2.6 Outlet Facilities

1. Summary

DESCRIPTION		UNIT	QUANTITY	LEGEND
EXCAVATION	EXCAVATION	m^3	2,148.2	
	OVERBREAK	m^3	121.9	5cm
	TOTAL	m^3	2,270.0	
STEEL RIB SUPPORT	H-100x100x6x8	kg	26,533.0	
	PLATE(t=9)	kg	1,017.0	
	PLATE(t=16)	kg	3,428.3	
	BOLT NUT		516	
	COLLAR BRACE	kg	3,793.0	Φ16
	Total	kg	35,287.4	
	Total x 1.05	kg	37,100.0	
	STEEL PIPE		3,096	Φ21.7x1.9×80
WIRE NET		m^2	2,397.7	Φ5x150x150 (2.13 kg/m2)
		(kg)	5,107.2	
		x1.05	5,400.0	
CURTAIN GROUT			18	L=10.00m
CONSOLIDATION GROUT			48	L=5.00m
ROCK BOLT	D22 L=1.50m		777	
	TOTAL	m	1,166	
	TOTAL x 1.05	m	1,200	
SHOTCRETE	OVERBREAKAGE	m^3	121.9	5cm
	SHOTCRETE	m^3	234.4	10cm
	TOTAL	m^3	356.3	
	OVERBREAKAGE	m^2	2,464.1	
	SHOTCRETE	m^2	2,403.9	
	TOTAL	m^2	4,868.0	
CONCRETE	OUTLET PROJECTION	m^3	49.2	
	x 1.05	m^3	50.0	
FORM	OUTLET PROJECTION	m^2	83.5	
PLUG	FILLING CONCRETE	m^3	1,313.1	
	x 1.05	m^3	1,400.0	
	WATER STOP SEAL	m	7.4	

SUMMARY (Inclined Intake Structure)

DESCRIPTION			UNIT	TOTAL	LEGEND
Inclined Intake Structure	Excavation	Total	m^3	9,295.9	
		x 1.1	m^3	10,200.0	
	Concrete Type B	Total	m^3	803.5	
		x 1.05	m^3	840.0	
	Concrete Type C	Total	m^3	84.9	
		x 1.05	m^3	89.0	
	Reinforcing Bar	Total	kg	40.6	
		x 1.06	kg	43.0	
	Excavated Slope	Total	m^2	2,387.0	
		x 1.1	m^2	2,620.0	

2. EXCAVATION

2-1. EXCAVATION(TYPICAL SECTION)

v1	= 5.373×368.476	= 1,979.822 m^3
v2(OVERBREAK)	= 0.310×368.476	= 114.228 m^3

2-2. EXCAVATION(PLUG SECTION)

v1	= 8.476×19.044+1/2(5.373+8.476)x1.000	= 168.341 m^3
v2(OVERBREAK)	= 0.381×20.047	= 7.638 m^3

2-3. EXCAVATION(TOTAL)

EXCAVATION ΣV = v1+v1 = 1,979.82 + 168.34 = 2,148.163 m^3

OVERBREAK ΣV = v2+v2 = 114.23 + 7.64 = 121.866 m^3

3. STEEL RIB SUPPORT

3-1. STEEL RIB SUPPORT(TYPICAL SECTION)

N=367.470/1.50=245

ITEM	LENGTH	QUANTITIY	WHEIGHT/UNIT	WHEIGHT/m	EXTENSION	TOTAL WEIGHT
H-100x100x6x8 (kg)	2.955	2	17.2	101.652	245	24,904.740
PL-155×180×9 (kg)	-	2	1.971	3.942	245	965.790
PL-230×230×16 (kg)	-	2	6.644	13.288	245	3,255.560
BOLT NUT Φ25	0.070	2	-	-	245	490
COLLAR BRACE Φ16(kg)	1.576	6	1.58	14.940	245	3,660.418
STEEL PIPE Φ21.7×1.9	0.080	12	-	-	245	2,940
WIRE NET(m^2)	6.114	1	-	6.114m^2	367.470	2,246.712

3-2. STEEL RIB SUPPORT(PLUG SECTION)

N=20.047/1.50=13

ITEM	LENGTH	QUANTITIY	WHEIGHT/UNIT	WHEIGHT/m	EXTENSION	TOTAL WEIGHT
H-100x100x6x8 (kg)	3.641	2	17.2	125.250	13	1,628.255
PL-155×180×9(kg)	-	2	1.971	3.942	13	51.246
PL-230×230×16 (kg)	-	2	6.644	13.288	13	172.744
BOLT NUT	0.07	2	-	-	13	26
COLLAR BRACE Φ16(kg)	1.076	6	1.58	10.200	13	132.606
STEEL PIPE Φ21.7×1.9	0.080	12	-	-	13	156
WIRE NET(m^2)	7.534	1	-	7.534m^2	20.047	151.034

3-3. STEEL RIB SUPPORT(TOTAL)

ITEM	TYPICAL SECTION	PLUG SECTION	TOTAL WEIGHT
H-100x100x6x8 (kg)	24,904.740	1628.255	26,532.995
PL-155×180×9(kg)	965.790	51.246	1,017.036
PL-230×230×16 (kg)	3,255.560	172.744	3,428.304
BOLT NUT	490	26	516
COLLAR BRACE Φ16(kg)	3,660.418	132.606	3,793.024
STEEL PIPE Φ21.7×1.9	2,940.000	156	3,096
WIRE NET(m^2)	2,246.712	151.034	2,397.746

4. GROUTING

4-1. CURTAIN GROUT

L=10.00m	n		=	18

4-2. CONSOLIDATION GROUT

L=5.00m	n=6×8		=	48

5. ROCK BOLT

D22, L=1.50m, n=8	n=3×388.523/1.500	=3×259	=	777

5. SHOTCRETE

5.1 TYPICAL SECTION

V1 (OVERBREAKAGE)	= 0.310×368.476	=	114.228 m^3
V2 (SHOTCRETE)	= 0.596×368.477	=	219.612 m^3
A1 (OVERBREAKAGE)	= 6.269×368.476	=	2,309.976 m^2
A2 (SHOTCRETE)	= 6.114×368.477	=	2,252.862 m^2

5.1 PLUG SECTION

V1 (OVERBREAKAGE)	= 0.381×20.047	=	7.638 m^3
V2 (SHOTCRETE)	= 0.738×20.047	=	14.795 m^3
A1 (OVERBREAKAGE)	= 7.688×20.047	=	154.121 m^2
A2 (SHOTCRETE)	= 7.534×20.047	=	151.034 m^2

5.1 TOTAL

OVERBREAKAGE ΣV	= v1+v1 = 114.23 + 7.64	=	121.866 m^3
SHOTCRETE ΣV	= v2+v2 = 219.61 + 14.80	=	234.407 m^3
OVERBREAKAGE ΣA	= v1+v1 = 2,309.98 + 154.12	=	2,464.097 m^2
SHOTCRETE ΣA	= v2+v2 = 2,252.86 + 151.03	=	2,403.896 m^2

7. CONCRETE (OUTLET PROJECTION)

V1	= 4.471×5.012	=	22.409 m^3

8. FORM (OUTLET PROJECTION)

A1	= 6.780×5.012+4.471×2	=	42.923 m^2

9. PLUG

9-1. CONCRETE

V1	= 5.875×20.047	=	117.776 m^3

9-2 FORM

A1	= 5.875×3	=	17.625 m^2

9-3. WATER STOP SEAL

L1	= 7.38×1	=	7.380 m

TYPE OF WORK : Production and Construction of concrete (Type B)
LOCATION : Inclined Intake Structure

CALCULATION	RESULT
(Between EL+110.00m and EL+130.00m)	
$A_1 = 0.70 \times 3.90 - (0.55 \times 0.25) \times 2 = 2.455\ m^2$	
$A_2 = 1.60 \times 0.95 - (0.90 \times 0.40) = 1.160\ m^2$	
$A_3 = 1/2 \times (4.95 + 3.90) \times 1.050 - (0.60 \times 0.30) \times 2 - \pi/4 \times 0.20^2 = 4.255\ m^2$	
$A_4 = A_1 + A_2 \times 2 + A_3 = 9.030\ m^2$	
$V_1 = A_4 \times (24.377 - 1.00) = 211.094\ m^3$	
$A_5 = 0.70 \times 3.90 - (3.40 \times 0.25) = 1.880\ m^2$	
$A_6 = 0.55 \times 1.050 = 0.578\ m^2$	
$A_7 = A_5 + A_6 \times 2 + A_2 \times 2 = 5.356\ m^2$	
$V_2 = A_7 \times 1.90 + A_4 \times 0.50 = 14.691\ m^3$	
$V_3 = 1/2 \times (EL+114.666 - EL+110.000) \times 3.100 \times 3.900 - \pi/4 \times 1.40^2 \times 1.470 = 25.943\ m^3$	
$V_4 = 1/6 \times 3.00 \times 1.800 \times \{(2 \times 1/2 \times (6.70 + 3.10) + 6.70\} \times 2 = 29.700\ m^3$	
$V_5 = 1/2 \times 1.240 \times 3.00 \times (7.50 + 3.90) \times 1/2 = 10.602\ m^3$	
$V_6 = 1/2 \times (3.941 + 1.200) \times 3.350 \times 3.900 - (1.40 \times 0.60 \times 2.800) + 1/2 \times (0.858 \times 1.200) \times 3.900 - 1/2 \times (0.957 + 0.600) \times 0.50 \times 3.40 = 31.916\ m^3$	
$\Sigma V = V_1 + \sim + V_6 =$	323.946 m^3
(Between EL+130.00 and EL+152.00)	
$A_1 = \{2.30 \times 0.95 - (0.55 \times 0.40 + 0.40 \times 0.90)\} \times 2 = 3.210\ m^2$	
$A_2 = 1/2 \times (3.90 + 4.95) \times 1.050 - \pi/4 \times 0.20^2 = 4.615\ m^2$	
$V_1 = (A_1 + A_2) \times 37.85 = 296.176\ m^3$	
$V_2 = (A_1 + A_2) \times 1/2 \times (1.376 + 4.450) = 22.794\ m^3$	
$\Sigma V = V_1 + V_2 =$	318.970 m^3

TYPE OF WORK : Production and Construction of concrete (Type B)
LOCATION : Inclined Intake Structure

CALCULATION	RESULT
(Operation Deck)	
$V_1 = 0.60 \times 11.700 \times 6.20 = 43.524\ m^3$	
$V_2 = -0.60 \times 3.780 \times 0.60 = -1.361\ m^3$	
$V_3 = \{1/2 \times (0.656 + 0.369) \times 0.10 \times 2 + 0.30 \times 0.56\} \times 0.60 \times 2 = -0.325\ m^3$	
$V_4 = -\{1/2 \times (0.656 + 0.369) \times 0.10 \times 2 + 0.30 \times 0.56\} \times 1.82 = -0.492\ m^3$	
$V_5 = 1/2 \times (6.194 + 7.571) \times 0.80 \times 6.20 = 34.137\ m^3$	
$V_6 = 1/2 \times (10.168 + 9.774) \times 3.60 \times 0.60 \times 2 = 43.075\ m^3$	
$V_7 = 0.80 \times 10.03) \times 6.20 = 49.754\ m^3$	
$V_8 = -(0.914 + 0.430) \times 0.80 \times 0.55 \times 2 = -1.183\ m^3$	
$V_9 = -0.914 \times 0.80 \times 2.00 = -1.462\ m^3$	
$V_{10} = -(0.631 + 0.745 + 0.688) \times 0.80 \times 0.40 \times 2 = -1.321\ m^3$	
$V_{11} = -1.344 \times 0.80 \times 2.00 = -2.150\ m^3$	
$V_{12} = -0.40 \times 0.40 \times 6.194 \times 2 = -1.982\ m^3$	
$V_{13} = 1/2 \times 0.210 \times 0.294 \times 0.60 \times 14 = 0.259\ m^3$	
$V_{14} = 1/2 \times 0.60 \times 0.210 \times 2.80 = 0.176\ m^3$	
$V_{15} = 1/2 \times (0.210 + 0.219) \times 0.294 \times 0.60 \times 5 = 0.189\ m^3$	
$V_{16} = -\pi/4 \times 0.20^2 \times 7.566 = -0.238\ m^3$	
$\Sigma V = V_1 + \sim + V_{16} =$	160.600 m^3
TOTAL =	803.516 m^3

TYPE OF WORK : Production and Construction of concrete (Type C)
LOCATION :

CALCULATION		RESULT
(Upstream portal of Diversion Facility)		
$V_1 = 0.40 \times 6.10 \times 0.60 \times 2$	$= 2.928\ m^3$	
$V_2 = 0.50 \times 6.10 \times 0.60 \times 2$	$= 3.660\ m^3$	
$V_3 = 1.522 \times 0.60 \times 0.40 \times 2$	$= 0.731\ m^3$	
$V_4 = 0.50 \times 5.60 \times 0.40$	$= 1.120\ m^3$	
$V_5 = 0.60 \times 5.60 \times 0.40$	$= 1.344\ m^3$	
$\Sigma V = V_1 + \sim + V_5$	$=$	$9.783\ m^3$
(Inclined Intake Structure)		
$V_1 = 0.55 \times 0.25 \times 23.877 \times 2$	$= 6.566\ m^3$	
$V_2 = 0.25 \times 3.40 \times 0.50$	$= 0.425\ m^3$	
$V_3 = 1/2 \times (0.60 + 0.957) \times 0.50 \times 3.40$	$= 1.323\ m^3$	
$V_4 = 0.40 \times 0.40 \times (24.377 + 1.400) \times 2$	$= 8.249\ m^3$	
$V_5 = (0.60 \times 0.30 + 0.10 \times 0.40) \times (24.377 + 1.400) \times 2$	$= 11.342\ m^3$	
$V_6 = 1.050 \times 1.00 \times 2.000$	$= 2.100\ m^3$	
$V_7 = 0.60 \times 1.50 \times 2.000$	$= 1.800\ m^3$	
$V_8 = 0.55 \times 0.40 \times (37.85) \times 2$	$= 16.654\ m^3$	
$V_9 = 0.40 \times 0.40 \times (37.85 + 4.690) \times 2$	$= 13.613\ m^3$	
$V_{10} = (0.60 \times 0.30 + 0.10 \times 0.40) \times (37.85 + 4.690) \times 2$	$= 18.718\ m^3$	
$V_{11} = 0.25 \times 0.25 \times 3.10$	$= 0.194\ m^3$	
$V_{12} = 0.40 \times 0.40 \times 6.194 \times 2$	$= 1.982\ m^3$	
$V_{13} = 0.983 \times 0.25 \times 0.55 \times 2$	$= 0.270\ m^3$	
$V_{14} = (0.631 + 0.745 + 0.688) \times 0.40 \times 2$	$= 1.651\ m^3$	
$\Sigma V = V_1 + \sim + V_{14}$	$=$	$84.887\ m^3$

TYPE OF WORK :
LOCATION : Inclined Intake Structure

CALCULATION		RESULT
(Between El. +130.00 and El. + 152.00m)		
(Formwork)		
$A_1 = 2.30 \times 37.85 \times 4$	= 348.22 m²	
$A_2 = 1/2 \times 2.30 \times 1.690 \times 4$	= 21.57 m²	
$A_3 = 0.95 \times 37.85 \times 2$	= 71.92 m²	
$A_4 = 0.40 \times (37.85 + 1.960) \times 2$	= 31.85 m²	
$A_5 = 2.80 \times (37.85 + 3.640)$	= 116.17 m²	
$\Sigma A = A_1 + \sim + A_5$	=	589.73 m²
(Scaffolding)		
$A_1 = 348.22$ m²	=	348.22m²
(Supporting)		
$V_1 = 0.40 \times 0.40 \times (37.85 + 3.640) \times 2$	=	13.28 m³
(Operation Deck)		
$A_1 = 10.168 \times 5.00 - (0.656 \times 0.60 \times 2 + 0.656 \times 1.820)$	= 48.86 m²	
$A_2 = 0.60 \times 6.20 \times 2$	= 7.44 m²	
$A_3 = 11.70 \times 0.60 \times 2$	= 14.04 m²	
$A_4 = 1/2 \times (10.168 + 9.774) \times 3.60 \times 4$	= 143.58 m²	
$A_5 = 1/2 \times (6.194 + 7.571) \times 0.60 \times 2$	= 8.26 m²	
$A_6 = 0.80 \times 10.030 \times 2$	= 16.05 m²	
$A_7 = 0.80 \times 6.20$	= 4.96 m²	
$A_8 = 6.194 \times 0.40 \times 2 \times 2$	= 9.91 m²	
$A_9 = 6.194 \times 5.00$	= 30.97m²	
$A_{10} = 0.30 \times 6.032 \times 6$	= 1.86 m²	
$A_{11} = 1.032 \times 0.60 \times 2 \times 2$	= 2.48 m²	
$A_{12} = 1.032 \times 1.820$	= 1.88 m²	
$A_{13} = (0.914 + 0.430) \times 0.80 \times 2$	= 2.15 m²	
$A_{14} = 0.430 \times 0.80 \times 2$	= 0.69 m²	
$A_{15} = 3.10 \times 1.376 \times 2$	= 8.53 m²	
$A_{16} = 2.80 \times 1.376 \times 2$	= 3.85 m²	
$A_{17} = (0.631 + 0.745 + 0.688) \times 0.80 \times 2$	= 3.30 m²	

TYPE OF WORK :
LOCATION : Inclined Intake Structure

CALCULATION		RESULT
$A_{18} = 1.150 \times 7.544 \times 2$	$= 17.35\ m^2$	
$A_{19} = 2.673 \times 3.90$	$= 10.42\ m^2$	
$\Sigma A = A_1 + \sim + A_{19}$	$=$	$336.58\ m^2$
(Scaffolding)		
$A_1 = 1/2 \times (11.151 + 10.031) \times 4.40 \times 2$	$= 93.20\ m^2$	
$A_2 = 1/2 \times (10.168 + 9.774) \times 3.60 \times 2$	$= 71.79\ m^2$	
$\Sigma A = A_1 + A_2$	$=$	$164.99\ m^2$
(Supporting)		
$V_1 = 1/2 \times (10.168 + 9.774) \times 3.60 \times 5.00$	$= 179.48\ m^3$	
$V_2 = 1/2 \times 7.164 \times 10.03 \times 1.150 \times 2$	$= 82.63\ m^3$	
$V_3 = 1/2 \times 2.467 \times 1.762 \times 3.900$	$= 8.48\ m^3$	
$\Sigma V = V_1 + V_2 + V_3$	$=$	$270.59\ m^3$

TYPE OF WORK :
LOCATION : Inclined Intake Structure

CALCULATION	RESULT
(Between EL +110.00 to EL+130.00)	
(Formwork)	
A_1 = 2.30 x (24.377+1.40) x 2 = 118.57 m²	
A_2 = 1.90 x (24.377) x 2 = 92.63 m²	
A_3 = (3.90 + 2.00) x 24.377 = 143.82 m²	
A_4 = 0.40 x 24.377 x 2 = 19.50 m²	
A_5 = 0.25 x 24.377 x 4 = 24.377m²	
A_6 = 2.80 x 23.377 + 1.050 x 2.80 = 68.40 m²	
A_7 = 3.25 x 1.40 x 3 = 13.65 m²	
A_8 = (1.40 + 0.60 x 2) x 2.80 = 7.28 m²	
A_9 = 1/2 x (1.20 + 2.629) x 2.00 x 2 = 7.66 m²	
A_{10} = 2.00 x 3.90 = 7.80 m²	
A_{11} = 0.25 x 3.40 = 0.85 m²	
A_{12} = (1.40 + 1.05 + 1.40) x 2.80 = 10.78 m²	
$\Sigma A = A_1 + \sim + A_{12}$ =	515.32 m²
(Scaffolding)	
A_1 = 118.57m²	
A_2 = 7.66 m²	
A_3 = 3.25 x 2.80 x 2 = 18.20 m²	
A_3 = 2.00 x 3.90 = 7.80 m²	
A_4 = 3.35 x 3.90 = 13.07 m²	
$\Sigma A = A_1 + \sim + A_4$ =	165.30 m²
(Supporting)	
V = (2.00 x 0.70 + 2.80 x 0.90) x 24.377 =	95.56 m³

Inclined Intake Structure

Excavation

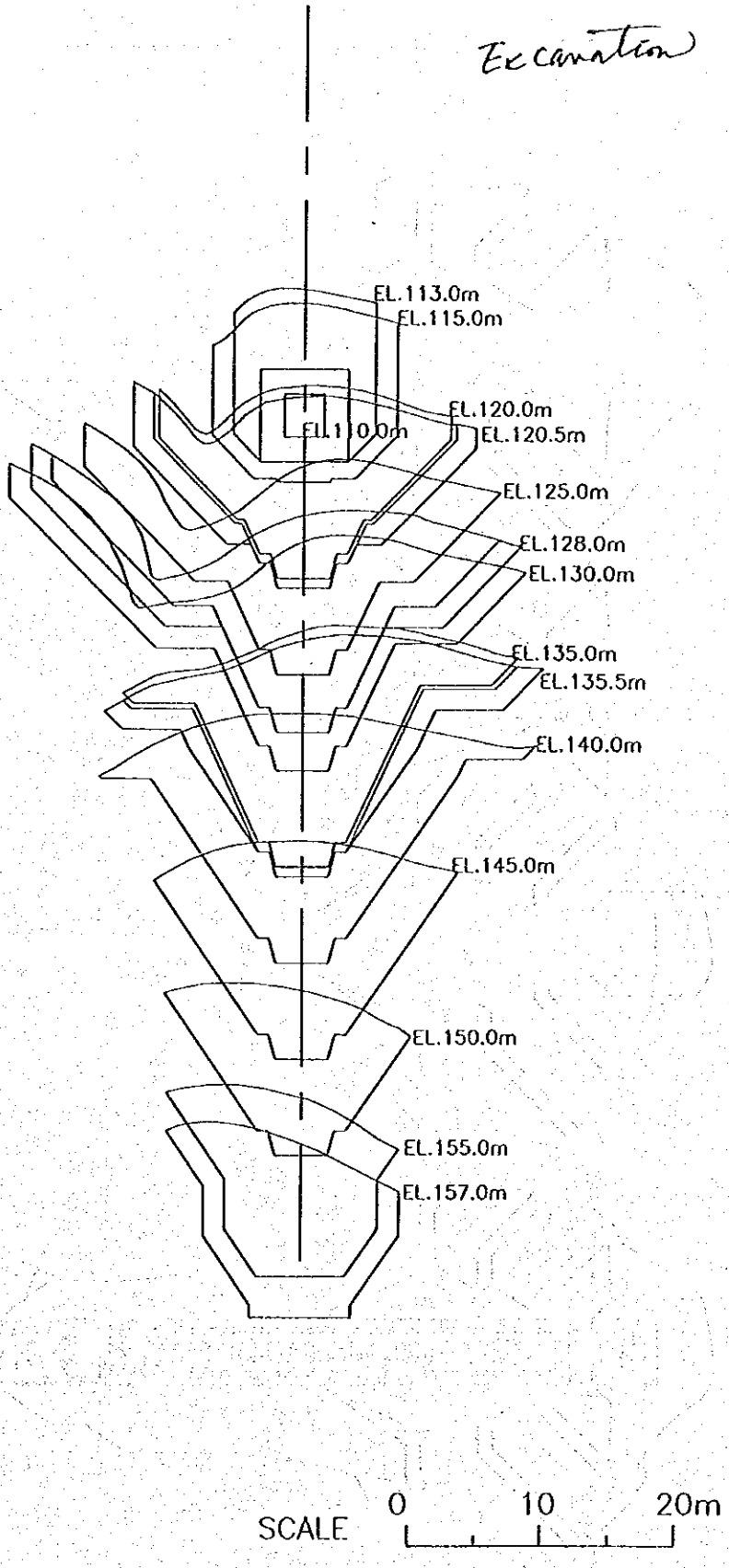
Elevation (m)	Area (m^2)			Volume (m^3)
	Area 1	Area 2	Total	
157.0	162.642		162.642	
155.0	154.021		154.021	316.7
150.0	136.288		136.288	725.8
145.0	214.630		214.630	877.3
140.0	283.078		283.078	1,244.3
135.5	228.113	43.543	271.656	1,248.2
135.5	228.113		228.113	0.0
135.0	229.650		229.650	114.4
130.0	273.616		273.616	1,258.2
128.0	227.600	46.137	273.737	547.4
128.0	227.600		227.600	0.0
125.0	227.117		227.117	682.1
120.5	176.470	39.282	215.752	996.5
120.5	176.470		176.470	0.0
120.0	178.929		178.929	88.8
115.0	155.616		155.616	836.4
113.0	44.220	79.920	124.140	279.8
113.0	44.220		44.220	0.0
110.0	9.300		9.300	80.3
110.0	0.000		0.000	0.0
Total				9,295.9
Total x 1.1				10,200.0

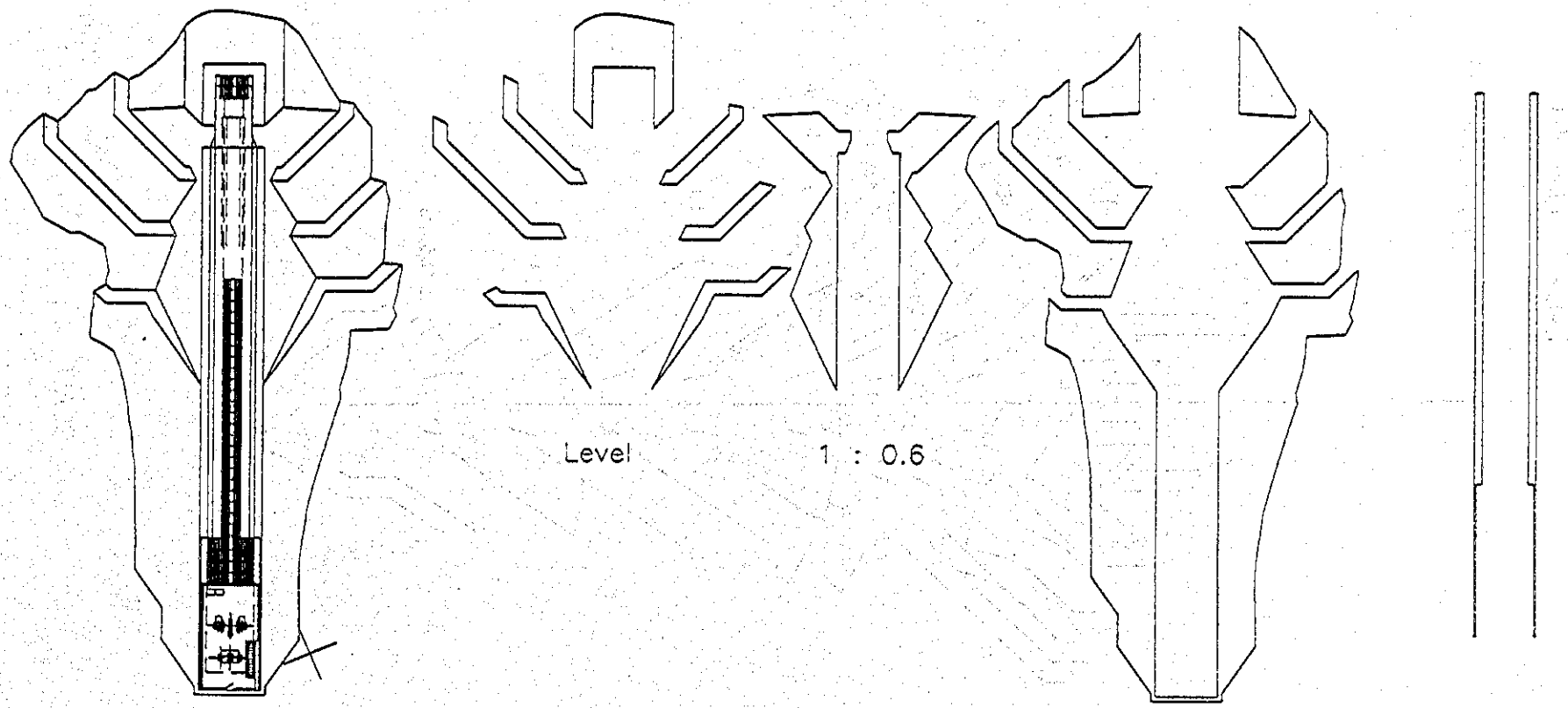
Excavated Slope

	1:0.6 (m2)	1:0.8 (m2)	1:1.4 (m2)	Level (m2)	total
	96.96	32.39	38.56	79.92	
	100.69	98.82	38.56	21.63	
		107.38		29.33	
		503.99		18.47	
		55.27		17.65	
		68.08		16.82	
		34.31		25.08	
Total	197.65	900.24	77.12	208.90	
x slope	384	1,441	95	467	
Total(x 1.1)	420	1,590	100	510	2,620

Intake Structure

Excavation





INCLINED INTAKE STRUCTURE

EXCAVATED SLOPE

2.7 Steel Structure

Total Quantity of Gate

ITEM	NEME	Steel Material (kg)	Material purchased (kg)	Machine single unit (kg)	Sub-total (kg)	Painting Priмer (m^2)	Painting Paint (m^2)	Acid cleaning (m^2)
BULK HEAD GATE	Gate Leaf	3334	139	0	3473	0.0	45.6	3.0
	Gate guide	19314	208	0	19522	468.5	44.3	39.1
	Hoist	7178	992	688	8858	2.4	92.2	0.5
	1 Gate Total	29826	1339	688	31853	470.9	182.1	42.6
EMERGENCY GATE	Gate Leaf	1639	51	0	1690	0.0	27.8	1.8
	Lifting Beam	428	4	0	432	0.0	9.5	0.2
	Gate guide	10902	6	0	10908	258.4	26.7	18.7
	Hoist	7512	987	504	9003	2.4	105.4	0.5
	1 Gate Total	20481	1048	501	22033	260.8	169.4	21.2
Trash Rack		14993	64	0	15057	0.0	477.2	0.4
STEEL PENSTOCK	Outlet pipe	140483	0	0	140483	2115.7	1833.7	0.0
	Installation stand	102417	5756	0	108173	3574.8	0.0	0.0
	Total	242900	5756	0	248656	5690.5	1833.7	0.0
OUT LET STRUCTURES (ϕ650)	Control Gate	5697	247	650	6594	8.4	39.7	0.9
	Guard Gate	5121	266	650	6037	8.2	34.8	0.5
	Auxiliary Facilities	1444	70	845	2359	32.8	0.0	0.0
	Installation stand	335	19	0	354	13.8	0.0	0.0
	Total	12597	602	2145	15344	63.2	74.5	1.4
OUT LET STRUCTURES (ϕ250)	Control Gate	829	30	217	1076	0.6	11.9	0.9
	Guard Gate	802	642	217	1661	0.5	7.8	0.0
	Auxiliary Facilities	756	13	285	1054	27.8	0.0	0.0
	Installation stand	235	13	0	248	9.5	0.0	0.0
	Total	2622	698	719	4039	38.4	19.7	0.9
Operating Stand		4192	30	0	4222	0.0	130.0	0.0
DIVERSION GATE	Gate Leaf	17207	126	0	17333	0.0	251.6	6.7
	Gate guide	3121	12	0	3133	58.4	11.2	7.1
	1 Gate Total	20328	138	0	20466	58.4	262.8	13.8
Electrical Equ				2020	531			
Total		347939	9675	6076	362201	6582.2	3149.4	80.3

BULK HEAD GATE(Gate Leaf) (1/3)

No.	Item	Material	Dimensions (mm) Shape	× Length	Quantity	Weight (kg) Unit	W	Painting Area (m^2) Painting I.S.	Painting O.S.	Acid
	Gate Leaf									
	Skin Plate	SS400	PL	14×1800×2200	1		435		7.9	
	Main Girder Flange	SS400	PL	14×90×2000	4		79		1.4	
	Main Girder Web	SS400	PL	9×(422×2055)	2		122		3.5	
	Main Girder Flange	SS400	PL	14×120×2000	6		158		2.9	
	Main Girder Web	SS400	PL	9×(422×2055)	3		183		5.2	
	Side Girder Flange	SS400	PL	14×100×1800	4		79		1.4	
	Side Girder Web	SM400C	PL	45×272×1800	2		311		1.8	
	Vertical sub beam Flange	SS400	PL	9×70×265	3		4		0.1	
	Vertical sub beam Flange	SS400	PL	9×70×305	9		14		0.4	
	Vertical sub beam Web	SS400	PL	9×442×1700	1		53		1.5	
	Vertical sub beam Web	SS400	PL	16×282×1700	2		113		1.8	
	Vertical sub beam Web	SS400	PL	9×160×1700	2		38		1.1	
	Main Wheel	SSW-Q1S	RB	φ400×70	8		555		2.7	
	Wheel pin	SCM435	RB	φ126×500	8		392		1.6	
	Key Plate	SUS304	PL	12×50×180	16		14			0.3
	Shaft End-Plate	SUS304	PL	16×φ170	8		23			0.4
	Side Shoe	CAC603	t	12×50×100	4		2		-	
	Bracket	SS400	PL	9×100×120	4		3		0.1	
	Bracket	SS400	PL	9×(100×150)	4		2		0.1	
	Seal base	SUS304	t	10×70×2100	1		12			0.2
	Seal base	SUS304	t	10×70×1750	2		19			0.2
	Seal guide	SUS304	PL	20×30×2000	1		10			0.1
	Seal clamp bar	SUS304	PL	12×50×2100	1		10			0.2
	Seal clamp bar	SUS304	PL	12×50×1750	2		17			0.4
	Seal clamp bar	SUS304	PL	12×95×2100	1		19			0.4
	Trash rack bar	SS400	FB	50×6×310	28		20		0.9	
	Trash rack Washer	SS400	PL	12×120×680	4		31		0.7	
	Water filling pipe	SGP	Pipe	150A×60	4		5		0.2	
	Water filling valve	SUS304	RB	φ350×120	2		87			0.5
	Bellmouth	SUS304	t	50×(φ350−φ150)	2		62			0.3
	Flange	SS400	t	22×(φ280−φ166)	4		28		0.3	

BULK HEAD GATE(Gate Leaf) (2/3)

No.	Item	Material	Dimensions(mm) Shape	× Length	Quantity	Weight(kg) Unit	Weight(kg) W	Painting Area(m²) Painting I.S.	Painting Area(m²) Painting O.S.	Painting Area(m²) Acid
	Rod cover	SGP	Pipe	65A×700	2		10		0.3	
	Flange	SS400	PL	12×(φ250−φ76.3)	2		8		0.2	
	Blind plate	SS400	PL	12×φ250	2		9		0.2	
	Rod	SS400	RB	φ40×1750	2		34		0.4	
	Head plate	SS400	t	60×100×200	2		19		0.2	
	Rod pin	S45C	RB	φ50×150	2		5		-	
	Bearing	SS400	RB	(φ80−φ56)×70	4		6		0.1	
	Bearing	SS400	PL	12×(φ200−φ60)	4		11		0.2	
	Rib	SS400	PL	6×50×70	8		1		0.0	
	Lifting beam	SS400	[	200×80×7.5×2000	2		98		3.0	
	Pin	S45C	RB	φ50×150	2		4		0.0	
	Bracket	SS400	PL	12×200×600	4		45		1.0	
	Bracket	SS400	PL	12×300×600	4		68		1.4	
	Bracket base	SS400	PL	12×300×400	2		26		0.6	
	Reinforcement	SS400	PL	9×250×500	4		35		1.0	
	Rib	SS400	PL	9×75×178	8		8		0.2	
	Lubricating Unit	SUS304	RB	φ10×(t=1.0)×5000	5		7			-
	Lubricating Unit	SS400	PL	12	1 set		20		0.4	
	Lubricating Unit	SS400	PL	19	1 set		15		0.4	
	Lubricating Unit	SS400	PL	3.2	1 set		5		0.4	
				Sub Total			3334		45.6	3.0

BULK HEAD GATE(Gate Leaf)

(3/3)

No.	Item	Material	Dimensions(mm) Shape × Length	Quantity	Weight(kg) Unit	Weight(kg) W	Painting Area(m²) Painting I.S.	Painting Area(m²) Painting O.S.	Painting Area(m²) Acid
	Elbow	SGP	150A 90° E(S)	2		10			
	Bush	Oilless	#500SP(φ151−φ126)×90	8		32			
	Bush	Oilless	#500SP(φ56−φ41)×70	4		3			
	Bush	Oilless	#500SP(φ68−φ42)×70	2		3			
	Seal Rubber	Synthetic	φ10-P type×5600	1		22			
	Seal Rubber	Synthetic	t15×100 Flat type×2100	1		5			
	Lubrication parts	SUS304	3/8" nipple, connector, elbow	1 set		10			
	Seal Washer	SUS304+Synthetic rubbe	For M16	80	0.012	1			
	Bolt	SUS304	M16×80 N, W	80	0.203	16			
	Bolt	SUS304	M20×60 N, SW	32	0.296	9			
	Bolt	SUS304	M20×80 N, SW	32	0.345	11			
	Bolt	SUS304	M16×60 N, W	40	0.171	7			
	Bolt	SUS304	M12×60 N	100	0.085	9			
	Flash Bolt	SUS304	M12×50 N	16	0.082	1			
			Sub Total			139			
			Gate Leaf Total			3473	0.0	15.6	3.0

BULK HEAD GATE(Gate guide) (1/3)

No.	Item	Material	Dimensions (mm) Shape	× Length	Quantity	Weight (kg) Unit	W	Painting Area (m²) Painting I.S.	O.S.	Acid
	Sill beam									
	Rail	SS400	[	300×90×9×2300	2		175	4.4		
	Rail	SS400	H	200×200×8/12×1000	2		100	2.4		
	Seal Plate	SUS304	PL	12×150×2600	1		37			0.4
	Cover Plate	SS400	PL	12×450×2600	1		110	1.2	1.2	
	Cover Plate	SS400	PL	12×300×350	2		20	0.2	0.2	
	Rib	SS400	PL	9×300×300	5		32	0.9		
	Installation beam	SS400	L	75×75×9×600	5		30	0.9		
	Installation beam	SS400	L	75×75×9×300	4		12	0.4		
	Installation beam	SS400	RB	16×250 M16	23		9	0.3		
	Anchor bar	SD295A	D	16×400	23		14	0.5		
	Lintel beam									
	Rail	SS400	[	200×90×8×2300	1		70	1.7		
	Seal Plate	SUS304	t	13×150×2000	1		31			0.3
	Cover Plate	SS400	PL	12×(1021×2024)	1		178	1.9	1.9	
	Sub beam	SS400	L	100×100×12×2300	1		34	0.7	0.2	
	Rib	SS400	PL	9×90×120	20		15	0.4		
	Installation beam	SD295A	D	16×300	10		5	0.2		
	Installation beam	SD295A	D	16×400	10		6	0.2		
	Side guide(Main rail)									
	Rail Flange	SS400	PL	22×150×1950	4		202	2.3		
	Rail Web	SS400	PL	19×256×1950	2		149	2.0		
	Wheel track	SUS304N2	t	13×200×1950	2		80			0.8
	Cover Plate	SS400	PL	12×(1078×1950)	2		292	3.1	3.1	
	Rib	SS400	PL	9×300×400	10		85	2.4		
	Installation beam	SS400	RB	16×250 M16	10		4	0.1		
	Anchor bar	SD295A	D	16×400	10		6	0.2		
	Joint plate	SS400	PL	12×100×256	8		19	0.3		
	Side guide(Front rail)									
	Front rail	SS400	CT	150×150×6.5/9×1950	2		72	2.3		
	Front rail	SUS304	L	75×75×9×1950	2		39	1.2		
	Wheel track	SUS304	PL	10×120×1950	2		37			0.5
	Bearing Plate	SS400	PL	10×50×1950	2		15			0.2
	Rib	SS400	PL	9×100×200	10		14	0.4		

BULK HEAD GATE(Gate guide) (2/3)

No,	Item	Material	Dimensions(mm) Shape	× Length	Quantity	Weight(kg) Unit	W	Painting Area(m²) Painting I.S.	O.S.	Acid
	Installation beam	SS400	L	75×75×9×150	10		15	0.4		
	Installation beam	SS400	RB	16×250 M16	20		8	0.3		
	Anchor bar	SD295A	D	16×400	20		12	0.4		
	Joint plate	SS400	PL	12×100×141	8		11	0.2		
	Side guide(Sub rail)									
	Main Rail	SS400	H	194×150×6/9×65714	2		4022	129.1		
	Wheel track	SUS304	PL	10×100×65714	2		1,042			13.1
	Joint plate	SS400	PL	12×100×176	80		133	2.8		
	Installation beam	SS400	L	75×75×9×300	264		789	23.8		
	Installation beam	SS400	RB	16×250 M16	792		313	10.0		
	Anchor bar	SD295A	D	16×400	792		494	15.9		
	Side guide(Sub front rail)									
	Rail	SS400	CT	150×150×6.5/9×65108	2		2396	78.1		
	Rail	SS400	L	75×75×9×65108	2		1297	39.1		
	Wheel track	SS400	PL	10×120×65108	2		1239			15.6
	Bearing Plate	SS400	PL	10×50×165108	2		516			6.5
	Rib	SUS304	PL	9×100×200	264		373	10.6		
	Joint plate	SS400	PL	12×100×141	80		106	2.3		
	Installation beam	SS400	L	75×75×9×200	264		526	15.8		
	Installation beam	SS400	RB	16×250 M16	792		313	10.0		
	Anchor bar	SD295A	D	16×400	792		494	15.9		
	Inspection stand									
	Rail	SS400	H	150×150×7/10×3000	2		187		5.4	
	Rail	SS400	H	150×150×7/10×3500	2		218		6.3	
	Post	SS400	H	150×150×7/10×900	14		392		11.3	
	Beam	SS400	H	150×150×7/10×850	4		106		3.1	
	Beam	SS400	H	150×150×7/10×400	2		25		0.7	
	Beam	SS400	H	150×150×7/10×433	6		81		2.3	
	Rib	SS400	PL	12×71.5×130	56		49		1.0	
	Side roller rail	SS400	L	75×75×9×3500	2		70		2.1	
	Sub beam	SS400	L	75×75×9×1200	2		24		0.7	
	Sub beam	SS400	L	75×75×9×800	2		16		0.5	
	Gusset	SS400	PL	9×200×200	8		23		0.6	

BULK HEAD GATE(Gate guide) (3/3)

No,	Item	Material	Dimensions(mm) Shape	Dimensions(mm) × Length	Quantity	Weight(kg) Unit	Weight(kg) W	Painting Area(m²) Painting I.S.	Painting Area(m²) Painting O.S.	Painting Area(m²) Acid
	Wheel track	SUS304	PL	10×100×3000	2		48			0.6
	Bearing Plate	SUS304	PL	10×100×3500	2		56			0.7
	Bearing Plate	SUS304	PL	10×50×3500	2		28			0.4
	Anchor Pad	SS400	PL	16×250×250	20		157	1.3	1.3	
	Stiffener	SS400	FB	65×9×230	20		21	0.6		
	Stiffener	SS400	FB	65×9×230	40		32	0.9		
	Anchor	SD295A	D	16×300	80		37	1.2		
	Liner plate	SS400	PL	12×100×130	40		49		1.0	
	Liner plate	SS400	PL	12×100×100	20		19		0.4	
	Gate resting device	SS400			1 set		100		1	
	Air pipe									
	Air pipe	SGP	Pipe	150A×450	1		8	0.5		
	Air pipe	SGP	Pipe	150A×4700000	1		1386	72.7		
	Elbow	SGP	Pipe	150A 90° E(L)	4		28	0.5		
	Joint plate	SS400	FB	90×6×269	48		55	2.3		
	Installation beam	SS400	L	75×75×9×300	36		108	3.2		
				Sub Total			19314	468.5	44.3	39.1
	Side guide(Sub front rail)									
	Bolt	SUS304		M16×60 N	176	0.158	28			
	Nut	SUS304		M16	3274	0.034	111			
	Gate resting device									
	Bolt, Nut	SS400		M16×70 N	32	0.174	6			
	Air Pipe									
	U bolt	SS400		for 150A, A type, M16	36		34			
	Anchor bolt	SS400		M16×170	72		26			
	Anchor setter	glass		AP16	72		3			
				Sub Total			208			
				Gate guide Total			19522	468.5	44.3	39.1

BULK HEAD GATE(Hoist)

(1/5)

No.	Item	Material	Dimensions (mm)		Quantity	Weight (kg)		Painting Area (m²)		
			Shape	× Length		Unit	W	Painting		Acid
								I.S.	O.S.	
	Drum			P.C. D1000×1800						
	Shell	SM400C	t	40×1800×3016	1		1705		5.4	
	Side plate	SM400A	PL	32×(φ1300−φ880)	1		181		1.4	
	Side plate	SM400A	PL	28×(φ1200−φ100)	2		494		4.5	
	Shaft End-Plate	SM400A	PL	28×(φ1200−φ400)	1		221		2.0	
	Rib	SM400A	PL	28×(150×400)	6		59		0.5	
	Fastening plate	SS400	t	10×150×150	6		10		0.2	
	Boss	S25C	RB	(φ400−φ220)×250	1		172		0.4	
	Rope stopper	S25C	t	55×120×125	2		13		0.1	
	Bush	CAC603	RB	(φ220−φ190)×250	1		22		-	
	Drum gear			(M=12, Z=118, B=120)						
	Rim	SCM435	RB	(φ1440−φ1344)×120	1		148		0.8	
	Web	SCW410	t	25×(φ1344−φ400)	1		293		2.7	
	Rib	SCW410	t	25×85×472	6		37		0.9	
	Fastening plate	SCW410	t	16×100×180	6		12		0.3	
	Boss plate	SCW410	RB	(φ400−φ220)×250	1		172		0.4	
	Bush	CAC603	RB	(φ220−φ190)×250	1		22		-	
	Pinion gear	SCM440		(M=12, Z=21, B=130)	1		44		0.1	
	Drum shaft	S45C-N	RB	φ190×2400	1		534		1.4	
	Key Plate	SS400	PL	16×60×250	4		8		0.1	
	Pinion pin	S45C-N	RB	φ110×685	1		51		0.3	
	Bearing (2 pieces)	SC450	RB	φ100×160	2		120		0.2	
	Bush	CAC603	RB	(φ130−φ100)×160	2		11		-	

BULK HEAD GATE(Gate guide)

(2/5)

No.	Item	Material	Dimensions(mm) Shape	× Length	Quantity	Weight(kg) Unit	W	Painting Area(m²) Painting I.S.	Painting O.S.	Acid
	Drum Bracket	SS400	PL	22×(750×1000)	2		207		2.4	
	Drum Bracket	SM400A	t	20(PL25)×200×1050	2		66		0.8	
	Drum Bracket	SM400A	t	20(PL25)×200×1100	2		69		0.9	
	Drum Bracket	SS400	PL	12×180×750	4		51		1.1	
	Drum Bracket	SS400	PL	12×100×600	2		11		0.2	
	Drum Bracket	SS400	PL	12×180×800	4		54		1.2	
	Drum Bracket	SS400	PL	14×400×400	2		35		0.6	
	Drum Bracket	SS400	t	14(PL19)×(400×400)	2		35		0.6	
	Drum Bracket	SS400	PL	12×96×374	16		54		1.1	
	Bearing Stand	SM400A	t	20(PL25)×160×410	2		21		0.3	
	Bearing Stand	SS400	PL	12×170×410	2		13		0.3	
	Bearing Stand	SS400	PL	12×65×170	8		8		0.2	
	Brake Stand	SS400	t	10(PL12)×85×430	2		6		0.1	
	Brake Stand	SS400	PL	12×350×450	1		15		0.3	
	Brake Stand	SS400	PL	12×98×450	2		8		0.2	
	Brake Stand	SS400	PL	12×98×400	2		7		0.2	
	Brake Stand	SS400	PL	12×90×173	4		6		0.1	
	Motor Stand	SS400	t	10×80×280	2		4		-	
	Motor Stand	SS400	PL	12×310×360	1		11		0.2	
	Motor Stand	SS400	PL	12×138×450	2		12		0.2	
	Motor Stand	SS400	PL	12×138×410	2		11		0.2	
	Position indicator stand	SS400	PL	12×400×400	1		15		0.3	
	Position indicator stand	SS400	L	65×65×6×150	2		2		0.1	
	Limit switch box stand	SS400	L	65×65×6×400	2		5		0.2	
	Limit switch box stand	SS400	L	65×65×6×200	2		2		0.1	
	Emergency opening device									
	Rod	SUS304	RB	φ25×1300	1		5			0.1
	Thrust	SUS304	RB	φ50×200	1		3			0.1
	Guide	SUS304	PL	30×(φ80−φ27)	2		2			0.1
	Guide	SUS304TPA	Pipe	80A(Sch40)×400	1		6			0.2
	Bracket	SS400	PL	12×180×250	1		4		0.1	
	Bracket	SS400	PL	6×80×250	1		1		-	
	Bracket	SS400	PL	6×50×220	1		1		-	

BULK HEAD GATE(Gate guide) (3/5)

No,	Item	Material	Dimensions(mm) Shape	× Length	Quantity	Weight(kg) Unit	W	Painting Area(m²) Painting I.S.	Painting O.S.	Acid
	Control Stand	SS400	PL	12×220×240	1		5		0.1	
	Control Stand	SS400	PL	12×220×240	1		5		0.1	
	Control Stand	SS400	H	200×200×8/12×680	1		34		0.8	
	Control Stand	SS400	PL	9×85×300	2		4		0.1	
	Gear cover	SS400	PL	2.3×2.5㎡	2		90		10.0	
	Gear cover	SS400	L	50×50×6×400	16		28		0.8	
	Chain cover	SS400	PL	2.3×0.4㎡	2		20		1.6	
	Chain cover	SS400	L	50×50×6×200	4		4		0.1	
	Oil catch	SS400	PL	2.3×2.5㎡	2		90		10.0	
	Oil catch	SS400	L	50×50×6×1600	4		28		1.3	
	Oil catch	SS400	L	50×50×6×850	4		15		0.7	
	Hanger	SS400	PL	22×300×380	16		315		3.6	
	Hoist flame									
	Main girder	SS400	H	400×200×8/13×3380	2		442		10.8	
	Main girder	SS400	H	400×200×8/13×2000	4		523		12.8	
	Sub flame	SS400	[	250×90×9/13×2360	1		82		2.0	
	Sub flame	SS400	[	250×90×9/13×350	8		97		2.4	
	Sub flame	SS400	[	250×90×9/13×500	1		17		0.4	
	Rib	SS400	PL	PL12×96×374	12		41		0.9	
	Anchor Pad	SS400	PL	16×200×200	12		60	1.0		
	Anchor	SD295A	D	16×150	48		11	0.4		
	Liner	SS400	t	100×100×200	12		188	1.0		
				Sub Total			7178	2.4	92.2	0.5

BULK HEAD GATE(Gate guide) (4/5)

No.	Item	Material	Dimensions(mm) Shape × Length	Quantity	Weight(kg) Unit	Weight(kg) W	Painting Area(m²) Painting I.S.	Painting Area(m²) Painting O.S.	Painting Area(m²) Acid
	Motor		1.5kw, 6P, 50Hz	1		53			
	Helical speed reducer		QBG-496 i=1/500	1		550			
	Limit switch Box		MD233	1		30			
	Gate Position Indicator		STX110-S1-D	1		50			
			Sub Total			683			
	Brake		BMS4-1316UPS	1		109			
	Chain coupling		CR-5016-J	2		7			
	Gear coupling		KSS-280	1		116			
	Limit switch		Direct moving type	1		10			
	Limit switch		Roller hand type	3		3			
	Chain sprocket		RS40 T=60	2		6			
	Chain sprocket		RS40 T=18	2		1			
	Roller chain		RS40 160 rink	1		1			
	Roller chain		RS40 100 rink	1		1			
	Wire Rope	JIS(6×37)	φ20×140m G type	1		202			
	Rope socket		for φ20	1		6			
	Pin		for φ20	1		3			
	Tool box			1 set		25			
	Name plate(operation)	White acryle	t=5.0 mm	1		-			
	Name plate	C2801P		1		-			
	Inbricating Oil			1 set		330			
	Hand pomp		MP-113 3 l	2		30			
	Distributing Valve		VS32	2		3			
	Distributing Valve		VS33	4		8			
	Distributing Valve		VS34	2		5			
	Y type strainer		3/8	4		4			
	Oil pack		SGP-104	1		12			
	Lubricating parts		High pressure screwed union 3/8	34		6			
			High pressure screwed tee 3/8	4		1			
			High pressure screwed elbow 3/8	18		3			
			High pressure screwed elbow 3/8	5		1			

BULK HEAD GATE(Gate guide) (5/5)

No.	Item	Material	Dimensions(mm) Shape × Length	Quantity	Weight(kg) Unit	Weight(kg) W	Painting Area(m²) Painting I.S.	Painting Area(m²) Painting O.S.	Painting Area(m²) Acid
	Lubrication parts		High pressure plug 3/8	10		-			
			High pressure nipple 3/8	24		1			
			High pressure long nipple 3/8	10		2			
		SUS304	Pipe joint φ10×1/4	24		1			
		SUS304	Pipe union φ10	16		-			
		SUS304	Pipe elbow φ10×1/4	19		1			
			Tube clump φ10×1	66		1			
			Tube clump φ10×2	35		1			
			Tube clump φ10×3	12		-			
			Tube clump 3/8×2P	12		1			
		4T	M6 + screw bolt M6×10	125		1			
			+ screw bolt M8×30	12		-			
			1/4B×500 ℓ			1			
	Bolt, Nut								
	Reamer bolt	S45C	φ29×160 with N, SW	6		7			
	Bolt	SS400	M24×160 with N, SW	6		5			
	Bolt	SS400	M42×180 with N, SW	8		27			
	Bolt	SS400	M24×40 with N, SW	8		5			
	Bolt	SS400	M30×120 with N, SW	8		10			
	Knock pin	S45C	φ20×90 with N, SW	4		1			
	Bolt	SS400	M24×120 with N, SW	10		7			
	Knock pin	S45C	φ20×90 with N, SW	4		2			
	Bolt	SS400	M10×60 with N, SW	4					
	Bolt	SS400	M10×60 with N, SW	4					
	Bolt	SS400	M12×45 with N, SW	4		5			
	Bolt	SS400	M12×60 with N, SW	4					
	Bolt	SS400	M10×60 with N, SW	4					
	Bolt	SS400	M12×60 with N, SW	24					
	Bolt	SS400	M24×150 N2	24		20			
			Sub Total			992			
			Hoist Total			8853	2.4	92.2	0.5

EMERGENCY GATE(Gate Leaf) (1/1)

No.	Item	Material	Dimensions(mm) Shape	× Length	Quantity	Weight(kg) Unit	Weight(kg) W	Painting Area(m²) Painting I.S.	Painting Area(m²) Painting O.S.	Painting Area(m²) Acid
	Gate Leaf									
	Skin Plate	SS400	PL	16×1650×2700	1		560		8.9	
	Main girder	SS400	[	300×90×12/16×2600	4		505		10.0	
	Side girder	SS400	[	300×90×12/16×1630	2		158		3.1	
	Side girder	SS400	PL	9×100×595	6		25		0.7	
	Side girder	SS400	PL	9×291×775	6		96		2.7	
	Bearing Plate	CAC603	t	35×50×1630	2		51		-	
	Guide shoe	CAC603	t	45×50×150	6		18		-	
	Slide plate seat	SUS304	t	10×70×1630	2		18			0.2
	Seal base	SUS304	t	10×70×1630	2		18			0.2
	Seal base	SUS304	t	10×70×2300	1		13			0.2
	Rubber stopper	SUS304	PL	20×30×2300	1		10			0.2
	Seal clamp bar	SUS304	PL	12×50×1630	2		16			0.3
	Seal clamp bar	SUS304	PL	12×50×2300	1		11			0.2
	Seal clamp bar	SUS304	PL	12×95×2300	1		21			0.4
	Hanger	SS400	PL	12×200×480	4		36		0.8	
	Bracket	SS400	PL	12×60×200	4		5		0.1	
	Bracket	SS400	PL	12×(90×480)	8		25		0.5	
	Bracket	SS400	PL	12×(φ100−φ50)	8		4		0.1	
	Pin	SUS304	RB	φ50×175	2		5			0.1
	Rein forcement plate	SS400	PL	12×90×1300	4		44		0.9	
				Sub Total			1639		27.8	1.8
	Seal Rubber	Synthetic		φ40-P type×5554	1		22			
	Seal Rubber	Synthetic		t15×100 Flat type×2300	1		7			
	Bolt	SUS304		M16×70 N.W	80	0.187	15			
	Seal Washer	SUS304+Synthetic rubber		for M16	80	0.012	1			
	Bolt	SUS304		M16×50 N	44	0.142	6			
				Sub Total			51			
				Gate Leaf Total			1,690		27.8	1.8

EMERGENCY GATE(Lifting beam) (1/1)

No,	Item	Material	Dimensions(mm) Shape	× Length	Quantity	Weight(kg) Unit	W	Painting Area(m²) Painting I.S.	O.S.	Acid
	Beam Flange	SS400	PL	9×160×2650	2		60		1.7	
	Beam Web	SS400	PL	9×182×2650	2		68		1.9	
	Guide Flange	SS400	PL	9×160×500	8		45		1.3	
	Guide girder web	SS400	PL	9×152×500	8		43		1.2	
	Rib	SS400	PL	9×182×160	8		16		0.5	
	Rib	SS400	PL	9×152×160	4		7		0.2	
	Corner Rib	SS400	PL	9×(260×280)	4		10		0.3	
	Corner Rib	SS400	PL	9×160×400	4		18		0.5	
	Guide Roller	SUS304	RB	φ100×30	4		7			0.1
	Pin	SUS304	RB	φ28×87	4		2			-
	Key Plate	SUS304	t	6×26×76	4		-			-
	Bracket	SS400	PL	14×110×115	8		11		0.2	
	Bracket	SS400	PL	14×100×210	4		9		0.2	
	Liner	SS400	t	6×100×210	4		4		0.2	
	Seat plate	SS400	PL	16×110×220	4		12		0.2	
	Hook	SS400	t	50×(140×900)	2		58		0.4	
	Pin	SUS304	RB	φ45×160	2		4			-
	Key Plate	SS400	t	9×30×100	2		-		-	
	Hand bar	SUS304	PL	19	2		1			-
	Rein forcement	SS400	t	25×(φ100−φ45)	4		5		0.0	
	Weight	SS400			2		20		0.3	
	Pin	SUS304	RB	φ22×150	2		1			-
	Hanger	SS400	PL	12×150×150	2		4		0.1	
	Hanger	SS400	PL	9×100×160	4		5		0.1	
	Hanger	SS400	PL	9×180×210	2		5		0.1	
	Stopper	SUS304	t	50×100×100	2		8			0.1
	Stopper	SS400	PL	9×180×210	2		5		0.1	
				Sub Total			428		9.5	0.2
	Bolt	SUS304		M16×50 with N, SW	16		2			
	Nut	SUS304		M12, M10			2			
				Sub Total			4			
				Lifting beam Total			432		9.5	0.2

EMERGENCY GATE(Gate guide) (1/2)

No.	Item	Material	Dimensions(mm) Shape	× Length	Quantity	Weight(kg) Unit	W	Painting Area(m²) Painting I.S.	O.S.	Acid
	Sill beam									
	Rail	SS400	[	150×75×6.5×2700	1		50	1.6		
	Seal Plate	SUS304	PL	10×250×2700	1		54			0.7
	Rib	SS400	PL	9×(120×120)	6		4	0.1		
	Installation beam	SS400	L	75×75×9×200	6		12	0.4		
	Installation beam	SS400	RB	16×300 M16	18		9	0.3		
	Anchor bar	SD295A	D	16×400	18		11	0.4		
	Lintel guide									
	Rail	SS400	[	150×75×6.5×2300	1		43	1.4		
	Seal Plate	SUS304	t	10×250×2300	1		27			0.3
	Cover Plate	SS400	PL	9×450×2300	1		73	2.1		
	Rib	SS400	PL	9×100×150	5		5	0.2		
	Rib	SS400	PL	9×50×100	5		2	0.1		
	Installation beam	SS400	L	75×75×9×200	5		10	0.3		
	Installation beam	SS400	RB	16×200 M16	10		3	0.1		
	Anchor bar	SD295A	D	16×400	10		6	0.2		
	Side guide(Main rail)									
	Rail	SS400	[	200×90×8×1750	2		106	2.7		
	Bearing Plate	SUS304	t	10(30)×200×1750	2		13			0.2
	Cover Plate	SS400	PL	9×450×1750	2		111	3.2		
	Rib	SS400	PL	9×75×170	4		4	0.1		
	Rib	SS400	PL	9×75×150	4		3	0.1		
	Installation beam	SS400	L	75×75×9×250	8		20	6.0		
	Installation beam	SS400	RB	16×300 M16	16		8	0.2		
	Anchor bar	SD295A	D	16×400	16		10	0.3		
	Side guide(Sub rail)									
	Rail	SS400	H	125×125×6.5/9×63284	2		2,987	94.9		
	Bearing Plate	SUS304	t	10(30)×100×63284	2		1304			16.4
	Cover Plate	SS400	PL	9×450×63284	2		4,024	113.9		
	Rib	SS400	PL	9×50×84	128		38	1.0		
	Rib	SS400	PL	9×84×250	128		190	5.4		
	Joint Plate	SS400	PL	9×100×300	40		85	2.4		
	Bearing Plate	SS400	L	75×75×9×250	128		319	9.6		0.2
	Rib	SS400	RB	16×300 M16	256		121	3.9		

EMERGENCY GATE(Gate guide) (2/2)

No.	Item	Material	Dimensions(mm) Shape	× Length	Quantity	Weight(kg) Unit	W	Painting Area(m²) Painting I.S.	Painting O.S.	Acid
	Anchor bar	SD295A	D	16×400	256		160	5.1		
	Inspection stand									
	Rail	SS400	H	125×125×6.5/9×3500	2		165		5.3	
	Post	SS400	H	150×150×7/10×850	6		159		4.6	
	Post	SS400	H	150×150×7/10×600	6		112		3.2	
	Joint	SS400	H	125×125×6.5/9×1300	4		123		3.9	
	Joint	SS400	H	125×125×6.5/9×900	2		42		1.4	
	Joint	SS400	H	125×125×6.5/9×975	4		92		2.9	
	Sub beam	SS400	L	75×75×9×1100	6		66		2.0	
	Gusset Plate	SS400	PL	9×200×200	12		34		1.0	
	Bearing Plate	SUS304	t	10(30)×100×3500	2		72			0.9
	Stopper	SS400	PL	12×100×100	2		2		0.0	
	Stopper	SS400	PL	12×100×200	4		8		0.2	
	Rib	SS400	PL	9×59.3×107	24		11		0.3	
	Rib	SS400	PL	9×72×130	24		16		0.4	
	Anchor pad	SS400	PL	16×250×250	12		94	0.7	0.7	
	Stiffener	SS400	FB	65×9×230	12		13	0.4		
	Stiffener	SS400	FB	65×9×230	24		19	0.6		
	Anchor	SD295A	D	16×300	48		22	0.7		
	Liner	SS400	PL	12×100×130	24		29		0.6	
	Liner	SS400	PL	12×100×100	12		11		0.2	
				Sub Total			10902	258.4	26.7	18.7
	Bolt	SS400		M16×70 N	32	0.174	6			
				Sub Total			6			
				Gate guide Total			10908	258.4	26.7	18.7

EMERGENCY GATE(Hoist)

(1/5)

No.	Item	Material	Dimensions(mm)		Quantity	Weight(kg)		Painting Area(m²)		
				Shape × Length		Unit	W	Painting		Acid
								I.S.	O.S.	
	Drum			P.C.D860×600						
	Shell	SM400C	t	30×600×2608	2		737		3.1	
	Side plate	SM400A	PL	28×(φ1100−φ950)	2		224		2.0	
	Shaft End-Plate	SM400A	PL	28×(φ1000−φ330)	2		308		2.8	
	Rib	SM400A	PL	28×(100×300)	12		55		0.5	
	Fastening plate	SS400	t	10×150×150	12		21		0.4	
	Boss	S25C	RB	(φ330−φ220)×250	2		187		0.7	
	Rope stopper	S25C	t	35×80×85	2		3		-	
	Bush	CAC603	RB	(φ220−φ190)×250	2		43		-	
	Dram gear			(M=16, Z=98, B=160)						
	Rim	SCM435	RB	(φ1600−φ1492)×160	2		570		2.4	
	Web	SCW410	t	28×(φ1472−φ330)	2		772		6.7	
	Rib	SCW410	t	28×100×571	12		134		2.5	
	Fastening plate	SCW410	t	16×180×200	12		54		0.7	
	Boss	SCW410	RB	(φ330−φ220)×250	2		187		0.7	
	Bush	CAC603	RB	(φ220−φ190)×250	2		43		-	
	Pinion gear	SCM440		(M=16, Z=21, B=130)	2		207		0.3	
	Drum shaft	S45C-N	RB	φ190×1100	2		490		1.3	
	Key Plate	SS400	PL	16×60×250	8		15		0.2	
	Pinion pin	S45C-N	RB	φ80×500	2		39		0.3	
	Bearing(2 pieces)	SC450	RB	φ70×100	4		114		0.4	
	Bush	CAC603	RB	(φ80−φ70)×100	4		7		-	

EMERGENCY GATE(Hoist)

(2/5)

No,	Item	Material	Dimensions(mm) Shape	× Length	Quantity	Weight(kg) Unit	W	Painting Area(m^2) Painting I.S.	Painting O.S.	Acid
	Drum bracket	SS400	PL	16×(750×1000)	4		318		5.1	
	Drum bracket	SS400	t	16(PL19)×200×1050	4		106		1.7	
	Drum bracket	SS400	t	16(PL19)×200×1100	4		111		1.8	
	Drum bracket	SS400	PL	12×180×750	8		102		2.2	
	Drum bracket	SS400	PL	12×100×600	4		23		0.5	
	Drum bracket	SS400	PL	12×180×800	8		109		2.3	
	Drum bracket	SS400	PL	14×400×400	4		70		1.3	
	Drum bracket	SS400	t	14(PL19)×(400×400)	4		53		0.2	
	Drum bracket	SS400	PL	12×96×374	8		27		0.6	
	Bearing Stand	SS400	t	16(PL19)×150×410	2		30		0.5	
	Bearing Stand	SS400	PL	12×104×400	2		16		0.3	
	Bearing Stand	SS400	PL	12×120×104	8		9		0.2	
	Brake Stand	SS400	t	10(PL12)×85×430	2		6		0.1	
	Brake Stand	SS400	PL	12×350×450	1		15		0.3	
	Brake Stand	SS400	PL	12×98×450	2		8		0.2	
	Brake Stand	SS400	PL	12×98×400	2		7		0.2	
	Brake Stand	SS400	PL	12×90×173	4		6		0.1	
	Motor Stand	SS400	t	10×80×170	2		2		-	
	Motor Stand	SS400	PL	12×200×200	1		4		0.1	
	Motor Stand	SS400	PL	12×108×450	2		9		0.2	
	Motor Stand	SS400	PL	12×108×410	2		8		0.2	
	Position indicate stand	SS400	PL	12×400×400	1		15		0.3	
	Position indicate stand	SS400	L	65×65×6×150	2		2		0.1	
	Limit indicate stand	SS400	L	65×65×6×400	2		5		0.2	
	Limit indicate stand	SS400	L	65×65×6×200	2		2		0.1	
	Emergency opening device									
	Rod	SUS304	RB	φ25×1300	1		5			0.1
	Thrust	SUS304	RB	φ50×200	1		3			0.1
	Guide	SUS304	PL	30×(φ80−φ27)	2		2			0.1
	Guide	SUS304TPA	Pipe	80A(Sch40)×400	1		6			0.2
	Bracket	SS400	PL	12×180×250	1		4		0.1	
	Bracket	SS400	PL	6×80×250	1		1		-	
	Bracket	SS400	PL	6×50×220	1		1		-	

EMERGENCY GATE(Hoist) (3/5)

No.	Item	Material	Dimensions(mm) Shape	× Length	Quantity	Weight(kg) Unit	W	Painting Area(m²) Painting I.S.	O.S.	Acid
	Operating stand	SS400	PL	12×220×240	1		5		0.1	
	Operating stand	SS400	PL	12×220×240	1		5		0.1	
	Operating stand	SS400	H	200×200×8/12×680	1		34		0.8	
	Operating stand	SS400	PL	9×85×300	2		4		0.1	
	Gear cover	SS400	PL	2.3×2.5㎡	2		90		10.0	
	Gear cover	SS400	L	50×50×6×400	16		28		0.8	
	Chain cover	SS400	PL	2.3×0.4㎡	2		20		1.6	
	Chain cover	SS400	L	50×50×6×200	4		4		0.1	
	Oil catch	SS400	PL	2.3×2.5㎡	2		90		10.0	
	Oil catch	SS400	L	50×50×6×1600	4		28		1.3	
	Oil catch	SS400	L	50×50×6×850	4		15		0.7	
	Hanger	SS400	PL	22×300×380	16		315		3.6	
	Flame									
	Main girder	SS400	H	400×200×8/13×3600	2		471		11.5	
	Main girder	SS400	H	400×200×8/13×2100	4		549		13.4	
	Sub beam	SS400	[	250×90×9/13×2100	2		145		3.6	
	Sub beam	SS400	[	250×90×9/13×200	5		35		0.9	
	Sub beam	SS400	[	250×90×9/13×1000	2		69		1.7	
	Rib	SS400	PL	PL12×96×374	12		41		0.9	
	Rib	SS400	PL	PL9×80×224	8		10		0.3	
	Anchor	SS400	PL	16×200×200	12		60	1.0		
	Anchor	SD295A	D	16×150	48		11	0.4		
	Liner	SS400	t	100×100×200	12		188	1.0		
				Sub Total			7512	2.4	105.4	0.5

EMERGENCY GATE(Hoist)

(1/5)

No.	Item	Material	Dimensions(mm) Shape × Length	Quantity	Weight(kg) Unit	Weight(kg) W	Painting Area(m²) Painting I.S.	Painting Area(m²) Painting O.S.	Painting Area(m²) Acid
	Motor		0.75kw, 6P, 50Hz	1		39			
	Helical speed reducer		QBG-440 i=1/500	1		380			
	Limit Switch Box		MD233	1		30			
	Gate Position indicator		STX110-S1-D	1		50			
			Sub Total			499			
	Brake		BMS4-1316UPS	1		109			
	Chain coupling		CR-5016-J	2		7			
	Gear coupling		HS-SSA-90 ℓ=400	2		73			
	Limit switch		Direct moving type	1		10			
	Limit switch		Roller hand type	3		3			
	Chain sprocket		RS40 T=60	2		6			
	Chain sprocket		RS40 T=18	2		1			
	Roller chain		RS40 160 rink	1		1			
	Roller chain		RS40 100 rink	1		1			
	Wire Rope	JIS(6×37)	φ16×140m G type	2		258			
	Rope sket		for φ16	2		7			
	Pin		for φ16	2		3			
	Tool box			1式		25			
	Name plate(Operation)	White acryle	t=5.0 mm	1		-			
	Name plate	C2801P		1		-			
	Inbricating Oil			1式		330			
	Head pump		MP-113 3ℓ	2		30			
	Distributing Valve		VS32	2		3			
	Distributing Valve		VS33	4		8			
	Distributing Valve		VS34	2		5			
	Y Type strainer		3/8	4		4			
	Oil pack		SGP-104	1		12			
	Lubricating parts		High pressur screwed union 3/8	34		6			
			High pressur screwed tee 3/8	4		1			
			High pressur screwed elbow 3/8	18		3			
			High pressur screwed elbow 3/8	5		1			

EMERGENCY GATE (Hoist) (5/5)

No,	Item	Material	Dimensions (mm) Shape × Length	Quantity	Weight (kg) Unit	Weight (kg) W	Painting Area (m^2) Painting I.S.	Painting Area (m^2) Painting O.S.	Painting Area (m^2) Acid
	Lubricatring parts		High pressure plug 3/8	10		-			
			High pressure nipple 3/8	24		1			
			High pressure nipple 3/8	10		2			
		SUS304	Pipe joint φ10×1/4	24		1			
		SUS304	Pipe union φ10	16		-			
		SUS304	Pipe ilbow φ10×1/4	19		1			
			Tube clump φ10×1	66		1			
			Tube clump φ10×2	35		1			
			Tube clump φ10×3	12		-			
			Tube clump 3/8×2P	12		1			
		4T	+ screw bolt M6×10	125		1			
			+ screw bolt M8×30	12		-			
			1/4B×500			1			
	Bolt, Nut								
	Reamer bolt	S45C	φ25×120 with N, SW付	12		7			
	Bolt	SS400	M20×120 with N, SW付	12		5			
	Bolt	SS400	M16×100 with N, SW付	16		4			
	Bolt	SS400	M20×35 with N, SW付	16		3			
	Bolt	SS400	M30×120 with N, SW付	16		19			
	Knock pin	S45C	φ20×90 with N, SW付	8		2			
	Bolt	SS400	M20×120 with N, SW付	6		3			
	Knock pin	S45C	φ20×90 with N, SW付	4		2			
	Bolt	SS400	M10×60 with N, SW付	4					
	Bolt	SS400	M10×60 with N, SW付	4					
	Bolt	SS400	M12×45 with N, SW付	4		5			
	Bolt	SS400	M12×60 with N, SW付	4					
	Bolt	SS400	M10×60 with N, SW付	4					
	Bolt	SS400	M12×60 with N, SW付	24					
	Bolt	SS400	M24×150 N2	24		20			
			Sub Total			987			
			Hoist Total			8998	2.4	105.4	0.5

TRASH RACK (Emergency Gate) (1/3)

No,	Item	Material	Dimensions (mm) Shape	× Length	Quantity	Weight (kg) Unit	W	Painting Area (m²) Painting I.S	O.S.	Acid
	EMERGENCY GATE Trash rack									
	Trash rack bar	SS400	FB	90×9×1900	40	12.1	483		13.7	
	Trash rack bar	SS400	FB	90×9×500	28	3.2	89		2.5	
	Binding bolt	SS400	RB	φ22×1500	18	4.5	81		1.9	
	Binding bolt	SS400	RB	φ22×650	12	1.9	23		0.5	
	Distance piece	SGP	Pipe	20A×91	312	0.15	48		4.9	
	Trash rack guide	SS400	L	75×75×9×1500	8	14.9	120		3.6	
	Trash rack guide	SS400	L	75×75×9×550	4	5.5	22		0.7	
	Hook Bolt	SS400	RB	16×180 M16	24	0.3	7		0.2	
	Support beam	SS400	H	200×200×8/12×3300	2	164.7	329		7.9	
	Support beam	SS400	H	200×200×8/12×600	4	29.9	120		2.9	
	Post	SS400	H	200×200×8/12×2500	3	124.8	374		9	
	Rib	SS400	PL	12×96×176	22	1.6	35		0.7	
	Bearing plate	SUS304	PL	10×100×1800	2	14.3	29			0.4
	Seat plate	SS400	PL	12×250×450	3	10.6	32		0.7	
	Liner	SS400	t	10×250×450	3	8.8	26		0.7	
	Installation beam	SS400	L	75×75×9×150	8	1.5	12		0.4	
	Installation bolt	SS400	RB	16×300 M16	32	0.5	15		0.5	
	Anchor bar	SD295A	D	16×400	32	0.6	20		0.6	
				Sub Total			1865		51.4	0.4
	Nut	SS400		M16	112	0.034	4			
	Nut	SS400		M22	120	0.074	9			
	Bolt	SS400		M22×60 N, SW	24	0.296	7			
				Sub Total			20			
				EMERGENCY GATE Trash rack Total			1885		51.4	0.4

TRASH RACK (Trash rack) (2/3)

No,	Item	Material	Dimensions (mm) Shape	Dimensions (mm) × Length	Quantity	Weight (kg) Unit	Weight (kg) W	Painting Area (m²) Painting I.S	Painting Area (m²) Painting O.S.	Painting Area (m²) Acid
	Trash Rack									
	Trash rack bar	SS400	FB	65×12×1470	456	9.0	4104		103.2	
	Trash rack bar	SS400	FB	65×12×863	19	5.28	100		2.5	
	Trash rack bar	SS400	FB	65×12×1817	19	11.13	211		5.3	
	Binding bolt	SS400	RB	φ22×1900	310	5.67	1758		40.7	
	Distance piece	SGP	Pipe	20A×88	5580	0.148	825		83.9	
	Trash rack guide	SS400	L	75×75×6×1900	26	13.0	338		14.8	
	Trash rack guide	SS400	FB	65×6×1900	26	5.8	151		6.4	
	Hook Bolt	SS400	RB	16×180 M16	208	0.3	59		1.9	
	Support beam	SS400	H	150×150×7/10×2600	27	81.9	2211		63.2	
	Rib	SS400	PL	9×71.5×130	108	0.66	71		2.0	
	Rib	SS400	PL	9×150×130	108	1.38	149		4.2	
	Installation beam	SS400	L	75×75×9×150	54	1.0	55		2.4	
	Installation bolt	SS400	RB	16×300 M16	108	0.47	51		1.6	
	Anchor bar	SD295A	D	16×400	108	0.62	67		2.2	
				Sub Total			10150		334.3	
	Bolt	SS400		M16×60 N	216	0.158	34			
	Nut	SS400		M16	216	0.034	7			
				Sub Total			41			
				Trash rack Total			10191		334.3	

TRASH RACK(Inspection room Trash rack) (3/3)

No,	Item	Material	Dimensions(mm) Shape	× Length	Quantity	Weight(kg) Unit	W	Painting Area(m²) Painting I.S	Painting O.S.	Acid
	Inspection room Trash Rack									
	Trash rack bar	SS400	FB	65×12×1470	168	9.0	1512		38.0	
	Binding bolt	SS400	RB	φ22×2100	48	6.3	301		7.0	
	Distance piece	SGP	Pipe	20A×88	960	0.14	142		14.4	
	Trash rack guide	SS400	L	75×75×6×2050	8	14.0	112		4.9	
	Trash rack guide	SS400	FB	65×6×2050	10	6.3	63		2.7	
	Hook bolt	SS400	RB	16×180 M16	64	0.28	18		0.6	
	Support beam	SS400	H	150×150×7/10×4600	5	144.9	725		20.7	
	Rib	SS400	PL	9×71.5×130	20	0.66	13		0.4	
	Rib	SS400	PL	9×150×130	20	1.38	28		0.8	
	Installation beam	SS400	L	75×75×9×200	10	1.99	20		0.6	
	Installation bolt	SS400	RB	16×300 M16	40	0.47	19		0.6	
	Anchor bar	SD295A	D	16×400	40	0.63	25		0.8	
				Sub Total			2978		91.5	
	Nut	SS400		M16	80	0.034	3			
				Sub Total			3			
				Inspection room Trash rack Total			2981		91.5	
				Trash rack Total(Steel Material)			14993		477.2	0.4
				Trash rack Total(Material Purchased)			64			

STEEL PENSTOCK(Trasition Pipe) (1/2)

No.	Item	Material	Dimensions(mm) Shape	× Length	Quantity	Weight(kg) Unit	W	Painting Area(m²) Painting I.S.	O.S.	Acid
	Transition Pipe	SM400A	PL	25×(□1400～φ1400)×1150	1	1148.4	1148	5.9	5.9	
	No.1 Ring girder Flange	SS400	PL	22×200×6413	1	221.5	222	2.6		
	No.1 Ring girder Web	SS400	PL	16×200×7425	1	186.5	187	3.6		
	No.2 Ring girder Flange	SS400	PL	22×200×5184	1	199.8	200	2.3		
	No.2 Ring girder Web	SS400	PL	16×200×6796	1	170.7	171	2.7		
	Bend Pipe	SM400A	PL	9×φ1400×2471	1	772.8	773	10.9	10.9	
	Stiffener	SS400	PL	9×(φ1618－φ1418)	2	33.69	67	1.9		
	Straight Pipe	SM400A	PL	9×φ1400×14000	1	4378.3	4378	62.0	62.0	
	Stiffener	SS400	PL	9×(φ1618－φ1418)	10	33.69	337	9.5		
	Bend Pipe	SM400A	PL	9×φ1400×70686	1	22,105.8	22,106	312.9	312.9	
	Stiffener	SS400	PL	9×(φ1618－φ1418)	50	33.69	1685	47.7		
	Straight Pipe	SM400A	PL	9×φ1400×115000	1	35964.2	35964	509	509	
	Stiffener	SS400	PL	9×(φ1618－φ1418)	76	33.69	2,561	72.5		
	Straight Pipe	SM400A	PL	9×φ1400×71505	1	22393.2	22393	317	317	
	Stiffener	SS400	PL	9×(φ1618－φ1418)	48	33.69	1618	45.8		
	Bend Pipe	SM400A	PL	9×φ1400×35343	1	11052.9	11053	156.4	156.4	
	Stiffener	SS400	PL	9×(φ1618－φ1418)	26	33.69	876	24.8		
	Bend Pipe	SM400A	PL	9×φ1400×86986	1	27203.4	27203	385	385.0	
	Stiffener	SS400	PL	9×(φ1618－φ1418)	58	33.69	1,954	55.3		
	Bend Pipe	SM400A	PL	9×φ1400×7891	1	2,468	2,468	34.9	34.9	
	Stiffener	SS400	PL	9×(φ1618－φ1418)	6	33.69	202	5.7		
	Straight Pipe	SM400A	PL	9×φ650×1207	1	176.5	177	2.5	2.5	
	Straight Pipe	SM400A	PL	9×φ650×3917	1	572.9	573	8.1	8.1	
	Straight Pipe	SM400A	PL	9×φ650×6600	1	965.4	965	13.7	13.7	
	Bend Pipe	SM400A	PL	9×φ650×1046	1	152.9	153	2.2	2.2	
	Bend Pipe	SM400A	PL	9×φ650×3063	1	448.0	448	6.3	6.3	
	Reinforcement	SM400A	PL	12×(φ1000－φ650)	1	42.7	43	0.5		
	Stiffener	SS400	PL	9×(φ868－φ668)	12	17.0	204	5.8		
	Straight Pipe	SM400A	PL	6×φ300×200	1	9.1	9	0.2	0.2	
	Reducer pipe	SM400A	PL	6×(φ300～φ250)×250	1	10.2	10	0.2	0.2	
	Straight Pipe	SM400A	PL	6×φ250×182	1	6.9	7	0.1	0.1	
	Straight Pipe	SM400A	PL	6×φ250×972	1	35.1	35	0.7	0.7	
	Straight Pipe	SM400A	PL	6×φ250×6150	1	233.0	223	4.9	4.9	

STEEL PENSTOCK (Trasition Pipe)

(2/2)

No,	Item	Material	Dimensions (mm) Shape × Length		Quantity	Weight (kg) Unit	Weight (kg) W	Painting Area (m^2) Painting I.S.	Painting Area (m^2) Painting O.S.	Painting Area (m^2) Acid
	Bend Pipe	SM400A	PL	6×φ250×216	1	8.2	8	0.2	0.2	
	Bend Pipe	SM400A	PL	6×φ250×785	1	29.7	30	0.6	0.6	
	Reinforcement	SM400A	PL	9×(φ500−φ250)	1	10.4	10	0.3		
	Stiffener	SS400	PL	6×(φ412−φ262)	6	3.7	22	1.0		
				Sub Total			140,483	2115.7	1833.7	