	5.00	1.00	0.500	0.042
Arsenic (As)	0.0010	0.05	0.01	0.005	n.d
Cadmium (Cd)	0.0001	0.10	0.05	0.010	n.d
Lead (Pb)	0.0010	0.10	0.05	0.010	n.d
Mercury (Hg)	0.00002	0.01	0.005	0.001	n.d
Chromium (VI)	0.001	0.05	0.005	0.001	n.d
Barium (Ba)	0.001	No limit			n.d
Selenium (Se)	0.001				n.d
Tin (Sn)	0.001				n.d
Boron (Salt)	0.001				n.d

Note: Cat.I = Foundational Cat.II = Progressive Cat.III = Aspirational

Parameter hints:

For indirect dischargers, the requirement in the ZDHC-Guideline for heavy metals is to sample pre-treated effluent and only test the following: Arsenic, Cadmium, Chromium (VI), Lead, Mercury

Result value details:

[2] For polyester wet processing facilities Foundational, Progressive and Aspirational limits do not yet apply (unless required by law or voluntarily adopted), however facilities must continue to sample and report on the Antimony parameter. ZDHC intends to introduce these limits for Polyester wet processing facilities by 2025 which can be met by adopting antimony-free polyester and/or mitigation technologies.

Table 3. Conventional parameters

Conventional parameters	Method	LOQ	Limit values according to (ZDHC Version 2.1, November 2022) Wastewater guideline (mg/L unless otherwise noted)			Sample Results [mg/L]
			Cat.I	Cat.II	Cat.III	Treated wastewater
Temperature difference [°C] (f)	DIN 38404-4	n.a	Δ+15	Δ+10	Δ+5	Δ+ 4.8
Total Suspended Solids (TSS)	ISO 11923	4 mg/L	50	15	5	15.0
Chemical Oxygen Demand (COD)	ISO 6060 and ISO 15705	4 mg/L	150	80	40	43.8
Total-N	ISO 11905 Part 1 ISO 29441	0.5 mg/L	20	10	5	8.45
Total-Phosphorus	ISO 17294	0.10 mg/L	3	0.5	0.1	0.24
pH value (f)	ISO 10523	n.a.		6-9		7.50
Colour (436 nm)	ISO 7887-B	n.a.	7	5	2	3.10
Colour (525 nm)		n.a.	5	3	1	1.82
Colour (620 nm)		n.a.	3	2	1	1.30
BOD_5	ISO 5815-1	1 mg/L	30	15	8	17.0
Ammonium-N	ISO 11732 and ISO 7150	0.01 mg/L	10	1	0.5	1.57
AOX	HACH LCK 390	0.05mg/L	3	0.5	0.1	0.91
HEM (Oil and Grease)	ISO 9377-2	0.5mg/L	10	2	0.5	2.70
Total Phenol / Phenol Index	ISO 6439	0.001mg/L	0.5	0.01	0.001	n.d
Total Dissolved Solid (TDS)	USEPA 160.1	1.0mg/L	Sample and report only			2388.0
Wastewater Flowrate (f)	-	15m^3 per day	Sample and report only			1345 m^3 per day
Persistent Foam (f)	-	n.a	No indication of Persistent foam in receiving water			Not visible
Dissolved Oxygen (DO) (f)	EPA360.1 SM 4500-O-G	n.a	Sample and report only			5.04
Total chlorine (f)	ISO7393-2	n.a	Sample and report only			0.4

Note: Cat.I = Foundational Cat.II = Progressive Cat.III = Aspirational

Table 3. Conventional Parameters (E. coli in Treated wastewater)

Method:	SM9222D presumptive, confirm positive with SM9222G
LOQ:	100MPN/ 100mL

Conventional parameters	Limit values according to ZDHC wastewater guidelines (mg/L unless otherwise noted)	Sample Results [MPN/100mL]
E. coli (#)	126MPN/100mL	n.d

Table 3. Anions (in Treated Wastewater)

Anions	Method	LOQ	Limit values according to ZDHC wastewater guideline (mg/L unless otherwise noted)			Sample Results [mg/L]
			Cat.I	Cat.II	Cat.III	Treated wastewater
Cyanide	ISO 6703-1, 2, 3, LCK 315 Cyanide Cuvette test	0.01mg/L	0.2	0.1	0.05	0.14
Chloride	ISO15923-1	-	-	-	-	40.7
Sulfide	ISO10530	0.01mg/L	0.5	0.05	0.01	0.10
Sulfate	ISO15923-1	2.0mg/L	-	-	-	824.2
Sulfite	SM4500-SO32-C	0.1mg/L	2.0	0.5	0.2	1.6

Note: Cat.I = Foundational Cat.II = Progressive Cat.III = Aspirational

Table 4A. Heavy Metals parameters: (Sludge)	
Method:	Preparation: EPA 3050, Analysis: EPA 6010D or EPA 6020B, For Mercury- EPA 7473, 7471b Preparation: EPA 3051a, Analysis: EPA 6020B
LOQ:	As per Below list

Metals	LOQ (mg/kg)	RL (mg/kg)	Sample Results
Arsenic (As)	0.05	5.00	n.d
Cadmium (Cd)	0.05	1.00	n.d
Lead (Pb)	0.05	5.00	n.d
Nickel (Ni)	0.05	20.0	n.d
Antimony (Sb)	0.05	5.00	n.d
Barium (Ba)	0.05	200	n.d
Cobalt (Co)	0.05	400	n.d
Copper (Cu)	0.05	50.0	2.99
Selenium (Se)	0.05	5.00	n.d
Silver (Ag)	0.05	50.0	n.d
Total Chromium (Cr)	0.05	50.0	n.d
Zinc (Zn)	0.05	400	6.37
Chromium (VI)	5.00	20.0	n.d
Mercury (Hg)	0.05	1.00	n.d

Parameter hints:
Since Metal and cyanide values are less than the threshold limit table 4B, laboratory checked table 4C for conventional & MRSL parameters relevant to the disposal pathway the supplier selected meet (s) the limit value.

Table 4A. Conventional parameters: (sludge)				
Conventional parameters	**Method**	**LOQ**	**RL**	**03.Sludge**
pH	EPASW9045D	n.a.	n.a.	7.67
Paint Filter Test	EPASW-846 or EPA9095B	n.a.	n.a.	The free-standing liquid is not observed
Fecal Coliform (#)	EPA1681	100 MPN/g	n.a.	n.d
% Solids	EPA 160.3, HJ 613 at 105°C	n.a.	n.a.	81.6

#Note: Test Subcontract at ISO 17025:2017 Accredited Lab.

Table 4A. Conventional parameters: (sludge)	
Method:	USEPA 9013, HJ 745, EPA 9014, or EPA 9213
LOQ:	0.2 (mg/kg)

Anions	RL (mg/kg)	03.Sludge
Cyanide	20	0.29

Table 4A. Alkylphenol (AP) and Alkylphenol Ethoxylates (APEOs) (for Sludge)	
Method:	DIN EN ISO 18254-1 / DIN EN ISO 18857-2 (LC-MS/MS Determination)
LOQ:	0.4mg/kg

Substances	CAS-No.	RL (µg/L)	Sample Results
Nonyl phenol (NP), mixed isomers	104-40-5 11066-49-2 25154-52-3 84852-15-3	0.4	n.d
Octyl phenol (OP), mixed isomers	140-66-9 1806-26-4 27193-28-8	0.4	n.d
Octyl phenol ethoxylates (OPEO)	9002-93-1 9036-19-5 68987-90-6	0.4	n.d
Nonyl phenol ethoxylates (NPEO)	9016-45-9 26027-38-3 37205-87-1 68412-54-4 127087-87-0	0.4	n.d

Table 4A. Polycyclic Aromatic Hydrocarbons (PAHs) (for Sludge)	
Method:	USEPA3550(solvent extraction, GC-MS/MS)
LOQ:	0.05mg/kg

Substances	CAS-No.	RL (mg/kg)	Sample Results
Acenaphthene	83-32-9	0.2	n.d
Acenaphthylene	208-96-8	0.2	n.d
Anthracene	120-12-7	0.2	n.d
Benzo [a] anthracene	56-55-3	0.2	n.d
Benzo [a] pyrene (BaP)	50-32-8	0.2	n.d
Benzo [b] fluoranthene	205-99-2	0.2	n.d
Benzo [e] pyrene	192-97-2	0.2	n.d
Benzo [ghi] perylene	191-24-2	0.2	n.d
Benzo [j] fluoranthene	205-82-3	0.2	n.d
Benzo [k] fluoranthene	207-08-9	0.2	n.d
Chrysene	218-01-9	0.2	n.d
Dibenz [a,h] anthracene	53-70-3	0.2	n.d
Fluoranthene	206-44-0	0.2	n.d
Fluorene	86-73-7	0.2	n.d
Indeno [1,2,3-c,d] pyrene	193-39-5	0.2	n.d
Naphthalene	91-20-3	0.2	n.d
Phenanthrene	85-01-8	0.2	n.d
Pyrene	129-00-0	0.2	n.d

Table 4A. Chlorotoluene's (for Sludge)	
Method:	Solvent extraction followed by GC-MS/MS (reference method USEPA 3650 & USEPA 827)
LOQ:	0.05mg/kg

Substances	CAS-No.	RL (mg/kg)	Sample Results
2-Chlorotoluene	95-49-8	0.2	n.d
3-Chlorotoluene	108-41-8	0.2	n.d
4-Chlorotoluene	106-43-4	0.2	n.d
2,3-Dichlorotoluene	32768-54-0	0.2	n.d
2,4-Dichlorotoluene	95-73-8	0.2	n.d
2,5-Dichlorotoluene	19398-61-9	0.2	n.d
2,6-Dichlorotoluene	118-69-4	0.2	n.d
3,4-Dichlorotoluene	95-75-0	0.2	n.d
3,5-Dichlorotoluene	25186-47-4	0.2	n.d
2,3,4-Trichlorotoluene	7359-72-0	0.2	n.d
2,3,6-Trichlorotoluene	2077-46-5	0.2	n.d
2,4,5-Trichlorotoluene	6639-30-1	0.2	n.d
2,4,6-Trichlorotoluene	23749-65-7	0.2	n.d
3,4,5-Trichlorotoluene	21472-86-6	0.2	n.d
2,3,4,5-Tetrachlorotoluene	76057-12-0	0.2	n.d
2,3,5,6-Tetrachlorotoluene	29733-70-8	0.2	n.d
2,3,4,6-Tetrachlorotoluene	875-40-1	0.2	n.d
Pentachlorotoluene	877-11-2	0.2	n.d

*Since Metal and cyanide values less than the threshold limit table 4B, the laboratory checked table 4C for conventional & MRSL parameters relevant to the disposal pathway the supplier selected meet (s) the limit value.

HOHENSTEIN

Laboratories Bangladesh Limited

HOHENSTEIN

A. General Data

Laboratory Sample Number	ZDHC-MFFL-30.06
Customer Name	Mahmud Fabrics & Finishing's Ltd.
Field Contact Person	MD PRINCE KAWSAR Phone No: 01787695055
Project (Facility Name and Address)	
Buyer	
Name of Sampler	MD. MAHIDUR RAHMAN
Date of collected sample	30.06.2024
Factory with effluent treatment plant	☑ Yes ☐ No

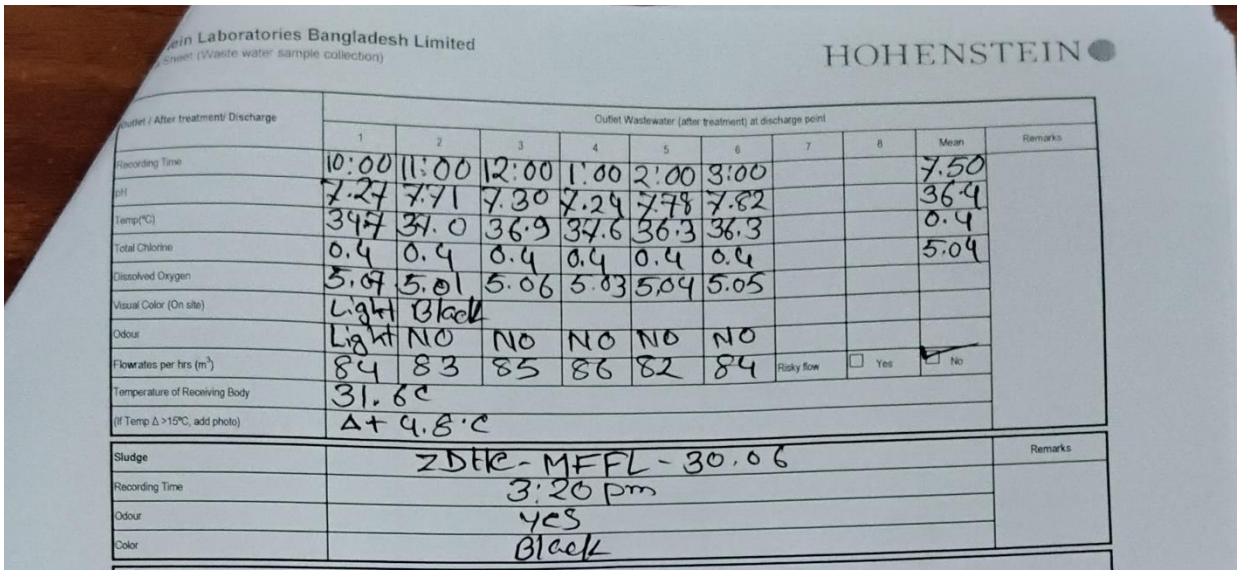
B. ZDHC questionnaire

01. Discharge Mode	☑ Direct	☐ Indirect	☐ Indirect with pretreatment	☐ Indirect without pretreatment	☐ Zero Liquid Discharge	
02. Types of wastewater	☑ Industrial wastewater			☐ Industrial wastewater with domestic wastewater		
03. ETP Plant Details	Total industrial wastewater generated over 12 months by the facility			Capacity (m^3)	369,241 m^3	
	Total working days in 12 months period (full days which industrial wastewater is generated)			Day(s)	349 Days	
04. Number of Sample Location(s)	Inlet/Raw sample ID	☑ R0001	☐ R0002	☐ R0003	Discharge sample ID	☑ D0001 ☐ D0002 ☐ D0003
05. Sampling Location/GPS (Field ID)	Latitude	a 24.031076 b.		Longitude	a 90.250311 b.	
06. Pretreatment type of ETP	☐ Activated carbon		☐ Electrocoagulation		☐	
	☐ Adsorption with activated carbon		☐ Electroflocculation		☐	
	☑ Advanced Oxidation process (ACPs)		☐ Evaporation		☐	
	☑ Chemical Addition for Neutralization		☐ Others		☐	
07. Wastewater Discharge to aquatic body	☐ No	☐ Channel	☑ River	☐ Tank/Pond	☐ Stream	Name of aquatic body: Turag River
08. Temparature at risk pose	☑ No		☐ Yes		(*if at risk pose add photo)	
09. Flow rate at risk	☑ No		☐ Yes		(*if at risk pose add photo)	
10. Sludge Location/ GPS ID	Latitude	a 24.031765 b.		Longitude	a 90.250892 b.	
11. Sludge Discharge to aquatic body	☑ No	☐ Channel	☐ River	☐ Tank/Pond	☐ Stream	Name of aquatic body
12. If "No" which pretreatment are performed	☐ Aerobic Digestion		☐ Gravity thikener		☐	
	☐ Anaerobic Digestion		☐ On-site incineration or/and energy recovery		☐	
	☐ Belt filter press		☐ Others-Please Specify		☐	
	☐ Centrifugation		☐ Plate & flame filter press		☐	
	☐ Dissolved Air Flotation (DAF) thickener		☑ Press Filter		☐	
13. Disposal pathway (Minimum 25% each) (% of disposal of each with the document)	☐ A-Offsite Incineration		☐ E-Offsite Incineration and Building Products Processed			
	☐ B-Landfill with Significant Control Measures		☐ F - Landfills with No Control Measures			
	☑ C-Building Products Processed		☐ G - Land Application			
	☐ D-Landfill with Limited Control Measures		☐ Any Other(s)			
**Please collect the document on sludge disposal or a copy of your licensed third-party waste collector for sludge disposal (needed to upload in ZDHC gateway)						
Factory Type	☑ Dyeing	☐ Printing	☑ Washing	☑ Finishing	☐ Other(Please specify)	
	*Note: It would be selected more than one					

C. Field Data for Wastewater

Sampling method	☐ Spot sampling / Grab Sampling	☑ Composite sampling ☐ Others
Persistent Foam (if "yes", take photo)	☐ Yes	☑ No
Sample matrix	☐ Incoming Water (Ground water)	
	☑ Inlet Wastewater (Before treatment/Raw wastewater)	
	☑ Outlet Wastewater (After treatment) at discharge point	
	☑ Sludge	

Inlet / Before treatment/ Raw	Inlet Wastewater (before treatment)									
	1	2	3	4	5	6	7	8	Mean	Remarks
Recording Time	10:00	11:00	12:00	1:00	2:00	3:00				
pH	11.06	9.28	10.31	10.21	10.21	10.20			10.2	
Temp(°C)	39.8	46.9	47.0	46.8	46.9	45.9			45.9	
Total Chlorine	0.6	0.6	0.6	0.6	0.6	0.6			0.6	
Dissolved Oxygen	3.22	1.90	1.28	1.31	2.41	2.00			2.01	
Visual Color (On site)	Ash	Ligh Ash	Ash							
Odour	Yes	Yes	Yes	Yes	Yes	Yes				



ein Laboratories Bangladesh Limited
Sheet (Waste water sample collection)

HOHENSTEIN

Outlet / After treatment/ Discharge	Outlet Wastewater (after treatment) at discharge point									
	1	2	3	4	5	6	7	8	Mean	Remarks
Recording Time	10:00	11:00	12:00	1:00	2:00	3:00			7.50	
pH	7.27	7.71	7.30	7.29	7.78	7.82			36.4	
Temp(°C)	347	31.0	36.9	37.6	36.3	36.3			0.4	
Total Chlorine	0.4	0.4	0.4	0.4	0.4	0.4			5.04	
Dissolved Oxygen	5.04	5.01	5.06	5.03	5.04	5.05				
Visual Color (On site)	Light Black									
Odour	Light	NO	NO	NO	NO	NO				
Flowrates per hrs (m³)	84	83	85	86	82	84	Risky flow	☐ Yes	☑ No	
Temperature of Receiving Body	31.6c									
(If Temp Δ >15°C, add photo)	Δ+ 4.8·c									

Sludge	ZDHC - MFFL - 30.06	Remarks
Recording Time	3:20 pm	
Odour	Yes	
Color	Black	

Dhaka, Bangladesh, 27.08.2024

Head of Textile & Chemical Testing

Johny Yasmin Kanta

Hohenstein Laboratories Bangladesh Limited
Dhaka, Bangladesh

Manager for Textile

S.M. Imam Uddin

Please contact for any complaint: bd_customerhelp@hohenstein.com