

		Sampling & Analysis Jul. 23	Sampling & Analysis (Jan.-Jun. 2022)	7.2 Panbil 2023. Outlet Monitoring Recap	Recommendation for WIK based on international guidelines	Source (international guidelines)
		WIK (Batam) Analysis: 31/07/2023	Table 19: Wastewater Quality in WWTP Die Casting	Analysis Panbil Industrial Estate		
Temperature	°C	28	32		increase < 3	International Finance Corporation: Environmental, Health, and Safety Guidelines - Effluent Levels for Metal, Plastic, and Rubber Products Manufacturing
Soluble solids (TDS)	mg/L	221	19		500	Code of Federal Regulations: Other safe drinking water act regulations
Suspended solids (TSS)	mg/L	18	7	49.83	30-50	Water Soil & Stewardship - Platinum 7.10 Optimizing Effluent and Sludge Quality at the Facility-Level
pH		7.2	7.8	7.06	6.5-8.5	International Finance Corporation: Environmental, Health, and Safety Guidelines - Effluent Levels for Metal, Plastic, and Rubber Products Manufacturing
Dissolved iron (Fe)	mg/L	0.4	0.1		0.3-3	Code of Federal Regulations: Other safe drinking water act regulations
Dissolved manganese (Mn)	mg/L	< 0.14	< 0.09		0.05	International Finance Corporation: Environmental, Health, and Safety Guidelines - Effluent Levels for Metal, Plastic, and Rubber Products Manufacturing
Barium (Ba)	mg/L	< 0.10	< 0.10		1.3	Code of Federal Regulations: Other safe drinking water act regulations
Copper (Cu)	mg/L	< 0.14	< 0.04	0.09	0.1-2	WHO Guidelines for drinking-water quality Abwasserabgabengesetz Germany (Wastewater Levy Act)
Zinc (Zn)	mg/L	< 0.16	< 0.01	< 0.08	0.2-2	WHO Guidelines for drinking-water quality Abwasserabgabengesetz Germany (Wastewater Levy Act)
Hexavalent Chromium (Cr6+)	mg/L	< 0.02	< 0.02	< 0.02	0.05	International Finance Corporation: Environmental, Health, and Safety Guidelines - Effluent Levels for Metal, Plastic, and Rubber Products Manufacturing
Total Chromium (Cr)	mg/L	< 0.15	< 0.05	0.10	0.05	"Regulations for chromium emissions to the aquatic environment in Europe and elsewhere" (https://pubmed.ncbi.nlm.nih.gov/32957286/)
Cadmium (Cd)	mg/L	< 0.005	< 0.005	< 0.03	0.003-0.005	"Regulations for chromium emissions to the aquatic environment in Europe and elsewhere" (https://pubmed.ncbi.nlm.nih.gov/32957286/)
Mercury (Hg)	mg/L	< 0.0001	< 0.0001		0.001	WHO Guidelines for drinking-water quality
Lead (Pb)	mg/L	< 0.005	< 0.005	< 0.005	0.01-0.05	Abwasserabgabengesetz Germany (Wastewater Levy Act)
Stannum/Tin (Sn)	mg/L	< 0.02	< 0.02		2	WHO Guidelines for drinking-water quality
Arsenic (As)	mg/L	< 0.0001	< 0.0001		0.01-0.1	International Finance Corporation: Environmental, Health, and Safety Guidelines - Effluent Levels for Metal, Plastic, and Rubber Products Manufacturing
Selenium (Se)	mg/L	< 0.0001	< 0.0001		0.04	International Finance Corporation: Environmental, Health, and Safety Guidelines - Effluent Levels for Metal, Plastic, and Rubber Products Manufacturing
Nickel (Ni)	mg/l	< 0.16	< 0.05	0.27	0.05	WHO Guidelines for drinking-water quality
Cobalt (Co)	mg/l	< 0.15	< 0.11		0,004 (chronic) - 0,11 (acute)	Abwasserabgabengesetz Germany (Wastewater Levy Act)
Cyanide (CN)	mg/L	< 0.008	< 0.008		0.05	TECHNICAL REPORT - WATER QUALITY GUIDELINES FOR COBALT, page 12 (https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/cobalt_tech.pdf)
Sulfide (H2S)	mg/L	< 0.02	< 0.02	< 0.002	0.05-0.1	Thresholds defined by Indonesia for "businesses/activities without established wastewater quality standards" (p. 79)
Fluoride (F)	mg/L	0.6	0.5		1.5	WHO Guidelines for drinking-water quality
Free chlorine (Cl2)	mg/L	< 0.02	< 0.02		0.2	WHO Guidelines for drinking-water quality
Ammonia-Nitrogen (NH3-N)	mg/L	18	0.2	8	1.5	WHO Guidelines for drinking-water quality
Nitrate (NO3-N)	mg/L	2	3		20	WHO Guidelines for drinking-water quality
Nitrite (NO2-N)	mg/L	0.4	1		0.6	BAT Reference Document on Waste Water and Waste Gas Treatment/-management in the chemical industry: Umweltbundesamt Germany
Total Nitrogen	mg/L	20	4		10	BAT Reference Document on Waste Water and Waste Gas Treatment/-management in the chemical industry: Umweltbundesamt Germany
BOD5	mg/L	14	17	18.67	25	Water Soil & Stewardship - Platinum 7.10 Optimizing Effluent and Sludge Quality at the Facility-Level
COD	mg/L	43	49	54.5	20 (direct discharge) -100 (transfer to wastewater treatment plant)	Water Soil & Stewardship - Platinum 7.10 Optimizing Effluent and Sludge Quality at the Facility-Level
Methylene blue active compound	mg/L	< 0.05	< 0.05		5	Abwasserabgabengesetz Germany (Wastewater Levy Act)
Phenol	mg/L	< 0.008	< 0.008	< 0.008	0.15	Water Soil & Stewardship - Platinum 7.10 Optimizing Effluent and Sludge Quality at the Facility-Level
Oils & Fats	mg/L	< 1.00	< 1.00	2	10	Thresholds defined by Indonesia for "businesses/activities without established wastewater quality standards" (p. 79)
Total Coliform Bacteria	MPN/100 ml	2100	1700		400 bacteria/100ml	BAT Reference Document on Waste Water and Waste Gas Treatment/-management in the chemical industry: Umweltbundesamt Germany
Detergent LAS as MBAS				< 0.05		Water Soil & Stewardship - Platinum 7.10 Optimizing Effluent and Sludge Quality at the Facility-Level