

Building Works for AFL Sub-Station



Shanghai Pudong International Airport Project (Airfield Lighting System)
Main AFL Substation (Building Works)

No.	Description of Works	Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China RMB
				Rate	Amount	Rate	Amount	
Foundation Works								
1	R.C. Girder Strap Foundation (C20,h<1.5m)	M ³	205.2800					
2	R.C. Foundation (C20 h<1.5m)	M ³	3.2400					
Column and Beam Works								
3	R.C. Columns (Perimeter=2.5m,C20)	M ³	2.2500					
4	R.C. Beams (C20)	M ³	56.9500					
5	Aseismic Tie Columns (C30)	M ³	35.2500					
6	R.C. Columns (h>3.6m,Per-3m-Increment)	M ³	2.2500					
7	Beams (Height of Story >3.6m,Per-3m-Increment)	M ³	56.9500					
Wall Works								
8	Standard Brick External Wall (1 Brick)	M ²	1,715.9000					
9	Standard Brick Internal Wall (1 Brick)	M ²	2,008.8000					
10	External Double-Pole Scaffolding (h<20m)	M ²	2,420.3000					
11	Full Scaffolding (3.61m<h<5.8m)	M ²	2,117.2000					
Floor, Ground and Roof Works								
12	Land Grading	M ²	2,117.5000					
13	Indoor Backfill	M ²	2,117.5000					
14	Bedding Mortar (Thickness=1cm)	M ²	2,075.0400					
15	Bedding Concrete (C15,Thickness=1cm)	M ²	313.0200					
16	Cement Mortar Bonding Tile Course	M ²	2,412.7200					
17	Asphalt Damp-Proof Course on Ground (2Felt 3Pth)	M ²	25.2000					

Shanghai Pudong International Airport Project (Airfield Lighting System)
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No.	Description of Works	Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China RMB
				Rate	Amount	Rate	Amount	
18	Fine Ballast Concrete Screenshot (Thickness=3cm)	M ²	7.4000					
19	Bedding Concrete (C10, Thickness=1cm)	M ²	24.0100					
20	Cement Mortar Screenshot (Thickness=2cm)	M ²	2,284.3400					
21	Bedding Mortar (Thickness=1cm)	M ²	337.6800					
22	Cement Mortar Screenshot (Per-0.5-Thickness)	M ²	337.6800					
23	Asphalt Damp-Proof Course on Ground (2Felt 3Pith)	M ²	52.2000					
24	Cement Mortar Coat Polishing and Solidifying (Thickness=2cm)	M ²	1,866.4200					
25	Paper-Faced Gypsum Ceiling without Person	M ²	792.9000					
26	Glass Cloth Damp-Proof Course on Ground (2Cloth 3Pitch)	M ²	232.2400					
27	Asphalt Water-Proof Roof (2Felt 3Pith)	M ²	232.2400					
28	Cast-in-Place R.C. Beam and Slab	M ²	2.39.76					
29	Monolithic R.C. Steps (C20)	M ²	46.8000					
30	Steel Railing with Wooden Rail	M	23.1000					
31	Concrete Apron (C15)	M ²	210.0000					
32	Concrete Ramp (C15)	M ²	24.0000					
33	Concrete Steps (C15)	M ²	30.2900					
34	Cast-in-Place R.C. Slab (Story Height > 3.6m, Per-3m-Increment)	M ²	2,039.7600					
35	Pedestal Supported Panel Conductive Flooring Door and Window Works	M ²	821.1600					
36	Silver Aluminum Alloy Doors	M ²	57.2400					

Shanghai Pudong International Airport Project (Airfield Lighting System)
Main AFL Substation (Building Works)

No.	Description of Works	Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China RMB
				Rate	Amount	Rate	Amount	
37	Plywood-Veneered Doors	M ²	99.7500					
38	Silver Aluminum Alloy Sliding Windows	M ²	105.8000					
	Finishing Works							
39	Nonglazed Tile 95*45	M ²	1,876.4900					
40	Painted Tile 150*150, Cement Mortar	M ²	332.5600					
41	Multi-color Coating of Wall and Columns	M ²	3,426.9900					
42	Multi-color Plaster Ceiling Slab	M ²	1,307.1000					
	Acid-resistant, Preservation and Heat Reserving Works							
43	Cast-in-Place Perlite Cement	M ³	100.4500					
	Earth Works							
44	Caterpillar Excavator	Machine-Team	1.0000					
45	Earth Moving	M ³	30.0000					

Shanghai Pudong International Airport Project (Airfield Lighting System)
Main AFL Substation Garage (Building Works)

No.	Description of Works	Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China RMB
				Rate	Amount	Rate	Amount	
Foundation Works								
1	Brick Foundation	M ³	16.4900					
2	R.C. Girder Strap Foundation (C20, h<1.5m)	M ³	21.5100					
Column and Beam Works								
3	R.C. Beams (C30)	M ³	1.5600					
4	Aseismatic Tie Columns (C20)	M ³	1.6200					
5	R.C. Beams (Height of Story >3.6m, Per-3m-Increment)	M ³	1.5600					
Wall Works								
6	Standard Brick External Wall (1 Brick)	M ²	182.52					
7	Standard Brick Internal Wall (1 Brick)	M ²	94.7700					
8	Iron Sheet Rainwater Pipe (Developed Width= 45cm)	Linear-Meter	8.5000					
9	Parapet Downspout Elbow (D100)	Set	2.0000					
10	External Scaffolding (h<12m)	M ²	255.9600					
11	Internal Scaffolding (h>3.6m)	M ²	94.7700					
12	Full Scaffolding (3.61m<h<5.8m)	M ²	126.3600					
Floor, Ground and Roof Works								
13	Land Grading	M ²	132.1100					
14	Indoor Backfill	M ²	132.1100					
15	Bedding Concrete (C15, Thickness=1cm)	M ²	132.1100					
16	Asphalt Damp-Proof Course on Ground (2Felt 3Pith)	M ²	132.1100					

Shanghai Pudong International Airport Project (Airfield Lighting System)
Main AFL Substation Garage (Building Works)

No.	Description of Works	Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China RMB
				Rate	Amount	Rate	Amount	
17	Glass Cloth Damp-Proof Course on Ground (2Cloth 3Pitch)	M ²	126.3600					
18	Cast-in-Place R.C. Slab (Story Height > 3.6m, Per-3m-Increment)	M ²	126.3600					
19	Concrete Apron (C15)	M ²	29.4800					
20	Concrete Ramp (C15)	M ²	56.1600					
21	Multi-color Plaster Ceiling Slab	M ²	132.1100					
22	Fine Ballast Concrete Coating (Per-1cm-Thickness)	M ²	132.1100					
23	Cement Mortar Screed (Thickness=2cm)	M ²	396.3300					
24	Asphalt Water-Proof Roof (2Felt 3Pith)	M ²	132.1100					
25	R.C. Weather Shed and Sunshading Board	M ²	12.6000					
	Door and Window Works							
26	Silver Aluminum Alloy Sliding Windows	M ²	5.4000					
27	Precast Terrazzo Windows Boards	M ²	1.8400					
28	Silver Aluminum Alloy Rolling Doors	M ²	39.6000					
	Finishing Works							
29	Multi-color Coating of Wall and Columns	M ²	185.4000					
30	Nonglazed Tile 95*45	M ²	210.9600					
	Acid-resistant, Preservation and Heat Reserving Works							
31	Cast-in-Place Perlite Cement	M ³	5.9400					
	Earth Works							
32	Caterpillar Excavator	Machine-Team	1.0000					
33	Earth Moving	M ³	87.0000					

Shanghai Pudong International Airport Project (Airfield Lighting System)
Main AFL Substation (Paving)

No.	Description of Works	Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China RMB
				Rate	Amount	Rate	Amount	
1	Road							
1	1 C30 Cement Concrete 22cm	100 SQ.M.	14.42					
1	2 2cm Fine Stone Levelling	100 SQ.M.	15.9					
1	3 15cm Second Coat Crushed Stone	100 SQ.M.	15.9					
1	4 15cm Second Coat Crushed Stone	100 SQ.M.	15.9					
2	Greenery Patches	100 SQ.M.	20					
3	Fence Wall	100 SQ.M.	7					
4	Gate	SQ.M.	14					

Shanghai Pudong International Airport Project (Airfield Lighting System)
Main AFL Substation (Water Supply and Sewage)

No.	Description of Works		Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China RMB
					Rate	Amount	Rate	Amount	
	Item								
1	Fire Hydrant	SG28/65-6	set	4					
2	Full-Automatic Electrical Boiling Water Heater	N<10 kWatt.	set	2					
3	Full-Automatic Electrical Water Heater	N<3 kWatt.	set	4					
4	Gate Valve	DN80	p.c.	1					
5	Globe	DN15	p.c.	9					
6	Globe	DN20	p.c.	2					
7	Globe	DN25	p.c.	2					
8	Water Tap	DN15	p.c.	6					
9	Shower	DN15	set	4					
10	Urinal		set	2					
11	Closet		set	4					
12	Basin		set	4					
13	Galvanized Steel Pipe	DN15	m	55					
14	Galvanized Steel Pipe	DN20	m	9					
15	Galvanized Steel Pipe	DN25	m	7					
16	Galvanized Steel Pipe	DN32	m	5					
17	Galvanized Steel Pipe	DN40	m	2					
18	Galvanized Steel Pipe	DN50	m	7					
19	Galvanized Steel Pipe	DN65	m	14					
20	Galvanized Steel Pipe	DN80	m	40					
21	Cast Iron Drainage Pipe	DN50	m	48					
22	Cast Iron Drainage Pipe	DN75	m	6					
23	Cast Iron Drainage Pipe	DN100	m	24					
24	Round cast-iron Floor Drain	DN50	p.c.	5					

Shanghai Pudong International Airport Project (Airfield Lighting System)
Main AFL Substation (Water Supply and Sewage)

No.	Description of Works		Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China RMB
	Item				Rate	Amount	Rate	Amount	
25	Cleanout	DN50	p.c.	2					
26	Cleanout	DN75	p.c.	1					
27	Cleanout	DN100	p.c.	3					
28	Cast-iron Vent Cowl	DN100	p.c.	1					
29	Checkhole	DN50	p.c.	1					
30	Checkhole	DN100	p.c.	2					
31	Portable Phosphate Power Extinguisher	MF4	p.c.	30					
	Carbon Dioxide Extinguishing System								
32	Gas Cylinder	70 Liter	p.c.	20					
33	Valve of Cylinder Head	DN12	p.c.	20					
34	Actuating Cylinder	4 Liter	p.c.	3					
35	Gas Discharge Indicator		p.c.	20					
36	Safety Valve	0.4 MPa	p.c.	1					
37	Safety Valve	1.5 MPa	p.c.	1					
38	Pressure Switch		p.c.	3					
39	Pressure Switch		p.c.	1					
40	Selecting Valve	DN65	p.c.	1					
41	Selecting Valve	DN50	p.c.	1					
42	Selecting Valve	DN32	p.c.	1					
43	Check Valve	DN12	p.c.	20					
44	Check Valve	DN6	p.c.	2					
45	Metal Hose	DN12	p.c.	20					
46	Nozzle	4Q10	p.c.	12					
47	Nozzle	4Q11	p.c.	8					

Shanghai Pudong International Airport Project (Airfield Lighting System)
 Main AFL Substation (Water Supply and Sewage)

No.	Description of Works		Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China RMB
	Item				Rote	Amount	Rote	Amount	
48	Precise Seamless Steel Pipe	25	m	21					
49	Precise Seamless Steel Pipe	32	m	53					
50	Precise Seamless Steel Pipe	40	m	19					
51	Precise Seamless Steel Pipe	50	m	22					
52	Precise Seamless Steel Pipe	65	m	14					

Shanghai Pudong International Airport Project (Airfield Lighting System)
Main AFL Sub-Station (Ac & Exhaust)

Item No.	Description Of Works		Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China RMB
	Facilities	Specifications			Rate	Amount	Rate	Amount	
1	Vrv Air-Conditioner Outdoor Rszy10k	QL=28kW QH=31.5kW N=7.62kW U=380V		5					
	Indoor Fxyc63kv	QL=7.1kW QH=8.0kW N=30W U=220V		9					
	Indoor Fxyc50kv	QL=5.6kW QH=6.3kW N=20W U=220V		6					
	Indoor Fxyc40kv	QL=4.5kW QH=5.0kW N=20W U=220V		2					
	Indoor Fxyc32kv	QL=3.6kW QH=4kW N=15W U=220V		6					
	Indoor Fxyc25kv	QL=2.8kW QH=3.2kW N=15W U=220V		2					
	Indoor Fxyc20kv	QL=2.2kW		5					

Shanghai Pudong International Airport Project (Airfield Lighting System)
Main AFL Sub-Station (Ac & Exhaust)

Item No.	Description Of Works Facilities	Specifications	Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China RMB
					Rate	Amount	Rate	Amount	
2	Low-Noise Axial Fan	QH=2.5kW		3					
		N=10W							
		U=220V							
3	Fiber Glass Explosion-Proof Axial Fan	DZ-11 4B#		1					
		L=4000m ³ /h							
		N=0.25kW U=380V							
		BFT35-11 4#							
		L=2500m ³ /h							
		N=0.25kW							
		U=380V							

Shanghai Pudong International Airport Project (Airfield Lighting System)
Main AFL Substation (Electricity)

No.	Description of Works		Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China RMB
					Rate	Amount	Rate	Amount	
	Item								
1	Fluorescent	2X40W	set	25					
2	Overhead Fluorescent	2X40W	set	79					
3	Emergency Fluorescent	2X40W	set	3					
4	Emergency Light	1X40W	set	2					
5	Hanging-up Industrial Lamp	1X100W	set	32					
6	Overhead Light	1X60W	set	3					
7	Multi-Lamp	4X40W	set	4					
8	Explosion-Proof Light	1X100W	set	4					
9	Wall-fitting	2X60W	set	9					
10	Single Phase Socket	250V,10A	each	95					
11	Three Pole Switch	250V,6A	each	8					
12	Blast Two Pole Switch	250V,6A	each	2					
13	Two Pole Switch	250V,6A	each	41					
14	One Pole Switch	250V,6A	each	43					
15	Galvanized Steel Pipe	G20	m	1750					
16	Cable Line	BV-500V,4mm ²	m	2100					
17	Cable Line	BV-500V,2.5mm ²	m	3000					
18	Smoke Detector		each	60					
19	Temperature Detector		each	7					
20	Alarm Displayer		set	3					
21	Galvanized L-bar	50X50X5	m	85					
22	Galvanized Flat bar	40X4	m	240					
23	Galvanized Flat bar	25X4	m	180					
24	Galvanized Round bar	D8	m	380					
25	Galvanized Round bar	D12	m	60					

Shanghai Pudong International Airport Project (Airfield Lighting System)
 Main AFL Substation Garage (Electricity)

No.	Description of Works		Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China RMB
					Rate	Amount	Rate	Amount	
1	Distribution Box	25A	set	1					
2	Hang-up Industrial Lamp	1X100W	set	8					
3	Three Phase Socket	380V,10A	set	1					
4	Single Phase Socket	250V,10A	p.c.	1					
5	Two Pole Switch	250V,6A	set	4					
6	Galvanized Steel Pipe	G20	m	70					
7	Cable Line	BV-500V,4mm ²	m	40					
8	Cable Line	BV-500V,2.5mm ²	m	140					

Shanghai Pudong International Airport Project (Airfield Lighting System)
Secondary AFL Substation (Building Works)

No.	Description of Works	Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China RMB
				Rate	Amount	Rate	Amount	
Foundation Works								
1	Brick Foundation	M ³	76.0000					
2	R.C. Girder Strap Foundation (C20, h<1.5m)	M ³	90.2000					
Column and Beam Works								
3	R.C. Beams (C20)	M ³	17.9700					
4	Aseismatic Tie Columns (C20)	M ³	16.8300					
5	Beams, Height of Story > 3.6m	M ³	17.9700					
Wall Works								
6	Standard Brick External Wall (1 Brick)	M ²	535.6800					
7	Standard Brick Internal Wall (1 Brick)	M ²	597.2500					
8	Terrazzo Toilet Cubic	M ²	1.0000					
9	Iron Sheet Rainwater Pipe (Developed Width=45cm)	M ²	30.9000					
10	Parapet Downspout Elbow (D100)	M ²	6.0000					
11	External Scaffolding (h<12m)	M ²	651.6000					
12	Internal Scaffolding (h>3.6m)	M ²	619.2000					
13	Full Scaffolding (3.61m<h<5.8m)	M ²	699.2500					
Floor, Ground and Roof Works								
14	Land Grading	M ²	699.2500					
15	Indoor Backfill	M ²	699.2500					
16	Bedding Mortar (Thickness=1cm)	M ²	699.2500					
17	Bedding Concrete (C15, Thickness=1cm)	M ²	7.2000					

Shanghai Pudong International Airport Project (Airfield Lighting System)
Secondary AFL Substation (Building Works)

No.	Description of Works	Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China RMB
				Rate	Amount	Rate	Amount	
18	Cement Mortar Coat Polishing and Solidifying, Thickness=2cm	M ²	7.2000					
19	Glass Cloth Damp-Proof Course on Ground (2Cloth 3Pitch)	M ²	699.2500					
20	Concrete Apron (C15)	M ²	79.5700					
21	Concrete Ramp (C15)	M ²	47.5200					
22	Multi-color Plaster Ceiling Slab	M ²	692.0500					
23	Paper-Faced Gypsum Ceiling without Person	M ²	7.2000					
24	Cement Mortar Screed (Thickness=2cm)	M ²	716.5300					
25	Asphalt Water-Proof Roof (2Felt 3Pitch)	M ²	716.5300					
26	Concrete Steps (C20). Cement Mortar Coating	M ²	14.3100					
27	Fine Ballast Concrete Coating (Thickness=4cm)	M ²	692.0500					
28	R.C. Weather Shed and Sunshading Board	M ²	11.3400					
29	Cast-in-Place R.C. Slab, Story Height > 3.6m, Per-3m-Increment	M ²	699.2500					
	Door and Window Works							
30	Silver Aluminum Alloy Sliding Windows	M ²	16.2000					
31	Plywood-Veneered Doors	M ²	22.0500					
32	Precast Terrazzo Windows Boards	M ²	5.2500					
33	Silver Aluminum Alloy Casement Doors	M ²	34.5900					
	Finishing Works							
34	Painted Tile 150*150, Cement Mortar	M ²	49.9500					
35	Multi-color Coating of Wall and Columns	M ²	1,723.3200					

Shanghai Pudong International Airport Project (Airfield Lighting System)
 Secondary AFL Substation (Paving)

No.	Description of Works	Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China RMB
				Rate	Amount	Rate	Amount	
1	Road							
1 1	C30 Cement Concrete 22cm	100 Sq.M.	14.5000					
1 2	2cm Fine Stone Levelling	100 Sq.M.	15.9500					
1 3	15cm Second Coat Crushed Stone	100 Sq.M.	15.9500					
1 4	15cm Second Coat Crushed Stone	100 Sq.M.	15.9500					
2	Greenery Patches	100 Sq.M.	12.0000					

Shanghai Pudong International Airport Project (Airfield Lighting System)
Secondary AFL Substation (Water Supply and Sewage)

No.	Description of Works		Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China RMB
	Item				Rate	Amount	Rate	Amount	
1	Globe	DN20	p.c.	1					
2	Water Tap	DN15	p.c.	1					
3	Closet		set	1					
4	Galvanized Steel Pipe	DN15	m	8					
5	Galvanized Steel Pipe	DN20	m	4					
6	Cast Iron Drainage Pipe	DN50	m	4					
7	Cast Iron Drainage Pipe	DN100	m	24					
8	Round cast-iron Floor Drain	DN50	p.c.	1					
9	Portable Phosphate Power Extinguisher	MF4	p.c.	12					
	Carbon Dioxide Extinguishing System								
10	Gas Cylinder	70 Liter	p.c.	15					
11	Valve of Cylinder Head	DN12	p.c.	15					
12	Actuating Cylinder	4 Liter	p.c.	3					
13	Gas Discharge Indicator		p.c.	15					
14	Safety Valve	0.4 MPa	p.c.	1					
15	Safety Valve	15 MPa	p.c.	1					
16	Pressure Switch		p.c.	3					
18	Selecting Valve	DN65	p.c.	1					
19	Selecting Valve	DN50	p.c.	1					
20	Selecting Valve	DN32	p.c.	1					
21	Check Valve	DN12	p.c.	15					
22	Check Valve	DN6	p.c.	2					
23	Metal Hose	DN12	p.c.	15					
24	Nozzle	4Q10	p.c.	8					

Shanghai Pudong International Airport Project (Airfield Lighting System)
Secondary AFL Substation (Water Supply and Sewage)

No.	Description of Works		Unit	Quantity	Foreign Cost Component (Ycn)		Local Cost Component (China RMB)		Combined Total China RMB
	Item				Rate	Amount	Rate	Amount	
25	Nozzle	408	p.c.	6					
26	Precise Seamless Steel Pipe	25	m	9					
27	Precise Seamless Steel Pipe	32	m	40					
28	Precise Seamless Steel Pipe	40	m	4					
29	Precise Seamless Steel Pipe	50	m	6					
30	Precise Seamless Steel Pipe	65	m	12					

Shanghai Pudong International Airport Project (Airfield Lighting System)
 Secondary Substation (Ac & Exhaust)

Item No.	Description Of Works		Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China RMB
	Facilities	Specifications			Rate	Amount	Rate	Amount	
1	Cabinet Air-Conditioner Outdoor Ry125fy1 Indoor Fvy125fv1	QL=13kW QH=14.2kW N=4kW U=380V	Set	2					
2	Split Wall-Type Air-Conditioner Outdoor Ry453vic Indoor Fty453bvic	QL=4.85kW QH=5.50kW N=1.93kW U=220V	Set	3					
3	Fiber Glass Explosion- Proof Axial Fan	BFT35-11 4# L=2500M3/H N=0.25kW U=380V	Set	1					
4	Low-Noise Axial Fan	DZ-11 4B# L=4000M3/H N=0.25kW U=380V	Set	3					

Shanghai Pudong International Airport Project (Airfield Lighting System)
Secondary AFL Substation (Electricity)

No.	Description of Works		Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China RMB
					Rate	Amount	Rate	Amount	
	Item								
1	Fluorescent	2X40W	set	15					
2	Overhead Fluorescent	2X40W	set	15					
3	Emergency Fluorescent	2X40W	set						
4	Emergency Light	1X40W	set						
5	Hanging-up Industrial Lamp	1X100W	set	12					
6	Overhead Light	1X60W	set						
7	Multi-Lamp	4X40W	set						
8	Explosion-Proof Light	1X100W	set	2					
9	Wall-fitting	2X60W	set	9					
10	Single Phase Socket	250V,10A	each	10					
11	Three Pole Switch	250V,6A	each	6					
12	Blast Two Pole Switch	250V,6A	each						
13	Two Pole Switch	250V,6A	each	10					
14	One Pole Switch	250V,6A	each	12					
15	Galvanized Steel Pipe	G20	m	680					
16	Cable Line	BV-500V,2.5mm ²	m	1300					
17	Smoke Detector		each	18					
18	Temperature Detector		each	5					
19	Alarm Displayer		set	3					
20	Obstacle Light	100W	set	3					
21	Galvanized L-bar	50X50X5	m	65					
22	Galvanized Flat bar	40X4	m	190					
23	Galvanized Flat bar	25X4	m	120					
24	Galvanized Round bar	D8	m	220					
25	Galvanized Round bar	D12	m	20					



GRAND SUMMARY



Shanghai Pudong International Airport Project (Building Works for AFL Sub Station)

Item No.	Description of Works	Unit	Quantity	Foreign Cost Component (Yen)		Local Cost Component (China RMB)		Combined Total China RMB
				Rate	Amount	Rate	Amount	
1	Grand Summary							
2	Main AFL Sub Station	L.S	1					
A	Secondary AFL Sub Station	L.S	1					
	Subtotal of Bills (Items 1 to 2)							
B	Specified Provisional Sums included in Subtotal of Bills							
C	Total of Bills Less Specified Provisional Sums (A-B)							
D	Add Provisional Sum for Contingencies Allowance							
E	Tender Price (A+D) (Carried forward to Form of Tender)							



SECTION 2

- **TECHNICAL PARTICULARS**
- **ORIGIN OF FACILITIES**



SECTION 2
TECHNICAL PARTICULARS

The following schedule of particulars shall be filled in by the Tenderer. The particulars will be binding on the Contract and must not be changed without the written permission of the Engineer.

	Required	Proposed
1. Precision Approach Lighting System (PALS)		
(1) Name of manufacturer	--	
(2) Type/Model	--	
(3) Category	Cat.-II (& III)	
(4) Performance	ICAO, Annex 14 Appendix 2	
(5) Colour		
(a) PALS surface type (1)	White	
(b) PALS surface type (2)	Red	
(c) PALS elevated type (1)	White	
(d) PALS elevated type (2)	Red	
(6) Light fitting		
(a) Elevated lights	One pre-focussed tungsten-halogen	
- Current	6.6 A	
- Watt	200 W	
- Minimum lamp life	500 hours	
(b) Surface lights	Three pre-focussed tungsten-halogen	
- Current	6.6 A	
- Watt	350 W	
- Minimum lamp life	1,000 hours	
(7) Power supply	4 circuits	
(8) Brilliancy control	6 stages	

	Required	Proposed
2. Sequence Flashing Lights (Capacitor discharge Lights)		
(1) Name of manufacturer	-	
(2) Type / Model	-	
(3) Category	Cat.-II & III	
(4) Minimum effective intensity		
- High level	800cd±15 degrees	
- Medium level	800cd±15 degrees	
- Low level	150cd±15 degrees	
(5) Light fitting	Elevated type	
- Fitting with	xenon discharge lamp	
- Minimum lamp life	500 hours at 2 Hz	
(6) Power Supply	380/220V, 3 phase 4 wire	
(7) Brilliancy control	3 stages	

3. Precision Approach Path Indicator (PAPI) System

(1) Name of manufacturer	-	
(2) Type / Model	-	
(3) Light intensity (full)	Not exceed 0.320	
(4) Light fitting	Three pre-focussed tungsten-halogen lamp	
- Current	6.6 A	
- Watt	Not exceed 200 W	

	Required	Proposed
- Minimum lamp life	1,000 hours	
(5) Power Supply	Series loop circuits	
(6) Brilliancy control	4 stages	
4. Runway Edge Lights (REDL)		
(1) Name of manufacturer	-	
(2) Type / Model	-	
(3) Performance	ICAO, Annex 14 Appendix 2	
(4) Colour		
(a) REDL elevated type (1)	White/White	
(b) REDL elevated type (2)	White/Yellow	
(c) REDL surface type (1)	White/White	
(f) REDL surface type (2)	White/Yellow	
(5) Light intensity	ICAO, Annex 14 Appendix 1	
(6) Light fitting		
(a) Elevated lights	Bi-directional type with one tungsten halogen lamp	
- Current	6.6 A	
- Watt	Not exceed 200W	
- Minimum lamp life	500 hours	
(b) Surface lights	Bi-directional type with two tungsten halogen lamp	
- Current	6.6 A	
- Watt	Not exceed 200W	
- Minimum lamp life	1,000 hours	

	Required	Proposed
(7) Power supply	Two loop circuits	
(8) Brilliancy control	6 stages	

5. Runway Threshold Lights (RTHL) and Wing Bar Lights (WBAR)

(1) Name of manufacturer		
(2) Type / Model		
(3) Performance	ICAO, Annex 14 Appendix 2	
(4) Colour		
(a) RTHL surface type	Green	
(b) WBAR surface type	Red	
(5) Light fitting		
(a) Runway threshold lights	Un-directional surface type with two tungsten halogen lamp	
- Current	6.6 A	
- Watt	Not exceed 250W	
- Minimum lamp life	1,000 hours	
(b) Wing bar lights	Un-directional elevated light type with one tungsten halogen lamp	
- Current	6.6 A	
- Watt	Not exceed 200W	
- Minimum lamp life	500 hours	
(6) Power supply	Two loop circuits	
(7) Brilliancy control	6 stages	

	Required	Proposed
6. Runway End Lights (RENL)		
(1) Name of manufacturer	-	
(2) Type / Model	-	
(3) Performance	ICAO, Annex 14 Appendix 2	
(4) Colour	Red	
(5) Light intensity	ICAO, Annex 14 Appendix 2	
(6) Light fitting	Un-directional surface type with one tungsten halogen lamp	
- Current	6.6 A	
- Watt	Not exceed 200W	
- Minimum lamp life	500 hours	
(7) Power supply	Two loop circuits	
(8) Brilliancy control	6 stages	
7. Runway Center Line lights		
(1) Name of manufacturer	-	
(2) Type / Model	-	
(3) Performance	ICAO, Annex 14 Appendix 2	
(4) Colour		
(a) RCLL (1)	White/White	
(b) RCLL (2)	White/Red	

	Required	Proposed
(5) Light fitting		Omni-directional elevated type with one tungsten halogen lamp
- Current	6.6 A	
- Watt	Not exceed 50W	
- Minimum lamp life	500 hours	
(6) Power supply		Four loop circuits
(7) Brilliancy control		6 stages
8. Runway Touchdown Zone lights (RTZL)		
(1) Name of manufacturer	-	
(2) Type / Model	-	
(3) Performance		ICAO, Annex 14 Appendix 2
(4) Colour		White
(5) Light fitting		Un-directional surface type with one pre-focus tungsten halogen lamp
- Current	6.6 A	
- Watt	Not exceed 45W	
- Minimum lamp life	1,500 hours	
(6) Power supply		Two loop circuits

	Required	Proposed
(7) Brilliancy control	6 stages	

9. Taxiway Center Line Lights (TCLL) and Rapid Exit Taxiway (HS) TCLL

(1) Name of manufacturer	--	
(2) Type / Model	--	
(3) Performance	ICAO, Annex 14 Appendix 2	
(4) Colour		
(a) TCLL narrow type with shallow base	Green/Yellow	
(b) TCLL narrow type with shallow base	Green/Green	
(c) TCLL wide type with shallow base	Green/Green	
(d) TCLL narrow with deep base	Green/Green	
(e) TCLL wide with deep base	Green/Green	
(f) HSTCLL narrow with shallow base	Green	
(g) HSTCLL wide with shallow base	Green	
(h) HSTCLL narrow (stb ~ R)	Yellow	
(i) HSTCLL narrow (stb ~ R)	Green	
(j) HSTCLL wide (stb ~ R)	Yellow	
(k) HSTCLL wide (stb ~ R)	Green	
(5) Light fitting		
(a) Except rapid exit taxiway	Bi-directional surface type with one tungsten halogen lamp	
- Current	6.6 A	
- Watt	Not exceed 100W	
- Minimum lamp life	500 hours	
(b) On rapid exit taxiway	Un-directional surface type with one tungsten halogen lamp	
- Current	6.6 A	

	Required	Proposed
- Watt	Not exceed 100W	
- Minimum lamp life	500 hours	
(6) Power supply	10 loop circuits	
(7) Brilliancy control	6 stages	

10. Taxiway Edge Lights (TWYL)

(1) Name of manufacturer	--	
(2) Type / Model	--	
(3) Performance	IEC specifications	
Minimum luminous intensity: 2.0 cd		
- Beam aperture (Vertical)	0 to 6°	
- Beam aperture (Horizontal)	360°	
(4) Colour	Blue	
(5) Light intensity	ICAO, Annex 14 Appendix 1	
(6) Light fitting	Omni-directional elevated type with one tungsten halogen lamp	
- Current	6.6 A	
- Watt	Not exceed 50W	
- Minimum lamp life	500 hours	
(7) Power supply	6 loop circuits	

	Required	Proposed
(8) Brilliancy control	6 stages	
11. Stop Bar Lights (STBL)		
(1) Name of manufacturer	--	
(2) Type / Model	--	
(3) Performance	ICAO, Annex 14 Appendix 2	
(4) Colour		
(a) STBL surface type	Red	
(b) STBL elevated type	Red	
(c) STBL surface controllable type	Red	
(d) STBL elevated controllable type	Red	
(e) T CLL narrow controllable type (1)	Green/Yellow	
(f) T CLL narrow controllable type (2)	Green/Green	
(g) T CLL wide controllable type (1)	Green/Yellow	
(h) T CLL wide controllable type (2)	Green/Green	
(5) Light fitting		
(5-1) Surfaced type light	Un-directional type with one tungsten halogen lamp	
a) Controlled light		
- Current	6.6 A	
- Watt	Not exceed 65W	
- Minimum lamp life	1,000 hours	
b) Un-controlled light		
- Current	6.6 A	
- Watt	100W	
- Minimum lamp life	500 hours	

	Required	Proposed
(5-2) Elevated type light	Un-directional type with one tungsten halogen lamp	
a) Controlled light		
- Current	6.6 A	
- Watt	Not exceed 200W	
- Minimum lamp life	1,000 hours	
b) Un-controlled light		
- Current	6.6 A	
- Watt	Not exceed 200W	
- Minimum lamp life	500 hours	
(6) Sensor		
a) Function	To detect all types of aircrafts and vehicles at a speed of less than 50 km/hr.	
b) Type	Microwave	
c) Frequency	9.4 - 10.7 GHz	
(7) Power supply	Four loop circuits	
(8) Brilliancy control	4 stages	

12. Runway Guard Lights (RGL)

(1) Name of manufacturer	-
(2) Type / Model	-
(3) Colour	Two pairs of Yellow

	Required	Proposed
(4) Light intensity	ICAO, Annex 14 Appendix 2	
(5) Light fitting	Omni-directional elevated type with two tungsten halogen lamp	
- Current	6.6 A	
- Watt	Not exceed 100W	
- Minimum lamp life	1,000 hours	
(6) Power supply	Series loop circuit	
(7) Brilliancy control	On and off	

13. Taxiway Intersection Lights (TISL)

(1) Name of manufacturer	-
(2) Type / Model	-
(3) Performance	ICAO, Annex 14 Appendix 2
(4) Colour	Yellow
(5) Intensity	ICAO, Annex 14 Appendix 1
(6) Light fitting	Un-directional surface type with one tungsten halogen lamp
- Current	6.6 A
- Watt	Not exceed 100W

	Required	Proposed
- Minimum lamp life	500 hours	
(7) Power supply	Series loop circuit	
(8) Brilliancy control	6 stages	

14. Taxiing Guidance Signs (TXGS)

(1) Name of manufacturer	--	
(2) Type / Model	--	
(3) Light system	ICAO, Annex 14 Appendix 1	
(4) Light fitting	One or more tungsten halogen lamp	
- Current	6.6 A	
- Watt	Not exceed 100W	
- Minimum lamp life	500 hours	
(5) Power supply	Series loop circuit	
(6) Brilliancy control	6 stages	

15. Wind Direction Indicator Lights (WDIL)

(1) Name of manufacturer	--	
(2) Type / Model	--	
(3) Colour of light	Orange and White	

	Required	Proposed
(4) Power supply	AC 200V, single phase	

16. Apron Floodlights (FLO)

(1) Name of manufacturer	-	
(2) Type / Model	-	
(3) Average illumination		
(a) Aircraft Stands in the Passenger Terminal Area		
- Horizontal illumination	30 lux	
- Vertical	30 lux	
(b) Aircraft Stands in other Apron Area		
- Horizontal illumination	25 lux	
(c) Other Apron Area		
- Horizontal illumination	10 lux	
(4) Light fitting		
a) Type	High pressure sodium vapor lamp	
b) Life of light	Not less than 12,000 hours	
c) Type	Metal halide	
d) Life of lamp	Not less than 9,000 hours	
(5) Obstruction lights	Omni-directional or low intensity type	
(6) Ballast	Reactor type with a power factor of not less than 85%	

	Required	Proposed
(7) Power supply	380/220V, three phase, 4 wires	

(8) Control	On and off	
-------------	------------	--

17. Visual Docking Guidance System (VDGS)

(1) Name of manufacturer	-	
--------------------------	---	--

(2) Type / Model	-	
------------------	---	--

(3) Operational requirement	ICAO, Aerodrome Design Manual, Part 4, Appendix 1	
-----------------------------	---	--

(4) Sensor	Laser radar to confirm IEC 825, Radiological class I	
------------	--	--

(5) Power supply	AC 220V single phase	
------------------	----------------------	--

18. Aircraft Stand Identification Signs (ASIS)

(1) Name of manufacturer	-	
--------------------------	---	--

(2) Type / Model	-	
------------------	---	--

(3) Power supply	AC 220V single phase	
------------------	----------------------	--

	Required	Proposed
19. Road-Holding Position Lights		
(1) Name of manufacturer	--	
(2) Type / Model	--	
(3) Light fitting	ICAO, Annex 14 Appendix 1	
20. Remote Control and Monitoring System for the AFL.		
(1) Name of manufacturer	--	
(2) Type / Model	--	
(3) System configuration	Schematic diagram shall be submitted with Tender	
- VFR room of control tower		
- Control room of main AFL substation		
- Computer room of main AFL substation		
- Burn-out lamp detection system		
21. Isolating Transformer		
(1) Name of manufacturer	--	
(2) Type / Model	--	
(3) Specifications	Refer to Chapter 4.2 of Technical Specification	

	Required	Proposed
22. Frangible Coupling		
(1) Name of manufacturer	-	
(2) Type / Model	-	
(3) Impact load	5 kg	
(4) Static load	230 kg	
23. Cables		
(1) Name of manufacturer	-	
(2) Type / Model	-	
(3) Specifications	Refer to Chapter 4.4.2 - 4.4.6 of Technical Specification	
24. Plugs and Receptacle		
(1) Name of manufacturer	-	
(2) Type / Model	-	
25. Cable Protectors		
(1) Name of manufacturer	-	
(2) Type / Model	-	

	Required	Proposed
26. Constant Current Regulators (CCR)		
(1) Name of manufacturer	-	
(2) Type / Model	-	
(3) Standards	IEC-1822 or equivalent	
(4) Control	By microprocessor	
(5)	4.0, 7.5, 20 and 30 kW	
(6) Output current	6.6 amperes	
(7) Input voltage	208V	
(8) Frequency	50 Hz \pm 5%	
(9) Efficiency	90%	
(10) Power factor	90%	
(11) Load matching		
a) 10kV rated load	50 - 100%	
b) Resistive load	75 - 100%	
(12) Temperature rise	ANSI standards or equivalent	
(13) Operation		
- Stabilize	Within 500 ms	
- Output current	\pm 0.1 ampere	
(14) Type Test report	To be submitted with Tender	

	Required	Proposed
27. 10kV Metal Enclosed Switchgear		
(1) Name of manufacturer	-	-
(2) Type / Model	-	-
(3) Rated voltage	10 kV, 50 Hz	
(4) Short-time withstand current	25 kA (3 sec)	
(5) Insulating withstand voltage		
(a) Basic impulse insulation level (BIL)	75 kV	
(b) Power frequency	28 kV	
(6) Main bus bar rating	1,000 A	
28. 380V Distribution Panel		
(1) Name of manufacturer	-	-
(2) Type / Model	-	-
(3) Rated voltage	380/220 V	
(4) Designed interrupting capacity	6.3 kA	
29. Power Transformer		
(1) Name of manufacturer	-	-
(2) Type / Model	-	-
(3) Rated capacity		
a) Main AFL substation	1,000 kVA	
b) Secondary substation	800 kVA	

	Required	Proposed
(4) Primary voltage	10 kV ± 2.5%	
(5) Secondary voltage	380-220 V	
(6) Percent impedance	6% rated kVA	
(7) Withstand voltage		
(a) BIL	75 kV	
(b) Power frequency	28 kV	

30. 10kV Class Vacuum Circuit Breaker

(1) Name of manufacturer	--
(2) Type / Model	--
(3) Rated voltage	12 kV
(4) Rated current	800A or more
(5) Short-time current	25 kA (3 sec.)
(6) Insulation level	
(a) BIL	75 kV
(b) Power frequency	28 kV
(7) Operation time	O: 0.3 min. - CO: 1.5 min.
(8) Operating system	Motor charged spring operation
(9) Operating voltage	DC 110V

	Required	Proposed
31. 380V Class Air-Circuit Breaker (ACB)		
(1) Name of manufacturer	-	
(2) Type / Model	-	
(3) Rated voltage	AC 1000 V	
(4) Rated current	Refer to drawings	
(5) Rated breaking capacity	Not less than 50kA	
32. 400V Molded Case Circuit Breaker (MCCB)		
(1) Name of manufacturer	-	
(2) Type / Model	-	
(3) Rated voltage	AC 460 V	
(4) Rated current	Refer to drawings	
(5) Rated breaking capacity	Not less than 50kA	
33. 10kV Disconnecting Switch		
(1) Name of manufacturer	-	
(2) Type / Model	-	
(3) Rated voltage	12 kV	
(4) Rated current	400 A	
(5) Short time current	25 kA (3 sec)	

	Required	Proposed
(6) Withstand voltage		
(a) BIL	75 kV	
(b) Power frequency	28 kV	
34. 10kV Voltage Transformer		
(1) Name of manufacturer	-	
(2) Type / Model	-	
(3) Rated voltage	12 kV	
(4) Secondary voltage	110 V	
(5) Class	1.0	
(6) Burden	100 VA	
(7) Withstand voltage		
(a) BIL	75 kV	
(b) Power frequency	28 kV	
35. 10kV Current Transformer		
(1) Name of manufacturer	-	
(2) Type / Model	-	
(3) Primary current	100 A, 75 A	
(4) Secondary voltage	5 A	
(5) Class	1.0	
(6) Burden	40 VA	

	Required	Proposed
(7) Withstand voltage		
(a) BIL	75 kV	
(b) Power frequency	28 kV	

36. 14kV Lighting Arrester

(1) Name of manufacturer	-
(2) Type / Model	-
(3) Rated voltage	14 kV
(4) Rated discharge current	10 kA
(5) Withstand voltage (BIL)	90 kV

37. Protective Relay

(1) Name of manufacturer	-
(2) Type / Model	-
(3) Relay	Static Type

38. Battery and Charger (DC Source Panel)

(1) Name of manufacturer	-
(2) Type / Model	-
(3) Battery	Lead-acid high rate type
(4) Capacity	50 Ah / 10 Hr.

	Required	Proposed
(5) Nominal voltage	110 V	
(6) Battery charger operation	Automatic and manual	
(7) Output current	--	

39. Uninterruptible Power Supply (UPS) System

(1) Name of manufacturer	--	
(2) Type / Model	--	
(3) Rated output capacity		
a) Main AFL substation	300 kVA	
b) Secondary substation	200 kVA	
(4) Operation	parallel operation with 3 UPS	
(5) Rated voltage	380 V \pm 10%	
(6) DC circuit (floating voltage)	473 V	

40. Standby Generating Sets

(1) Name of manufacturer	--	
(2) Type / Model	--	
(3) Rated output capacity		
a) Main AFL substation	1,100 kVA	
b) Secondary substation	800 kVA	

	Required	Proposed
(4) Switching time		
(a) From the time of main power failure	< 15 seconds	
(b) To the time of restoration of main power	Within 0-5 minutes	
(5) Diesel engine	1,500 r.p.m. 4 stroke	
(6) Generator	380 V, 3 phase, 3 wires, 4 poles	
(7) Degree of protection	IP 23	
(8) Rated voltage	AC 380 V	

41. Remote Control and Monitoring System for the FLO, VDGS and ASIS

(1) Name of manufacturer	-	
(2) Type / Model	-	
(3) System configuration	Schematic diagram shall be submitted with Tender	
- General Control Center		
- Secondary substation in the passenger terminal building and secondary substation		
- Cargo apron substation		
- Maintenance apron substation		

	Required	Proposed
42. Remote Control and Monitoring System for the Power Supply System		

(1) Name of manufacturer

--

(2) Type / Model

--

(3) System configuration

Schematic diagram shall be submitted with Tender

- Control room of the main AFL substation
- Control room of the main AFL substation
- Local control room of the secondary substation

ORIGIN OF FACILITIES

Tenderer shall insert the required information on the names of manufacturers, and place of manufacture, of major items of the Facility in the form below.

Description of Facility Item	Name of Manufacturer	Address of Place of Manufacture, Testing and Inspection	Applied standard
<ol style="list-style-type: none"> 1. Precision Approach Lighting System (PALS) 2. Sequence Flashing Lights (SFL) / Capacitor Discharge Lights 3. Precision Approach Path Indicator (PAPI) 4. Runway Edge Lights (REDL) 5. Runway Threshold Lights (RTHL) and Wing Bar Lights (WBAR) 6. Runway End Lights (RENL) 7. Runway Center Line Lights (RCLL) 8. Runway Touchdown Zone Lights (RTZL) 9. Taxiway Center Line Lights (TCLL) 10. Taxiway Edge Lights (TWYL) 			

Bidder :

Signature :

ORIGIN OF FACILITIES

Tenderer shall insert the required information on the names of manufacturers, and place of manufacture, of major items of the Facility in the form below.

Description of Facility Item	Name of Manufacturer	Address of Place of Manufacture, Testing and Inspection	Applied standard
11. Stop Bar System (STBL)			
12. Runway Guard Lights (RGL)			
13. Taxiway Intersection Lights (TISL)			
14. Taxiing Guidance signs (TXGS)			
15. Wind Direction Indicator Light (WDIL)			
16. Apron Floodlight (FLO)			
17. Visual Docking Guidance System (VDGS)			
18. Aircraft Stand Identification Signs (ASIS)			
19. Road-Holding Position Lights			
20. Remote Control and Monitoring System for the AFL			

Bidder :

Signature :

ORIGIN OF FACILITIES

Tenderer shall insert the required information on the names of manufacturers, and place of manufacture, of major items of the Facility in the form below.

Description of Facility Item	Name of Manufacturer	Address of Place of Manufacture, Testing and Inspection	Applied standard
21. Isolating Transformer			
22. Frangible Coupling			
23. Cables			
24. Plugs and Receptacle			
25. Cable Protectors			
26. Constant Current Regulators (CCR)			
27. 10kV Metal Enclosed Switchgear			
28. 380V Distribution Panel			
29. Power Transformer			
30. 10kV Class Vacuum Circuit Breaker			
31. 380V Class Air-Circuit Breaker (ACB)			

Bidder :

Signature :

ORIGIN OF FACILITIES

Tenderer shall insert the required information on the names of manufacturers, and place of manufacture, of major items of the Facility in the form below.

Description of Facility Item	Name of Manufacturer	Address of Place of Manufacture, Testing and Inspection	Applied standard
32. 400V Molded Case Circuit Breaker (MCCB)			
33. 10KV Disconnecting Switch			
34. 10kV Voltage Transformer			
35. 10kV Current Transformer			
36. 14kV Lighting Arrester			
37. Protective Relay			
38. Battery and Charger (DC Source Panel)			
39. Uninterruptible Power Supply (UPS) System			
40. Standby Generating Sets			
41. Remote Control and Monitoring System for the FLO, VDGS and ASIS			
42. Remote Control and Monitoring for the Power Supply System			

Bidder :

Signature :



SECTION 3

- **CONDITIONS PROPOSED BY THE TENDERERS**
- **PROPOSED MINOR DEVIATIONS FROM THE SPECIFICATIONS**



CONDITIONS PROPOSED BY THE TENDERERS

Section, Submission and Clause Number of the Tender Document	Rewrite the Respective Detail of Deviation Documents	Conditions Proposed

- (1) This paper should be added as required.
- (2) Any other deviations found elsewhere, which are not clearly referred in this Form, shall be in compliant with the Tender Documents.

PROPOSED MINOR DEVIATIONS FROM THE SPECIFICATIONS

Section, Submission and Clause Number of the Tender Document	Rewrite the Respective Detail of Deviation Documents	Conditions Proposed

- (1) This paper should be added as required.
- (2) Any other deviations found elsewhere, which are not clearly referred in this Form, shall be in compliant with the Tender Documents.

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

SCIENCE AND TECHNOLOGY COMMISSION OF
SHANGHAI MUNICIPAL PEOPLE'S GOVERNMENT,
PEOPLE'S REPUBLIC OF CHINA

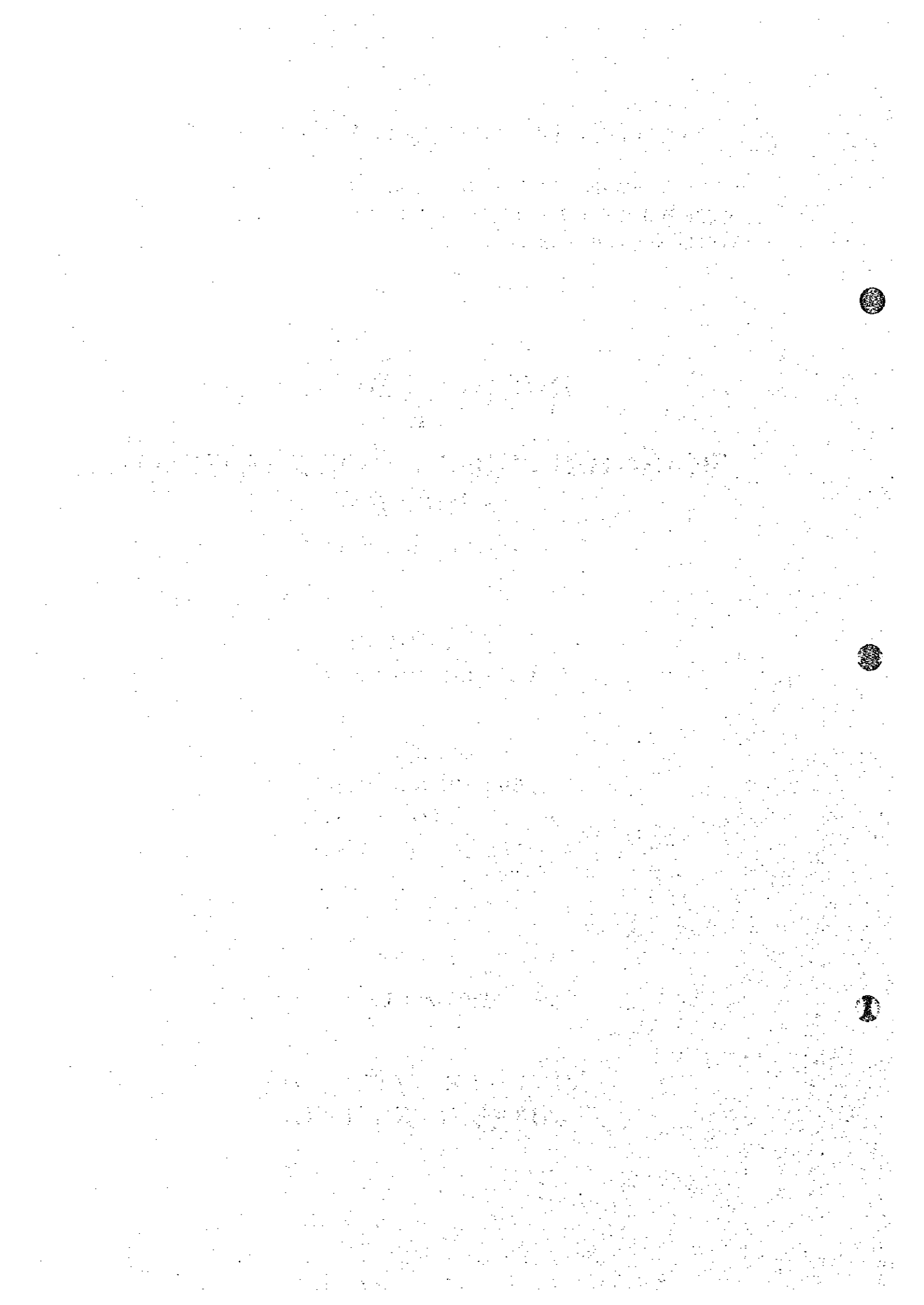
**DETAILED DESIGN
OF
SHANGHAI PUDONG INTERNATIONAL
AIRPORT
FINAL REPORT**

**VOLUME III
TENDER DOCUMENT**

**PART V-3
BILL OF QUANTITIES
FOR
FUEL SUPPLY SYTEM**

SEPTEMBER 1997

**NIPPON KOEI CO., LTD.
NIKKEN SEKKEI LTD.**



PEOPLE'S REPUBLIC OF CHINA
SHANHAI MUNICIPAL PEOPLE'S GOVERNMENT

SHANGHAI PUDONG INTERNATIONAL AIRPORT PROJECT
FINAL REPORT

TENDER DOCUMENT
PART V-3
BILL OF QUANTITIES
FOR
FUEL SUPPLY SYSTEM

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THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

PH 441

LECTURE 1

MECHANICS

1.1

1.2

1.3

1.4

1.5

1.6

1.7



PREAMBLE TO BILL OF QUANTITIES

SECTION 1: PREAMBLE

1.1 INTRODUCTION

1.1.1 The Bill of Quantities (Schedule of Unit Rates, Prices and Quantities) comprises the following parts:

Preamble
Preliminary And General Items
Direct Works
Grand Summary

The Grand Total on the General Summary Sheet shall equal the amount of the estimated Contract Price set forth in the Form of Tender.

1.1.2 The Bill of Quantities shall be used by the Shanghai Municipal People's Government (the Employer) and or the Engineer for:

- a) bid evaluations purposes
- b) the basis of remeasurement and valuation of estimated quantities
- c) the basis of evaluation for any variations or additional Works ordered under the Conditions of Contract
- d) assistance in the calculation of progress payments
- e) computation of the Contract Price

1.2 GENERAL

1.2.1 The Bill of Quantities shall be read in conjunction with the Conditions of Contract, Specification, Contract Drawings and all other Contract Documents relevant thereto and the cost of complying with the requirements and obligations thereof or which may be reasonably inferred therefrom shall be deemed to be included in the rates and prices set out in the Bill of Quantities.

- 1.2.2 Descriptions shall identify the work covered by the respective items, but the exact nature and extent of the work shall be ascertained from the Specification, Drawings and Conditions of Contract, as the case may be.
- 1.2.3 The order of stating dimensions in descriptions shall be in the sequence of length, width and height (or depth) unless otherwise described.
- 1.2.4 Where work is shown, described, indicated in or reasonably inferred or implied from the Specification and or Drawings but not specifically itemized in the Bill of Quantities, then the cost of such work shall be deemed to be included in the rates for the items associated with the particular work. No additional items, other than those stated in the Bill of Quantities, will be used to measure such work without the written consent of the Engineer.
- 1.2.5 Where the Contractor does not insert a rate against an item (or items) in the Bill of Quantities, the cost of carrying out the work described in the item(s) will be deemed to be included elsewhere and no measurement of the item(s) will be made.
- 1.2.6 Unit rates and prices shall be expressed in Chinese Renminbi and Japanese Yen to a maximum of two decimal places.
- 1.2.7 Throughout the Bill of Quantities the following abbreviations shall apply:

<u>Abbreviation</u>	<u>Full Meaning</u>
mm	millimetre
mm ²	square millimetre
m	metre
m ²	square metre
m ³	cubic metre
ha	hectare
ea	each
No	number
kg	kilogramme
km	kilometre
t	tonne
ltr	litre
LS	Lump Sum
PS	Provisional Sum,
MM	Man Month
MD	Man Day
Rate	Unit Rate

- 1.2.8 The Bill of Quantities identifies and represents the Works to be carried out as part of this project. Sections of works that can not be accurately measured are noted as Lump Sum. Additionally Provisional Sums have been included, which sums shall be used in whole or in part, or not at all, or the instructions of the Engineer.
- 1.2.9 The General Principles of Measurement and Principles of Measurement for each part of the Bill of Quantities apply equally to all parts of the Bill of Quantities when relevant and are not limited to the parts in which they are contained.
- 1.2.10 Where reference is made to the "descriptions" or "as described" the term "descriptions" or "as described" shall mean the descriptions of the item(s) contained in the Bill of Quantities, the Specification or Drawings.

SECTION 2: PRELIMINARY AND GENERAL ITEMS

2.1 CONTRACTUAL ITEMS

2.1.1 General

- 2.1.1.1 For the purpose of Interim Payment Certificates, the amount entered against Contractual items in the Preliminaries and General Items Section will be certified as stated following:
- (a) Performance Bond: the amount entered against this item will be certified in the Interim Payment Certificate following approval of the institution providing the security and receipt of the Performance Bond.
 - (b) Insurances: the amounts entered against these items will be certified in the Interim Payment Certificate following approval of the policies in accordance with the Conditions of Contract. Originals of receipts must be produced as evidence of payment.
 - (c) All other amounts entered against Preliminary and General Contractual items will be certified for payment in direct proportion to the accumulative value of certified Site construction Works.

2.2 SPECIFICATION ITEMS

2.2.1 General

2.2.1.1 For the purposes of Interim Payment Certificates, the amounts, entered against Specification Items in the Preliminaries and General Items Section will be certified as stated following:

- (a) Contractor's Site Establishment - on provision of the facilities and approval of the Engineer, 50% of the amount entered against this item will be certified for payment in the following Interim Payment Certificate. On completion of the Works, removal of the facilities and the making good of the area occupied thereby, all as specified and to the approval of the Engineer, 20% will be certified for payment in Final Payment Certificate. The remaining 30% will be certified for payment in equal monthly installments during the period for construction of the Works, providing that the facilities are maintained in accordance with the Contract and to the approval of the Engineer.
- (b) Construction Plant - on completion of mobilizing, erecting, testing and commissioning as specified of all plant and equipment and approval of the Engineer, 60% of the amount entered against this item will be certified for payment in the following Interim Payment Certificate. On completion of the demobilization of all plant and equipment and the making good of any area occupied thereby and approval of the Engineer, 40% of the amount will be certified for payment in the following Interim Payment Certificate.
- (c) General Site Requirement - on completion of the installations as specified and approval of the Engineer, 60% of the amount entered against this item will be certified for payment in the following Interim Payment Certificate. On completion of the Works removal of the installations and the making good of the area occupied thereby to the approval of the Engineer, 20% will be certified for payment in the next interim payment. The remaining 20% will be certified for payment in equal monthly installments during the period for construction of the Works, providing that the installations are maintained to the satisfaction of the Engineer.
- (d) Assistance to Engineer () - the quantities stated will be measured in accordance with Clause 56 of the Conditions of Contract and the calculated amounts certified.
- (e) Site Investigation () - where quantities are stated these will be measured in accordance with Clause 56 of the Conditions of Contract and the calculated amounts certified. Lump Sum amounts will be certified in direct proportion to the completion of that item.
- (f) Document Submission and Other Matters - the amount entered against these items will be certified in installments in proportion to the particular items completed.

SECTION 3: DIRECT WORKS

3.1 METHOD OF MEASUREMENT

- 3.1.1 The method of measurement and computations to be used in determination of quantities of material furnished and of work performed under the Contract will be those methods generally recognized as conforming to good engineering practices in China. All work completed under the Contract will be measured by the Engineer or his authorized representatives using metric-ton unit system of measurement.
- 3.1.2 Where appropriate, quantities have been rounded off to nearest integer (<0.5 rounded down, ≥0.5 rounded up). However, quantities of items measurement in hectares, tonnes or quantities of high value items have been expressed to one place of decimals.
- 3.1.3 When the application of 3.1.2 would cause an entire item to be eliminated, then such an item is enumerated stating the size or weight as appropriate.

3.2 MEASURED WORKS

- 3.2.1 Quantities included under the Measured Works sections of the Bill of Quantities are estimated quantities based on the Scope of Works set forth in the Contract Documents and shall be subject to remeasurement in accordance with the provisions of the Contract and valued at the unit rates included therein. There shall be no basis of claim or adjustment of the unit rates and prices in the event that the quantity of Work performed for any item shown in the Bill of Quantities, as finally measured in accordance with the provisions of the Contract, is different from that shown in the Bill of Quantities.
- 3.2.2 Unless otherwise stated, all items shall be deemed fully inclusive of all that is necessary to fulfill the liabilities and obligations arising out of the contract and shall include, but not be limited to, the following
- a) Labour, supervision and all associated costs
 - b) Materials, goods and all associated costs
 - c) Fitting, jointing and fixing materials and goods in position
 - d) Cutting to size and allowances for wastage of materials and goods
 - e) Provision of plant
 - f) Temporary works
 - g) Maintenance and protection of finished work
 - h) Establishment charges, overheads and profit

- 3.2.3 The Contract price shall be computed from the quantities of work entered in the Bill of Quantities and valued at the unit and lump sum prices tendered against the respective items in the Bill of Quantities hereto.
- 3.2.4 The Tenderer shall ensure that his tender prices are well balanced and that no section of the Bill of Quantities is heavily priced to cause lower prices in another section. The Employer reserves the right to require balancing of the Tender before acceptance.
- 3.2.5 Any difference between the cost of executing work of a similar description in different areas of the Site shall be allowed for in pricing the items concerned.
- 3.2.6 Except as otherwise provided in the Conditions of Contract, items included in the Preliminary and General items section shall not be subject to adjustment or remeasurement.
- 3.2.7 The CAAC 1-xxx numbers indicated in parenthesis within the "Description of Works" Column in the Bill of Quantities have been entered for the convenience of the Engineer in making cost estimations, and may be ignored by the Tenderer. The Tenderer shall compile all estimated prices on the basis of the Contract Documents.