

Arrival Signals	Provide on all landings: yes
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**Unit
No.:**

Machine

Item	Specific Requirements
Rated Speed	1465rpm
Load	75Amp
Ascending over-speed protection	Yes
Emergency Lowering Device	Yes
AC Power Regeneration	No

72BE9137

General:	
Unit No. & Brand name	05/L1044 SIGMA
Known As	Duplex
Location	E Block
Item	Specific Requirements
Load	1800kg
Speed	1,5m/s
Shaft Width	3127mm
Shaft Depth	3106mm
No. of Stops	7
No. of Openings	9
Travel	27700mm
Pit Depth	1700mm
No. of Car Doors	2
Door Width	1300mm
Door Height	2100mm
Door Type	Single speed centre opening
Operation	VVVF Microprocessor control
Machine Type	Geared
Machine Room Location	Above
No. of Units	4
Number of landing Doors	9
Counterweight Safeties	No
Intercommunication Device	No
Shaft Lighting	Yes
Position indicators	In car: yes

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Arrival Signals	Provide on all landings: yes
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**Unit
No.:**

Machine

Item	Specific Requirements
Rated Speed	1465rpm
Load	75Amp
Ascending over-speed protection	Yes
Emergency Lowering Device	Yes
AC Power Regeneration	No

72BE9138

General:	
Unit No. & Brand name	05/L1045 SIGMA
Known As	Duplex
Location	E Block
Item	Specific Requirements
Load	1800kg
Speed	1,5m/s
Shaft Width	3203mm
Shaft Depth	3058mm
No. of Stops	7
No. of Openings	9
Travel	27700mm
Pit Depth	1700mm
No. of Car Doors	2
Door Width	1300mm
Door Height	2100mm
Door Type	Single speed centre opening
Operation	VVVF Microprocessor control
Machine Type	Geared
Machine Room Location	Above
No. of Units	4
Number of landing Doors	7
Counterweight Safeties	No
Intercommunication Device	No
Shaft Lighting	Yes
Position indicators	In car: yes

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Arrival Signals	Provide on all landings: yes
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**Unit
No.:**

Machine

Item	Specific Requirements
Rated Speed	1465rpm
Load	75Amp
Ascending over-speed protection	Yes
Emergency Lowering Device	Yes
AC Power Regeneration	No

72BE9139

General:	
Unit No. & Brand name	05/L1046 SIGMA
Known As	Duplex
Location	E Block
Item	Specific Requirements
Load	1800kg
Speed	1,5m/s
Shaft Width	3123mm
Shaft Depth	3058mm
No. of Stops	9
No. of Openings	9
Travel	31000mm
Pit Depth	1500mm
No. of Car Doors	1
Door Width	1300mm
Door Height	2100mm
Door Type	Single speed centre opening
Operation	VVVF Microprocessor control
Machine Type	Geared
Machine Room Location	Above
No. of Units	4
Number of landing Doors	9
Counterweight Safeties	No
Intercommunication Device	No
Shaft Lighting	Yes
Position indicators	In car: yes

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Arrival Signals	Provide on all landings: yes
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**Unit
No.:**

Machine

Item	Specific Requirements
Rated Speed	1465rpm
Load	75Amp
Ascending over-speed protection	Yes
Emergency Lowering Device	Yes
AC Power Regeneration	No

72BE9140

General:	
Unit No. & Brand name	05/L1047 SIGMA
Known As	Single lift
Location	Block E waste lift
Item	Specific Requirements
Load	1600kg
Speed	1,0m/s
Shaft Width	2545mm
Shaft Depth	2530mm
No. of Stops	9
No. of Openings	9
Travel	30500mm
Pit Depth	1600mm
No. of Car Doors	1
Door Width	1100mm
Door Height	2100mm
Door Type	Centre opening
Operation	VVVF Microprocessor control
Machine Type	Gearless
Machine Room Location	Above
No. of Units	1
Number of landing Doors	9
Counterweight Safeties	No
Intercommunication Device	No
Shaft Lighting	Yes
Position indicators	In car: yes broken

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Arrival Signals	Provide on all landings: yes
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**Unit
No.:**

Machine

Item	Specific Requirements
Rated Speed	3600rpm
Load	24,2Amp
Ascending over-speed protection	No
Emergency Lowering Device	Yes
AC Power Regeneration	No

72BE9141

General:	
Unit No. & Brand name	05/L1048 SIGMA
Known As	Single lift
Location	Block K
Item	Specific Requirements
Load	1600kg
Speed	1.0m/s
Shaft Width	2800mm
Shaft Depth	2515mm
No. of Stops	7
No. of Openings	7
Travel	19400mm
Pit Depth	1700mm
No. of Car Doors	1
Door Width	900mm
Door Height	2100mm
Door Type	Centre opening
Operation	VVVF Microprocessor control
Machine Type	Gearless
Machine Room Location	Above
No. of Units	3
Number of landing Doors	7
Counterweight Safeties	No
Intercommunication Device	No
Shaft Lighting	Yes
Position indicators	In car: yes

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Arrival Signals	Provide on all landings: yes
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**Unit
No.:**

Machine

Item	Specific Requirements
Rated Speed	90m/min
Load	36.5Amp
Ascending over-speed protection	No
Emergency Lowering Device	Yes
AC Power Regeneration	No

72BE9142

General:	
Unit No. & Brand name	05/L1049 SIGMA
Known As	Triplex
Location	Block K
Item	Specific Requirements
Load	1600kg
Speed	1.0m/s
Shaft Width	2800mm
Shaft Depth	2515mm
No. of Stops	7
No. of Openings	7
Travel	19400mm
Pit Depth	1700mm
No. of Car Doors	1
Door Width	900mm
Door Height	2100mm
Door Type	Centre opening
Operation	VVVF Microprocessor control
Machine Type	Gearless
Machine Room Location	Above
No. of Units	4
Number of landing Doors	7
Counterweight Safeties	No
Intercommunication Device	No
Shaft Lighting	Yes
Position indicators	In car: yes

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Arrival Signals	Provide on all landings: yes
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**Unit
No.:**

Machine

Item	Specific Requirements
Rated Speed	90m/min
Load	36.5Amp
Ascending over-speed protection	No
Emergency Lowering Device	Yes
AC Power Regeneration	No

72BE9143

General:	
Unit No. & Brand name	05/L1050 SIGMA
Known As	Triplex
Location	Block K
Item	Specific Requirements
Load	1600kg
Speed	1.0m/s
Shaft Width	2834mm
Shaft Depth	2515mm
No. of Stops	7
No. of Openings	7
Travel	19400mm
Pit Depth	1700mm
No. of Car Doors	1
Door Width	900mm
Door Height	2100mm
Door Type	Centre opening
Operation	VVVF Microprocessor control
Machine Type	Gearless
Machine Room Location	Above
No. of Units	4
Number of landing Doors	7
Counterweight Safeties	No
Intercommunication Device	No
Shaft Lighting	Yes
Position indicators	In car: yes

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Arrival Signals	Provide on all landings: yes
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**Unit
No.:**

Machine

Item	Specific Requirements
Rated Speed	90m/min
Load	36.5Amp
Ascending over-speed protection	No
Emergency Lowering Device	Yes
AC Power Regeneration	No

72BE9144

General:	
Unit No. & Brand name	05/L1051 SIGMA
Known As	Triplex
Location	Block K
Item	Specific Requirements
Load	1600kg
Speed	1.0m/s
Shaft Width	1960mm
Shaft Depth	3519mm
No. of Stops	8
No. of Openings	8
Travel	25400mm
Pit Depth	1700mm
No. of Car Doors	1
Door Width	1000mm
Door Height	2100mm
Door Type	Side opening telescopic
Operation	VVVF Microprocessor control
Machine Type	Gearless
Machine Room Location	Above
No. of Units	4
Number of landing Doors	8
Counterweight Safeties	No
Intercommunication Device	No
Shaft Lighting	Yes
Position indicators	In car: yes

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Arrival Signals	Provide on all landings: yes
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Machine

Item	Specific Requirements
Rated Speed	90m/min
Load	36.5Amp
Ascending over-speed protection	No
Emergency Lowering Device	Yes
AC Power Regeneration	No

UNIVERSITAS GROUP

National Hospital: White Block

Unit No.:

General:		
Unit No. & Brand name	FSL20-88 Milleum Elevators	FSL20-89 Milleum Elevators
Known As	Passengers lift	Passengers lift
Location		
Item	Specific Requirements	
Load	1600 kg	1600KG
Speed	1.00 m/s	1.00 m/s
Shaft Width	To be measured	
Shaft Depth	To be measured	To be measured
No. of Stops	5	5
No. of Openings	1	1
Travel	To be measured	To be measured
Pit Depth	To be measured	To be measured
No. of Car Doors	1	1
Door Width	To be measured	To be measured
Door Height	To be measured	To be measured
Door Type	Side opening	Side opening
Operation	Automatic	Automatic
Machine Type	Gearless	Gearless
Machine Room Location	Top	Top
No. of Units	1	1
Number of landing Doors	5	5
Counterweight Safeties	Provide	Provide
Intercommunication Device	Provide	Provide

Shaft Lighting	Provide	Provide
Position indicators	In car	In car
Arrival Signals	Provide on all landings	Provide on all landings

Machine

Item	Specific Requirements	Specific Requirements
Rated Speed	1.00 m/s	1.00 m/s
Load	1600kg	1600kg
Ascending over-speed protection	Provide	Provide
Emergency Lowering Device	Provide	Provide
AC Power Regeneration	Provide	Provide

UNIVERSITAS MAIN HOSPITAL

General:						
Unit No. & Brand name	FSL 2013/2025 Otis	FSL2015/2009 Otis	FSL2015/2010 Otis	FSL 2013/2026 Otis	FSL2013/2027 Otis	FSL 21-122 Otis
Known As						Goods Lifts
Location	Main hospital					
Item	Specific Requirements					
Load	2000kg	2000kg	2000kg	1600kg	2000kg	2000kg
Speed	1.75m/s	1.75m/s	1.75m/s	1.75m/s	1.75m/s	1.0m/s
Shaft Width	To be measured					
Shaft Depth	To be measured					
No. of Stops	13	13	13	13	15	15
No. of Openings	13	13	13	26	30	30
Travel	To be measured					
Pit Depth	To be measured					
No. of Car Doors	1	1	1	2	2	2
Door Width	To be measured					
Door Height	To be measured					
Door Type	Centre opening	Centre opening	Centre opening		Centre opening	Side Opening
Operation	Gearless	Gearless	Gearless	Gearless	Gearless	Gearless
Machine Type	Traction	Traction	Traction	Traction	Traction	

Machine Room ,Location	Motor room					
No. of Units	1	1	1	1	1	1
Number of landing Doors	13	13	13	26	30	30
Counterweight Safeties	Provide	Provide	Provide	Provide	Provide	Provide
Intercommunication Device	Provide	Provide	Provide	Provide	Provide	Provide
Shaft Lighting	Provide	Provide	Provide	Provide	Provide	Provide
Position indicators	In car					
Arrival Signals	Provide on all landings					

Machine

Item	Specific Requirements					
Rated Speed	2000kg	2000kg	2000kg	1600kg	2000kg	2000kg
Load	1.75m/s	1.75m/s	1.75m/s	1.75m/s	1.75m/s	1.0m/s
Ascending over-speed protection	Provide	Provide	Provide	Provide	Provide	
Emergency Lowering Device	Provide	Provide	Provide	Provide	Provide	Provide
AC Power Regeneration	Provide	Provide	Provide	Provide	Provide	Provide

UAH HUIS IDALIA

Unit No.:

General:	Lift to be replaced	Lift to be replaced	Lift to be replaced
Unit No. & Brand name	Otis be105	Otis be106	Otis be107
Known As	Triplex	Triplex	Triplex
Location	Huis Idalia	Huis Idalia	Huis Idalia
Item	Specific Requirements	Specific Requirements	Specific Requirements
Load	1205kg	1205kg	1205kg
Speed	1.5m/s	1.5m/s	1.5m/s
Shaft Width	2500mm	2500mm	2500mm
Shaft Depth	2900mm	2900mm	2900mm
No. of Stops	12	12	12
No. of Openings	12	12	12
Travel	35000mm	35000mm	35000mm
Pit Depth	2780mm	2780mm	2780mm
No. of Car Doors	1	1	1
Door Width	1000mm	1000mm	1000mm
Door Height	2100mm	2100mm	2100mm
Door Type	Centre opening	Centre opening	Centre opening
Operation	Gear motor	Gear motor	Gear motor
Machine Type	Geared motor	Geared motor	Geared motor
Machine Room Location	Top floor	Top floor	Top floor
No. of Units	3	3	3
Number of landing Doors	12	12	12
Counterweight Safeties	Provide	Provide	Provide
Intercommunication Device	Provide	Provide	Provide
Shaft Lighting	Provide	Provide	Provide
Position indicators	In car	In car	In car
Arrival Signals	Provide on all landings	Provide on all landings	Provide on all landings

Machine

Item	Specific Requirements		
Rated Speed	1205kg	1205kg	1205kg
Load	1.5m/s	1.5m/s	1.5m/s
Ascending over-speed protection	Provide	Provide	Provide
Emergency Lowering Device	Provide	Provide	Provide
AC Power Regeneration	Provide	Provide	Provide

NATIONAL MAIN HOSPITAL

General:			Lift To be replaced	Lift To be replaced
Unit No. & Brand name	05/L1111 /KONE	05/L1110/ KONE	BFE639 /Otis	BFE638/ Otis
Known As	Duplex	Duplex	Duplex	Triplex
Location	Main Hospital	Main Hospital	National main hospital	National main hospital
Item	Specific Requirements	Specific Requirements	Specific Requirements	Specific Requirements
Load	2000kg	2000kg	2000kg	2000kg
Speed	1m/s	1m/s	1m/s	1m/s
Shaft Width	To measure	To be measured	To be measured	To be measured
Shaft Depth	To measure	To measure	To be measured	To be measured
No. of Stops	4	4	4	4
No. of Openings	4	4	4	4
Travel	To measure	To measure	To be measured	To be measured
Pit Depth	To measure	To measure	To be measured	To be measured
No. of Car Doors	1	1	1	1
Door Width	To measure	To measure	1000mm	To be measured
Door Height	To measure	To measure	To be measured	To be measured
Door Type	Side opening	Side opening	Centre opening	Centre opening
Operation	AMD	AMD		
Machine Type	Mx20	Geared motor		
Machine Room Location	Shaft	Shaft	Top floor	Top floor
No. of Units	2	2	2	2
Number of landing Doors	4	4	4	4
Counterweight Safeties	Provide	Provide	Provide	Provide
Intercommunication Device	Provide	Provide	Provide	Provide
Shaft Lighting	Provide	Provide	Provide	Provide
Position indicators	In car	In car	In car	In car
Arrival Signals	Provide on all landings			

Machine

Item	Specific Requirements	Specific Requirements	Specific Requirements	Specific Requirements
Rated Speed	2000kg	2000kg	2000kg	2000kg
Load	1m/s	1m/s	1m/s	1m/s
Ascending over-speed protection	Provide	Provide	Provide	Provide
Emergency Lowering Device	Provide	Provide	Provide	Provide
AC Power Regeneration	Provide	Provide	Provide	Provide

UAH

Unit No.: NETCARE

General:	
Unit No. & Brand name	05/L1005 Kone
Known As	Duplex
Location	Student Accommodation
Item	Specific Requirements
Load	2000kg
Speed	1.0 m/s
Shaft Width	To be measured
Shaft Depth	To be measured
No. of Stops	11
No. of Openings	11
Travel	To be measured
Pit Depth	To be measured
No. of Car Doors	1
Door Width	To be measured
Door Height	To be measured
Door Type	Side opening
Operation	Gearless
Machine Type	NMX
Machine Room Location	Shaft
No. of Units	1
Number of landing Doors	11
Counterweight Safeties	Provide
Intercommunication Device	Provide
Shaft Lighting	Provide
Position indicators	In car
Arrival Signals	Provide on all landings

Machine

Item	Specific Requirements
Rated Speed	2000kg
Load	1.0 m/s
Ascending over-speed protection	Provide
Emergency Lowering Device	Provide
AC Power Regeneration	Provide

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FORENSIC MORTUARY

General:	
Unit No. & Brand name	Vimec
Known As	Paraplegic
Location	Forensic Mortuary
Item	Specific Requirements
Load	300kg
Speed	0.5 m/s
Shaft Width	To be measured
Shaft Depth	To be measured
No. of Stops	2
No. of Openings	2
Travel	To be measured
Pit Depth	To be measured
No. of Car Doors	1
Door Width	To be measured
Door Height	To be measured
Door Type	Side opening
Operation	Hydraulic
Machine Type	Hydraulic
Machine Room Location	Ground Floor
No. of Units	1
Number of landing Doors	2
Counterweight Safeties	Provide
Intercommunication Device	Provide
Shaft Lighting	Provide
Position indicators	In car
Arrival Signals	Provide on all landings

Machine

Item	Specific Requirements
Rated Speed	300kg
Load	0.5 m/s
Ascending over-speed protection	Provide
Emergency Lowering Device	Provide
AC Power Regeneration	Provide

ALBERT NZULA HOSPITAL

General:	
Unit No. & Brand name	Schindler
Known As	
Location	Admin
Item	Specific Requirements
Load	
Speed	
Shaft Width	To be measured
Shaft Depth	To be measured
No. of Stops	2
No. of Openings	2
Travel	To be measured
Pit Depth	To be measured
No. of Car Doors	1
Door Width	To be measured
Door Height	To be measured
Door Type	Side opening
Operation	
Machine Type	
Machine Room Location	Shaft
No. of Units	1
Number of landing Doors	2
Counterweight Safeties	Provide
Intercommunication Device	Provide
Shaft Lighting	Provide
Position indicators	In car
Arrival Signals	Provide on all landings

Machine

Item	Specific Requirements
Rated Speed	
Load	
Ascending over-speed protection	Provide
Emergency Lowering Device	Provide
AC Power Regeneration	Provide

UAH

General:	Lift to be replaced	Lift to be replaced
Unit No. & Brand name	Bfe132	Bfe133 Otis
Known As		
Location	Doctors quarters	Doctors quarters
Item	Specific Requirements	
Load	1125kg	1125kg
Speed	1.5 ms	1.5 ms
Shaft Width	To be measured	To be measured
Shaft Depth	To be measured	To be measured
No. of Stops	6	6
No. of Openings	6	6
Travel	To be measured	To be measured
Pit Depth	To be measured	To be measured
No. of Car Doors	1	1
Door Width	To be measured	To be measured
Door Height	To be measured	To be measured
Door Type	Center opening	Center opening
Operation	Gear	Gear
Machine Type	Geared	Geared
Machine Room Location	Top floor	Top floor
No. of Units	2	2
Number of landing Doors	6	6
Counterweight Safeties	Provide	Provide
Intercommunication Device	Provide	Provide
Shaft Lighting	Provide	Provide
Position indicators	In car	In car
Arrival Signals	Provide on all landings	Provide on all landings

Machine

Item	Specific Requirements	Specific Requirements
Rated Speed	1125kg	1125kg
Load	1.5 ms	1.5 ms
Ascending over-speed protection	Provide	Provide
Emergency Lowering Device	Provide	Provide
AC Power Regeneration	Provide	Provide

FSSON STUDENT ACCOMMODATION

General:	Lift to be replaced	Lift to be replaced
Unit No. & Brand name	DFE 638 Schindler	DFE 639 Schindler
Known As	Duplex	Duplex
Location	Student Accommodation	Student Accommodation
Item	Specific Requirements	
Load	1500kg	1500kg
Speed	1.0 ms	1.0 ms
Shaft Width	To be measured	To be measured
Shaft Depth	To be measured	To be measured
No. of Stops	6	6
No. of Openings	6	6
Travel	To be measured	To be measured
Pit Depth	To be measured	To be measured
No. of Car Doors	1	1
Door Width	To be measured	To be measured
Door Height	To be measured	To be measured
Door Type	Center opening	Center opening
Operation	Geared	Geared
Machine Type		
Machine Room Location	Motor Room	Motor Room
No. of Units	1	1
Number of landing Doors	6	6
Counterweight Safeties	Provide	Provide
Intercommunication Device	Provide	Provide
Shaft Lighting	Provide	Provide
Position indicators	In car	In car
Arrival Signals	Provide on all landings	Provide on all landings

Machine

Item	Specific Requirements	Specific Requirements
Rated Speed	1500kg	1500kg
Load	1.0 ms	1.0 ms
Ascending over-speed protection	Provide	Provide
Emergency Lowering Device	Provide	Provide
AC Power Regeneration	Provide	Provide

FSSON ADMIN

General:		
Unit No. & Brand name	Kone	Kone
Known As	Duplex	Duplex
Location	Admin	Admin
Item	Specific Requirements	
Load	1000kg	1000kg
Speed	1.0 ms	1.0 ms
Shaft Width	To be measured	To be measured
Shaft Depth	To be measured	To be measured
No. of Stops	6	6
No. of Openings	6	6
Travel	To be measured	To be measured
Pit Depth	To be measured	To be measured
No. of Car Doors	1	1
Door Width	To be measured	To be measured
Door Height	To be measured	To be measured
Door Type	Center opening	Center opening
Operation	Gearless	Gearless
Machine Type	NMX	NMX
Machine Room Location	Shaft	Shaft
No. of Units	1	1
Number of landing Doors	6	6
Counterweight Safeties	Provide	Provide
Intercommunication Device	Provide	Provide
Shaft Lighting	Provide	Provide
Position indicators	In car	In car
Arrival Signals	Provide on all landings	Provide on all landings

Machine

Item	Specific Requirements	Specific Requirements
Rated Speed	1000kg	1000kg
Load	1.0 ms	1.0 ms
Ascending over-speed protection	Provide	Provide
Emergency Lowering Device	Provide	Provide
AC Power Regeneration	Provide	Provide

UAH MAIN HOSPITAL OUT PATIENTS

General:	To be replaced						
Unit No. & Brand name	BFE0457/Sabim	BFE0458/Sabim	BFE63/LIFT H Otis	BFE66/LIFT L(I) Otis	BFE65/LIFT K Otis	BFE64/LIFT J Otis	72NE6144 Otis
Known As	Duplex	Duplex	Simplex	Simplex	Simplex	Simplex	Simplex
Location	Main hospital out patients						
Item	Specific Requirements						
Load	750kg	1500kg	1850kg	1120kg	575kg	575kg	300kg
Speed	1m/s	1m/s	1.5m/s	0.5m/s	1.5m/s	1.5m/s	0.5m/s
Shaft Width	To be measured						
Shaft Depth	To be measured						
No. of Stops	3	3	3	2	14	14	2
No. of Openings	3	3	3	2	14	14	2
Travel	To be measured						
Pit Depth	To be measured						
No. of Car Doors	1	1	2	1	1	1	1
Door Width	To be measured						
Door Height	To be measured						

Door Type	Side opening	Side opening	Side opening	Swing door	Swing door	Swing door	Central shutter door
Operation	Geared	Geared	Geared	Geared	Geared	Geared	Manual
Machine Type	Gear	Gear	Gear	Gear	Gear	Gear	N/A
Machine Room Location	Top floor	Top of shaft					
No. of Units	2	2	1	1	1	1	1
Number of landing Doors	3	3	3	2	14	14	2
Counterweight Safeties	Provide						
Intercommunication Device	Provide						
Shaft Lighting	Provide						
Position indicators	In car						
Arrival Signals	Provide on all landings						

Machine

Item	Specific Requirements						
Rated Speed	750kg	1500kg	1850kg	1120kg	575kg	575kg	300kg
Load	1m/s	1m/s	1.5m/s	0.5m/s	1.5m/s	1.5m/s	0.5m/s
Ascending over-speed protection	Provide	Provide	Provide	Provide	Provide	Provide	
Emergency Lowering Device	Provide	Provide	Provide	Provide	Provide	Provide	
AC Power Regeneration	Provide	Provide	Provide	Provide	Provide	Provide	

EXTERNAL GROUP

BOITUMELO HOSPITAL

General:							To be Replaced
Unit No. & Brand name	05/L101 4 Otis	05/L101 3 Otis	05/L110 6 Otis	05/L892 Tyssonk rup	05/BE69 5 Otis	FSL20- 102	Hoist L891 Otis
Known As							
Location							
Item	Specific Requirements						
Load	1600kg	1600kg	1600kg	570kg	1600kg	1350kg	1000kg
Speed	1.00m/s	1.00m/s	1.00m/s	1.00m/s	0.5m/s	1.00m/s	1.00m/s
Shaft Width	To be measured						
Shaft Depth	To be measured						
No. of Stops	4	4	3	2	2	2	2
No. of Openings	4	4	3	2	2	2	2
Travel	To be measured						
Pit Depth	To be measured	L*b*w(900mm*2000mm*2000mm).					
No. of Car Doors	1	1	1	1	1	1	L*b*w(8910mm*1700mm*1500mm)
Door Width	To be measured	l*b(1960mm*1550mm)					
Door Height	To be measured						
Door Type	Side opening						
Operation	Vvv4	Vvv4	Vvv4+	SIEI GMBC	Co *25	Vvvf	Manual

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Machine Type	Gear less traction motor	3 phase induction motor	Gear less traction motor	Hoist drum motor			
Machine Room Location	Motor less	Motor less	Motor less	Motor less	Top of the roof	Top of the roof	Motor less
No. of Units	3	3	3	1	1	1	1
Number of landing Doors	3	3	3	2	2	2	2
Counterweight Safeties	Provide	Provide	Provide	Provide	Provide	Provide	Provide
Intercommunication Device	Provide	Provide	Provide	Provide	Provide	Provide	Provide
Shaft Lighting	Provide	Provide	Provide	Provide	Provide	Provide	Provide
Position indicators	In car	In car	In car	In car	In car	In car	In car
Arrival Signals	Provide on all landings	Provide on all landings	Provide on all landings	Provide on all landings			

Machine

Item	05/L1014 Otis	05/L1013 Otis	05/L1106 Otis	05/L892 Thyssenkrup	05/BE695 Otis	FSL20-102	Hoist L891 Otis
Rated Speed	1.00m/s	1.00m/s	1.00m/s	1.00m/s	0.5m/s	1.00m/s	1.00m/s
Load	1600kg	1600kg	1600kg	1600 kg	16000kg	1350kg	1000kg
Ascending over-speed protection	Provide	Provide	Provide	Provide	Provide	Provide	Provide
Emergency Lowering Device	Provide	Provide	Provide	Provide	Provide	Provide	Provide
AC Power Regeneration	Provide	Provide	Provide	Provide	Provide	Provide	Provide

Hoist L891

Pit - L*b*w(900mm*2000mm*2000mm).

Doors - l*b (1960mm*1550mm).

Car L*b*w (8910mm*1700mm*1500mm).

Load 1000kg

Bongani Hospital

General:							
Unit No. & Brand name	BFE390 Mitsubishi	BFE393 Mitsubishi	BF391 Mitsubishi	FSL20-110 Zhejiang Meilum	FSL20-111 Zhejiang Meilum	FSL20-112 Zhejiang Meilum	FSL20-113 Zhejiang Meilum
Known As							
Location							
Item	Specific Requirements	Specific Requirements	Specific Requirements	Specific Requirements	Specific Requirements	Specific Requirements	Specific Requirements
Load	1050kg	1050kg	1050kg	3000kg	3000kg	3000kg	3000kg
Speed	1.00 m/s	1.00 m/s	1.00 m/s	1.00m/s	1.00m/s	1.00m/s	1.00m/s
Shaft Width	To be measured	To be measured	To be measured	To be measured	To be measured	To be measured	To be measured
Shaft Depth	To be measured	To be measured	To be measured	To be measured	To be measured	To be measured	To be measured
No. of Stops	4	4	4	4	4	4	4
No. of Openings	4	4	4	4	4	4	4
Travel	To be measured	To be measured	To be measured	To be measured	To be measured	To be measured	To be measured
Pit Depth	To be measured	To be measured	To be measured	To be measured	To be measured	To be measured	To be measured
No. of Car Doors	1	1	1	1	1	1	1
Door Width	To be measured	To be measured	To be measured	To be measured	To be measured	To be measured	To be measured
Door Height	To be measured	To be measured	To be measured	To be measured	To be measured	To be measured	To be measured
Door Type	Side opening	Side opening	Side opening	Centre opening	Centre opening	Centre opening	Centre opening
Operation	2BC	2BC	2BC	Digital vvvf door	Digital vvvf door	Digital vvvf door	Digital vvvf door
Machine Type	3 phase induction motor	3 phase induction motor	3 phase induction motor	AC induction	AC induction	AC induction	AC induction

Machine Room Location	Roof						
No. of Units	1	1	1	1	1	1	1
Number of landing Doors	4	4	4	4	4	4	4
Counterweight Safeties	Provide						
Intercommunication Device	Provide						
Shaft Lighting	Provide						
Position indicators	In car						
Arrival Signals	Provide on all landings						

Machine

Item	BFE390	BFE393	BF391	FSL20-110 Zhejiang Meilum	FSL20-111 Zhejiang Meilum	FSL20-112 Zhejiang Meilum	FSL20-113 Zhejiang Meilum
Rated Speed	1.00m/s	1.00m/s	1.00m/s	1.00m/s	1.00m/s	1.00m/s	1.00m/s
Load	1050kg	1050kg	1050kg	3000kg	3000kg	3000kg	3000kg
Ascending over-speed protection	Provide	Provide	Provide	Provide	Provide	Provide	Provide
Emergency Lowering Device	Provide	Provide	Provide	Provide	Provide	Provide	Provide
AC Power Regeneration	Provide	Provide	Provide	Provide	Provide	Provide	Provide

Dihlabeng Hospital

General:			
Unit No. & Brand name	FSL16/10 Schindler	FSL16/11 Schindler	FSL16/12 Schindler
Known As	A lift	B lift	C lift
Location			
Item	Specific Requirements	Specific Requirements	Specific Requirements
Load	1800kg	1800kg	1800kg
Speed	1.00 m/s	1.5m/s	1.5m/s
Shaft Width	To be measured	To be measured	To be measured
Shaft Depth	To be measured	To be measured	To be measured
No. of Stops	6	5	5
No. of Openings	8	5	6
Travel	To be measured	To be measured	To be measured
Pit Depth	To be measured	To be measured	To be measured
No. of Car Doors			
Door Width	To be measured	To be measured	To be measured
Door Height	To be measured	To be measured	To be measured
Door Type			
Operation			
Machine Type			
Machine Room Location	Above Well	Above Well	Above Well
No. of Units	1	1	1
Number of landing Doors	8	5	6
Counterweight Safeties	Provide	Provide	Provide
Intercommunication Device	Provide	Provide	Provide
Shaft Lighting	Provide	Provide	Provide
Position indicators	In car	In car	In car
Arrival Signals	Provide on all landings	Provide	Provide

Machine

Item	FSL16/10 Schindler	FSL16/11 Schindler	FSL16/12 Schindler
Rated Speed	1800kg	1800kg	1800kg
Load	1.00 m/s	1.5m/s	1.5m/s
Ascending over-speed protection	Provide	Provide	Provide

Emergency Lowering Device	Provide	Provide	Provide
AC Power Regeneration	Provide	Provide	Provide

Manapo Hospital

Unit No.:

General:						
Unit No. & Brand name	05/L1018 MMR Signa	05/L1019 MMR Signa	05/L1020 MMR Signa	05/L1021 MMR Signa	05/L1022 MMR Signa	05/L1023 MMR Signa
Known As						
Location						
Item	Specific Requirements					
Load	1350kg	1350kg	1350kg	1350kg	1000kg	1000kg
Speed	1.75m/s	1.75m/s	1.75m/s	1.75m/s	1.75m/s	1.75m/s
Shaft Width	To be measured					
Shaft Depth	To be measured					
No. of Stops	4	4	4	4	4	4
No. of Openings	5	5	4	4	4	4
Travel	To be measured					
Pit Depth	To be measured					
No. of Car Doors	2	2	1	1		
Door Width	To be measured					
Door Height	To be measured					
Door Type	Auto telescope					
Operation	Automatic	Automatic	Automatic	Automatic	Automatic	Automatic
Machine Type	Gearless	Gearless	Gearless	Gearless	Gearless	Gearless
Machine Room Location	Above	Above	Above	Above	Above	Above
No. of Units	2	2	2	2	2	2
Number of landing Doors	4	4	4	4	4	4
Counterweight Safeties	Provide	Provide	Provide	Provide	Provide	Provide
Intercommunication Device	Provide	Provide	Provide	Provide	Provide	Provide
Shaft Lighting	Provide	Provide	Provide	Provide	Provide	Provide
Position indicators	In car					
Arrival Signals	Provide on all landings					

(91)

Machine

Item	05/L1018	05/L1019	05/L1020	05/L1021	05/L1022	05/L1023
Rated Speed	1.75m/s	1.75m/s	1.75m/s	1.75m/s	1.75m/s	Auto telescope
Load	1350kg	1350kg	1350kg	1350kg	1000kg	Auto telescope
Ascending over-speed protection	Provide	Provide	Provide	Provide	Provide	Provide
Emergency Lowering Device	Provide	Provide	Provide	Provide	Provide	Provide
AC Power Regeneration	Provide	Provide	Provide	Provide	Provide	Provide

Phekolong Hospital

Unit No.:

General:		
Unit No. & Brand name	FSL20-104 Milleum Elevators	BE816 Otis
Known As	Passengers lift	Passengers lift
Location		
Item	Specific Requirements	
Load	1600 kg	1600KG
Speed	1.00 m/s	1.00 m/s
Shaft Width	To be measured	To be measured
Shaft Depth	To be measured	To be measured
No. of Stops	2	2
No. of Openings	1	1
Travel	To be measured	To be measured
Pit Depth	To be measured	To be measured
No. of Car Doors	1	1
Door Width	To be measured	To be measured
Door Height	To be measured	To be measured
Door Type	Side opening	Swing door
Operation	Telescopic	Telescopic
Machine Type	Traction	Geared
Machine Room Location	Above	Above
No. of Units	1	1
Number of landing Doors	2	2
Counterweight Safeties	Provide	Provide
Intercommunication Device	Provide	Provide
Shaft Lighting	Provide	Provide
Position indicators	In car	In car
Arrival Signals	Provide on all landings	Provide on all landings

Machine

Item	Specific Requirements	Specific Requirements
Rated Speed	1.00 m/s	1.00 m/s
Load	1600kg	1600kg
Ascending over-speed protection	Provide	Provide
Emergency Lowering Device	Provide	Provide
AC Power Regeneration	Provide	Provide

Senorita-Nhlabathi Hospital

General:						
Unit No. & Brand name	05/L1125	05/L1126	05/L1128 Kone Elevators	05/L1129	05/L1130 Kone Elevators	05/L1127
Known As						
Location	Medical	Theatre	X-Ray	Theatre lift	Nurses home	Admin
Item	Specific Requirements	Specific Requirements	Specific Requirements	Specific Requirements	Specific Requirements	Specific Requirements
Load	1600 kg	1500kg	1000kg	1500kg	630kg	630kg
Speed	1.00 m/s	1.0m/s	1.0 m/s	1.0m/s	1.0m/s	1.0m/s
Shaft Width	To be measured	To be measured	To be measured	To be measured	To be measured	To be measured
Shaft Depth	To be measured	To be measured	To be measured	To be measured	To be measured	To be measured
No. of Stops	2	2	2	2	2	2
No. of Openings	1	1	1	1	1	1
Travel	To be measured	To be measured	To be measured	To be measured	To be measured	To be measured
Pit Depth	To be measured	To be measured	To be measured	To be measured	To be measured	To be measured
No. of Car Doors	1					
Door Width	To be measured	To be measured	To be measured	To be measured	To be measured	To be measured
Door Height	To be measured	To be measured	To be measured	To be measured	To be measured	To be measured
Door Type	AMD	AMD	AMD	AMD	AMD	AMD
Operation	Gearless	Gearless	Gearless	Gearless	Gearless	Gearless
Machine Type	MX	MX	MX	MX	MX	MX
Machine Room Location	Motorless	Motorless	Motorless	Motorless	Motorless	Motorless
No. of Units	1	1	1	1	1	1
Number of landing Doors	2	2	2	2	2	2
Counterweight Safeties	Provide	Provide	Provide	Provide	Provide	Provide
Intercommunication Device	Provide	Provide	Provide	Provide	Provide	Provide
Shaft Lighting	Provide	Provide	Provide	Provide	Provide	Provide
Position indicators	In car	In car	In car	In car	In car	In car
Arrival Signals	Provide on all landings	Provide	Provide	Provide	Provide	Provide

Machine

Item	05/L1125	05/L1126	05/L1128 Kone Elevators	05/L1129	05/L1130 Kone Elevators	05/L1127

Rated Speed	1600 kg	1500kg	1000kg	1500kg	630kg	1000kg
Load	1.00 m/s	1.0m/s	1.0 m/s	1.0m/s	1.0m/s	1.0 m/s
Ascending over-speed protection	Provide	Provide	Provide	Provide	Provide	Provide
Emergency Lowering Device	Provide	Provide	Provide	Provide	Provide	Provide
AC Power Regeneration	Provide	Provide	Provide	Provide	Provide	Provide

REPLACEMENT, MAINTENANCE, REPAIRS OF LIFT AND RESPONSE TO CALL-OUTS AT VARIOUS HEALTH FACILITIES WITHIN FREE STATE PROVINCE.

PART C3.4 NEW INSTALLATION STANDARD SPECIFICATION

NEW LIFTS

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3. GENERAL

1. SCOPE OF WORK

The basic scope of work is as follows:

- Replacement of all mechanical components which have been in operation for the past 20 years, including; Driving machinery, door equipment, car frames and enclosures as well as all safety and braking devices.
- Retention of door frames which can easily be re-used as this will reduce installation time, reduce cost as well as minimize disruption to daily activities within the building.
- Replacement of all electrical equipment including all wiring, new control systems, new operating controls (buttons switches etc.)
- Compliance with the latest requirements for Lifts with special recognition/compliance to access to Disabled as well as visually impaired individuals.

- Ensure reduced maintenance cost.
- Ensure energy efficiency and environmentally friendly
- Ensure a product life expectancy of a minimum of 15 years.

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PART 1

CONDITIONS OF CONTRACT

0.0 DEFINITIONS

- **“Best Practice”** shall mean the exercise of that degree of skill, diligence, prudence and foresight which would reasonably and ordinarily be expected from time to time from a skilled and experienced, Manufacturer, Supplier and/or Lift-Contractor seeking in good faith to comply with its contractual obligations as envisaged by the Works Information in accordance with world best class practices.
- **“Budgetary Allowance”** shall mean the monetary value anticipated for finishes which shall not form part of the Contract Appointment. The partial or full allocation of funds from the Budgetary Allowance shall be at the sole discretion of the Employer and/or Lift-Consulting Engineer.
- **“Builder’s Lift”** shall mean a lift used by an authorised Builder / Main Contractor to transport material and/or staff during the installation period prior to Works Completion.
- **“Builder’s Work”** shall mean all the work relating to the construction and/or modification and/or repair and/or finish of the building structure, electrical supply and distribution board, machine space ventilation and all other building related work necessary for the proper and complete installation of the lift equipment in terms of the Works Information.
- **“Confidence Trials”** shall mean the initial period of operation where the equipment is checked and monitored for operational compliance with the Works Information.
- **“Domestic Sub Contractor”** shall mean the Sub Contractor(s) directly appointed by and under the full direction, control and responsibility of the Lift-Contractor. The Domestic Sub Contractor(s) shall not be assigned or assume any of the contractual responsibilities of the Lift-Contractor.
- **“Lift-Contractor”** shall mean the tendering company or company contracted to supply, deliver, installed and maintain the equipment as specified.
- **“Main Offer”** shall mean the offer tendered or presented which complies in full with the intent and requirements of the Works Information without alternatives, options or deviations.

- **“Maintenance Agreement”** shall mean the Employer’s performance based Maintenance Agreement detailing the minimum requirements for the maintenance, repair and replacement of the equipment during the **12-month** guarantee period.
- **“Manufacturer”** shall mean the international parent company designing, manufacturing, supplying and supporting the control and drive equipment and who has the official jurisdiction to authorise and approve product usage or selection as well as setting the minimum standards of installation, safety and operation.
- **“Practical Completion”** shall mean that the equipment is in a state of completion where it can be made fully operation to provide an efficient and reliable service with safety in terms of the Works Information.
- **“Works Completion Inspection”** shall mean the final inspection(s) and test(s) conducted or witnessed by the Consulting Lift Engineer prior to placing the equipment into full operation.
- **“Works Completion”** shall mean the time of full compliance with the Works Information after the Works Completion Inspection(s) and Confidence Trial(s) have been satisfactory concluded and on issue of the Works Completion Certificate(s).
- **“Works Information”** shall mean the specification, approved programme, drawings and all other documentation that collectively makes up the Contract Appointment.

1.0 **INTENT**

1.0.1 The specification is intended to cover the complete upgrade/replacement of the lift equipment. The specifications outline the minimum equipment required, but do not cover all the details of design and construction. Such details are recognised as being the exclusive responsibility of the Lift-Contractor. It is hereby acknowledged that neither the Principal Agent nor the Consulting Lift Engineer invented or developed any part of the lift system, but have only made selections of capacities, speeds, control systems, materials and finishes, as well as specified performance and installation criteria as may be applicable.

1.1 **WORKS INFORMATION**

1.1.1 “Works Information” shall be interpreted as the tender documentation, specification, approved programme, drawings and all other documentation that collectively make up the Contract Appointment.

1.1.2 By submission of a tender, the Lift-Contractor shall be deemed to have inspected and be fully acquainted with the Works Information, local requirements, by-laws, regulations and all aspects of the works envisaged whether or not shown or detailed in the Works Information.

1.1.3 Check the Works Information and should any pages be missing, incorrectly numbered, duplicated, the reproduction is indistinct or contains any errors, notify the Consulting Lift Engineer and Principal Agent timeously for rectification. No liability whatsoever shall be admitted in respect of errors due to the above-mentioned causes.

1.2 STANDARDS AND CODES OF PRACTICE

1.2.1 Provide all work in accordance with the requirements of the South African National Standards **SANS 1545-1**, all other relevant published lift **SANS Standards**, the Occupational Health and Safety Act 85 of 1993 as revised and current regulations of all other codes applicable to the work. Other relevant Standards (SANS) to be applied shall include but shall not be limited to:

- SANS 50081-1 (EN 81-1) Electric Lifts
- SANS 50081-70 (EN 81-70) Accessibility to lifts for persons including persons with disability.
- SANS 1545-9 Lift landing doors – Fire resistance testing.
- SANS 0360- lift maintenance requirements.

1.2.2 Equipment shall be new and approved by the local authorities having the appropriate jurisdiction.

1.2.3 Provide all equipment from the same Manufacturer.

1.3 QUALIFICATIONS

1.3.1 Furnish a document which gives a complete description of all equipment wherein the lifts proposed do not comply with the Works Information, or are in conflict with the work of other trades as specified or shown in the Works Information. Failure to furnish such a document shall be interpreted to mean that the Lift-Contractor agrees to meet all requirements of the Works Information. Any conflict with the work of other trades brought about by the use of the Lift-Contractor's equipment shall not result in any added cost to the Employer.

1.4 APPROVALS AND SUBSTITUTIONS

- 1.4.1 Where the words "for approval" or "approved" are used and it is desired to substitute a different make or type of apparatus from that specified, all information pertinent to the adequacy and adaptability of the proposed equipment shall be submitted to the Principal Agent and Consulting Lift Engineer for approval prior to the equipment being ordered or released for manufacture.
- 1.4.2 Approvals for equipment specified or proposed substitutions shall not be given merely upon the submission of Manufacturer's part names.
- 1.4.3 Approvals for all equipment submitted as a substitution for that specified or shown on the drawings may be granted if such equipment meets the intended and anticipated requirements pertaining to performance, reliability, operation, space conditions, weight, and quality of equipment.

1.5 VERIFICATION, STANDARDS AND DEVIATIONS

- 1.5.1 Deviations from the Works Information shall not be accepted. The Lift-Contractor shall verify in the tender covering letter, that they have read and understand the content, meaning and intentions of the Works Information and have tendered accordingly.
- 1.5.2 When the Works Information cannot be met in terms of specific design requirements; substitution or alternative equipment may be considered provided that the substituted equipment does not reduce the intended performance, operation, duty-rate, redundancy and reliability requirements of the Works Information. Deviations or substituted equipment not clearly shown and detailed in the Tenderer's covering letter under the headings, "DEVIATIONS", shall not be considered or accepted.
- 1.5.3 Tender supplementary documentation showing the technical details, load, speed size, performance and operation of the equipment offered and conditions of Contract, shall only serve as an informative document in terms of the equipment offered, program, organisation and staff, and alternatives offered and shall not be considered an acceptable qualification in terms of the Works Information. Equipment offered as substitution that does not comply with **Part-1.5.2** of this Specification, whether or not shown in the supplementary document shall not be accepted.
- 1.5.4 It is accepted that the Manufacturers of lift equipment are continuously introducing new designs of equipment or individual components of the equipment. However, although the Principal Agent or Consulting Lift Engineer has not specified specific makes of equipment and has only specified the design, operation, reliability and performance requirements, there are a number of individual components of the

equipment offered by lift Manufacturers that shall not be accepted. The following equipment components offered in terms of this specification shall be clearly detailed in the tender supplementary documentation and shall be regarded by the Manufacturer as the most modern, technically advanced and most reliable equipment available:

- Car and landing signals,
- Car and landing call button units,
- Door drive equipment,
- Door protection devices,
- Control equipment,
- Drive equipment,
- Intercom equipment.

1.5.5 Not to restrict or limit the Lift-Contractor's technical input, advice or experience, substitute equipment better suited to the installation as a whole may be offered. Provide all technical details and descriptions of the substituted equipment for approval by the Principal Agent and Consulting Lift Engineer.

1.5.6 Should any person request equipment that in any way technically deviates from the Works Information, inform the Consulting Lift Engineer in writing, before entering into detailed discussions with the person requesting the revised equipment or placing the order for the manufacture and supply of the revised equipment. Should approval for the revised equipment not be obtained from the Consulting Lift Engineer, the Lift-Contractor shall be liable for all costs associated with providing equipment in terms of the Works Information.

1.6 ALTERNATIVES

1.6.1 Not limiting the Lift-Contractor's obligations in terms of **Part-1.5 (Deviations)**, the Principal Agent and Consulting Lift Engineer may consider alternatives based on grounds of cost if the alternatives do not negatively affect the specified performance levels, operation, reliability, duty-rate, and product expectation. Lift-Contractor's offering alternatives will not be penalised however, Lift-Contractor's shall not deviate with regards to the Main Offer.

1.6.3 Provide duplicates of and complete Bills of Quantities- if provided for each Alternative offered.

6.1.4 Alternatives presented and accepted by the Principal Agent and Consulting Lift Engineer shall comply in full with the Conditions of Contract as contained in the Works Information and shall not be limited to performance, operation, reliability, duty rate and quality of equipment.

1.7 GENERAL RESPONSIBILITIES

- 1.7.1 The work throughout shall be executed to the highest standards and to the entire satisfaction of the Principal Agent and Consulting Lift Engineer who shall interpret the meaning of the Works Information and shall have the authority to reject any work or equipment which in their judgement is not in full accordance therewith.
- 1.7.2 The Lift-Contractor shall be fully responsible for his work and shall replace any of the same, which may be damaged, lost or stolen, without additional cost to the Employer. The Lift-Contractor shall protect the building and its contents against damage by him, his Employees or Domestic Sub Contractors and shall make good any damage thereto. The Lift-Contractor shall indemnify the Employer and Principal Agent from and against all liability for damages arising from injuries or disabilities to persons or damage to property occasioned by any act or omission of the Lift-Contractor or any of their Domestic Sub Contractors, including any and all expenses, legal or otherwise, which may be incurred by the Employer, Principal Agent, Consulting Lift Engineer or in the defence of any claim, action or suit.
- 1.7.3 The Lift-Contractor shall put his work in place as fast as reasonably possible, shall at all times keep a competent Foreman in charge of the work and shall facilitate its inspection by the Principal Agent and/or Consulting Lift Engineer. Arrange any rubbish caused by on-site work in orderly piles and remove from site promptly.
- 1.7.4 Except for such changes as may be specifically approved by the Principal Agent and Consulting Lift Engineer, all work shall be in full accordance with the intent of the Works Information, complete in every detail and ready for satisfactory and efficient operation when delivered at Works Completion.
- 1.7.5 The Lift-Contractor warrants that the equipment and workmanship shall be of the highest grade, installed in a practical and first-class manner in accordance with Best Practice and ready and complete for full operation at Works Completion. It is specifically intended that all equipment and labour which is usually provided as part of such equipment as is called for and which is necessary for its proper completion and operation shall be provided without additional cost whether or not shown or described in detail in the Works Information.
- 1.7.6 The Lift-Contractor shall thoroughly acquaint himself with the work involved and shall verify on-site measurements necessary for the proper installation of his work. He shall also promptly furnish information well in advance of field requirements and shall co-operate with and co-ordinate the work of others as may be applicable.

1.7.7 Equipment damaged in transit shall not be set and shall be replaced without additional cost to the Employer.

1.7.8 The Lift-Contractor shall be fully responsible to check and verify that the retained equipment including the electrical feeder system / design is mechanically and electrically sound and compatible with the new equipment provided in so far as meeting the requirements of the Specification and providing a long term (20-years) solution.

1.7.9 **Retained Equipment:** Where Part-4 allows the option for the Lift-Contractor to retain existing equipment; it shall remain the Lift-Contractor's sole responsibility to ensure that retained equipment complies in full with the specification with regards to safety, operation, performance, reliability, duty rate and where applicable, the finish. Modifications made to retain components of the equipment which may become necessary to achieve the requirements of the specification shall be undertaken in accordance with the Manufacturer's approved design and installation requirements.

1.7.10 **Insurance:** The Lift-Contractor shall be required to take out adequate insurance in order to cover its obligations in terms of the Works Information and to keep them current for the duration of the Contract and in compliance with the NEC type contract.

1.8 **LIFT-CONTRACTOR'S SUBMISSION OF WORKS BY OTHER TRADES**

Notwithstanding the Lift-Contractor's obligations in terms of this specification with regards to Builder's Work:

1.8.1 Inform the Principal Agent and Consulting Lift Engineer in writing, clearly detailing all electrical, mechanical and structural work necessary for the proper installation of the equipment. Comments referring to the excluded work on the Lift-Contractor's plans, lay-outs or shop drawings shall not be regarded as sufficient detail and shall not replace the document called for under this section.

1.8.2 It is intended that at the outset of the installation, all parties shall clearly understand their responsibilities with regards to the proper and complete installation of the equipment. Failure to furnish the information covered under this section shall result in the Lift-Contractor being held liable for all work, which may become necessary for the proper and complete installation of the equipment.

1.9 **CO-ORDINATION**

Notwithstanding the Lift-Contractor's obligations in terms of this specification with regards to included Builder's Work:

1.9.1 Due to the nature of the installation, a fixed sequence of operations is required to properly install or upgrade the lift equipment therefore, closely schedule the work in order that the installation may be carried out in the proper sequence without delaying the completion of the entire Project.

1.9.2 The Lift-Contractor shall familiarise himself with the requirements of the other trades and shall carefully check the space requirements with other trades to ensure that the equipment can be installed in the proper sequence in the spaces allotted.

1.10 WORKS INCLUDED IN THE LIFT EQUIPMENT SCOPE OF WORKS

1.10.1 Design and provide all labour, equipment and services and perform all operations required for lift work as indicated on the drawings, or specified herein and in accordance with all applicable requirements of the Works Information.

1.10.2 The supply and fixing of all holding down bolts, car rail fixing bolts and associated motor room and shaft steel work.

1.10.3 Protection of Works during Installation:

- Adequately protect against damage, all equipment during installation.

1.11 CUTTING AND PATCHING

1.11.1 Furnish at tender stage all information so that the necessary openings for work can be built into the floors and walls in a timely manner.

1.11.2 The Lift-Contractor shall obtain approval from a Structural Engineer appointed by the Principal Agent for all cutting / core drilling of existing motor room slabs or shaft structural beams. Should the Lift-Contractor proceed with the cutting or core drilling of lift shaft structural beams or motor room slabs without written approval from a structural engineer, the Lift-Contractor shall be held liable for any consequence associated with the weakening of the slabs and beams covered under this section.

1.12 INSTALLATION PROGRAMME

1.12.1 The Tender must produce at tender stage a programme of intent (Gantt chart or any acceptable format) setting out the sequence of the construction time periods for the installation and completion of each section of the work.

1.12.2 Computer generated and printed programme shall include in detail, the following:

- Production of workshop drawings
- Order of overseas material
- Ex-factory shipment date
- Material arrival on site
- Removal of existing equipment
- Installation of new equipment
- Commissioning & legal certification
- Handover

1.13 **SUBMITTALS**

1.13.1 **Errors and Mistakes:** The Lift-Contractor shall be responsible for executing the work in accordance with the Works Information and shall remain responsible for any discrepancies, errors or omissions in the drawings and information supplied, whether it has been approved or not approved.

1.13.2 **Workshop Drawings:**

- Provide drawings and co-ordination drawings for all lift work, including shafts and motor rooms, car enclosures and landing entrances. Drawings shall show top clearances above cross-heads and counterweight frames, machine room layouts with power and heat release data, locations of all equipment on tops of cars, overhead beams and elevations, and reactions transmitted to the building structure.
- The lift contractor shall ensure that the design of all equipment meets the relevant legal and safety requirements.

1.13.3 **Samples/Brochures:**

- All exposed equipment and finishes shall be submitted to the Principal Agent or Consulting Lift Engineer for approval in sample form.

1.13.4 **Machine specification and data:**

- Layouts shall contain certification that the machines and controls selected meet the performance levels and duty rate specified.

1.13.5 Occupational Health and Safety Act Mandatory: In terms of the Occupational Health and Safety Act, the Lift-Contractor as the “Mandatory” shall issue the necessary documentation pertaining to on-site duties.

1.14 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS

1.14.1 Operating instruction and maintenance manuals will be regarded as a critical item required for Works Completion. The information included and presentation shall be functional, user-friendly and accurate.

Provide 3 sets of manuals for each individual/group of lifts

1.14.2 Presentation: The presentation of the operating instruction and maintenance manuals shall be as follows:

Part-1	Index
Part-2	Description of the lift system and equipment detail
Part-3	User operating instruction and safety procedures
Part-4	Complete set of layout / engineering drawings
Part-5	Complete set of principal / wiring diagrams
Part-6	Certificates of Compliance, permission to install & concessions.
Part-7	Test and commissioning certificates and data sheets
Part-8	Maintenance procedure manual, test tool and all related keys
Part-9	Complete set of installation parameters including programming Instructions and passwords

1.14.3 Operating Instructions: Instruction for the Employer’s designated operating personnel in the proper normal and emergency operation and safety procedures of the lift systems.

1.15 VISITS TO SITE

So that provision can be made in the tender, undertake site visits to understand the nature of the ground access to the site, areas suitable or available for storage of equipment and any other circumstances which could affect work and rates. No claim in this respect shall be considered later.

1.16 CERTIFICATE OF COMPLIANCE AND TEST CERTIFICATES

Carry out all the tests and checks required in terms of SANS-1545 and issue the necessary Certificate of Compliance prior to Works Completion. Items or incomplete or incorrect test or check noted on the Certificate of Compliance (Commissioning

Document) shall render the Certificate of Compliance (Commissioning Document) “Not Valid” and the entire document will have to be re-issued on satisfactory completion of all items noted.

1.17 TESTS AND COMMISSIONING CERTIFICATES

1.17.1 Upon completion of the installation and once being in full operation, completely test the equipment to demonstrate the equipment provided is in compliance with the Works Information. Provide all labour and equipment for on-site observation, testing, correction and re-setting.

1.18 N/A

1.19 ATTENDANCE AT SITE MEETINGS

Attend all site meetings arranged at regular intervals during the contract period.

1.20 GUARANTEE

1.20.1 Maintenance Guarantee Period (Free Maintenance Period):

- Provide fully comprehensive maintenance for the lift equipment for a period of: As specified in the main tender document and Bill of Quantities, or longer if applicable in terms of after Works Completion. As a minimum the maintenance work shall be performed in terms of the Employer’s Maintenance Agreement.

1.20.2 **Equipment Guarantee:** Equipment supplied shall be guaranteed against defect or failure of design, material and workmanship for a period of **Twelve (12) months** from date of Works Completion or, earlier if approved in writing by the Consulting Lift Engineer and provided the equipment is fully operational, maintained under a fully comprehensive Maintenance Agreement and delays in the Works Completion cannot be attributed to the Lift-Contractor’s acts or omissions.

1.20.3 **Latent and Patent Defects Liability Period:** Equipment supplied shall be guaranteed against latent defect in design of material for a period of **10-years** after date of Works Completion.

1.21 ELECTIVE MAINTENANCE AGREEMENT

1.21.1 **Maintenance Agreement:** Notwithstanding the requirements of the Works Information:

- The Lift-Contractor shall be prepared to enter into the Employer's fully comprehensive performance based Maintenance Agreement for a term as specified in the main tender document at the end of the free maintenance period. It is accepted that the Lift-Contractor is acquainted with the Employer's Maintenance Conditions.
- **Maintenance Costs:** Submit at tender stage, the proposed current day monthly maintenance costs for each unit. These maintenance costs will be escalated using the **Consumer Price Index (CPI)**
- The Employer reserves the right to appoint the Lift-Contractor or any alternative maintenance Contractor of its choice at the end of the specified period.

1.22 VARIATION ORDERS

No claims for any extras, additions or for any variations shall be entertained unless such extra, addition or variation has been approved in writing by the Project Manager.

1.23 PAYMENT

1.23.1 As per tender document and requirements of NEC 3 Contract

1.23.7 Ownership of Equipment / Works: Equipment or Works shall become the property of the Employer:

- on delivery to the site and provided payment in respect of the equipment delivered to site has been passed or,
- if approved and authorised by the Employer, on delivery to an off-site storage facility and provided payment in respect of the equipment delivered to the off-site storage facility has been passed or,
- on **thirty (30)-days** after delivery to the site if payment has not yet been passed and the delay in processing and passing payment was as a result of the Lift-Contractor's acts or omissions.

Such equipment or work whether or not ownership has been passed to the Employer, shall remain in the care of the Lift-Contractor, and shall remain subject to all the conditions of Contract as contained in the Works Information until Works Completion.

Notwithstanding the requirements of this section, the Project Manager reserves the right to reject equipment or work which is not in accordance with the Works

Information and upon such rejection the ownership of the equipment or work rejected shall immediately revert back to the Lift-Contractor.

1.24 RUBBLE

The Contractor shall clear and cart away all rubbish and superfluous material that may accumulate on a daily basis.

1.25 ORGANISATION AND STAFF

Provide at tender stage an organogram of people who will be operationally responsible or as per requirements of the main tender document.

1.26 FLUCTUATION IN LABOUR AND EQUIPMENT COSTS

1.26.1 Clearly show under **Section C: 3.1** of this specification, the Rand value of the labour, local equipment and imported equipment to be adjusted in accordance with this section.

1.26.2 Imported Components / Rate of Exchange:

Without restricting the Employer's right to buy forward cover:

1.26.2.1 The Contract price shall be subject to adjustment as per the NEC 3 contract

1.26.2.2 For imported equipment, provide the following information:

- Description of items imported,
- Country of origin,
- Currency,
- Banker's name,
- Tendered exchange rate,
- Free on-board cost expressed in Rands of each item of imported equipment included under this section together with a breakdown thereof,

1.26.3 Escalation: As per requirements of NEC 3 Contract

1.27 RETENTION MONIES

As per requirements described in main tender document

1.28 PENALTY FOR DELAY

As per requirements described in main tender document



1.29 ON-SITE STORAGE AND ACCOMMODATION

- 1.29.1 On-site stores shall be organised to allow for the efficient and effective control of lift equipment and the store and immediate vicinity shall be kept clean and organised at all times.
- 1.29.2 The Principal Agent or Consulting Lift Engineer reserves the right to inspect the storage areas at any time during the installation period.

1.30 PROFIT AND ATTENDANCE

As per requirements described in main tender document

1.31 OMITTING EQUIPMENT FROM THE TENDER

It is accepted that the prices tendered have been based on quantity units. However, the Principal Agent reserves the right to remove one or more entire lifts or any part of a lift from the Works Information without being penalised in any way, if it can be shown, that this decision was taken in light of a design change, design requirement or was budget motivated.

1.32 BROCHURES – TECHNICAL INFORMATION

1.32.1 Notwithstanding the requirements of the Works Information, all documentation presented under this section shall be regarded as informative information only. Presentation of technical information and brochures shall not be regarded as notice of a deviation, substitution or alternative. Present the following detailed brochures and technical information at tender stage:

- control system,
- drive system,
- door operator,
- door safety device / detector,
- call buttons and signals,
- remote monitoring station if specified,
- intercoms,
- emergency rescue device if specified.

1.32.2 Failing to submit the required information covered under this section shall entitle the Principal Agent, or Consulting Lift Engineer to disqualify the Tenderer.

- 1.32.3 Appointment for the lift Contract shall not be considered as acceptance of the equipment offered and it shall remain the Lift-Contractor's responsibility to select, supply and install the correct equipment in terms of the Works Information.

1.33 SUPERVISION OF ON-SITE WORK – CONSTRUCTION SUPERVISOR

- 1.33.1 Appoint a full-time competent employee in writing as the Construction Supervisor who shall not supervise any construction or other work on or in any other construction site.

1.34 TENDER SUBMITTALS

Provide the following information at tender stage:

- Brochures and technical information as specified,
- Detailed company profile and list of lift installations with contact numbers recently completed,
- Covering letter confirming verification, standards, substitutions deviations and alternatives as specified.
- Operational organogram

1.35 MAINTENANCE DURING INSTALLATION

- 1.35.1 **Maintenance during Installation Included:** Provide fully comprehensive free maintenance for all lifts during the installation period as specified below:

- The installation free maintenance period for each group of lifts shall commence on the day the first lift in each group is taken out of service for upgrade and shall continue until works completion of the entire group or the start of the **12-months** free maintenance period as specified.
- If it can be proven that extensions to the installation period was not as a result of the Lift-Contractor's actions or omissions, an amount for maintenance shall be paid pro-rata to the Lift-Contractor and the costs of the maintenance, shall be that calculated in accordance with maintenance contract.

1.36 EXISTING BUILDING IN OCCUPATION

- 1.36.1 The building shall be in occupation during the upgrade period therefore, allowances shall be made for the work to be carried out in such a manner as shall least interfere with the general routine of the occupants. Issue a programme with tender clearly showing the sequence in which the lifts are to be upgraded, the over-all upgrade period and the individual period of the lifts.

1.36.2 Work shall not be permitted on the landings without the use of barricades/hoarding and safety notices.

1.36.3 **Protection of Site:** It shall be the sole responsibility of the Lift-Contractor to protect against damage, the walls and floor finishes in the areas frequented the installation personnel. Provide canvas floor covering to protect the floor finishes of the lobbies used to gain access into the shaft, motor rooms and pit. Repair / replace all damage resulting from the Lift-Contractor's acts, negligence or omissions in this regard.

1.36.4 **Disturbances:** The Lift-Contractor shall carry out the work with as little mess and noise as possible and with the minimum disturbance to the operational environment of the building activities. This matter will be strictly enforced and should the Lift-Contractor fail in any way to comply with these requirements; the Principal Agent or Consulting Lift Engineer will instruct the Lift-Contractor on measures to rectify the situation at the Lift-Contractor's expense

1.37 **SAFETY & SECURITY**

1.37.1 The safety of the building occupants is of the utmost importance and to this end without exception; the Lift-Contractor shall be liable for any unsafe condition occasioned directly or indirectly by any act or omission of the Lift-Contractor or any of his Domestic Sub Contractors.

1.37.2 Immediately after appointment, issue a document for distribution to the on-site staff, the Consulting Engineer and the Principal Agent, detailing all safety procedures to be followed during the installation period. This document shall cover safety procedures pertaining to:

- Work carried out on landings,
- Work carried out in lift shafts with adjacent lifts still in service,
- Work carried out in lift motor rooms with lifts still in service,
- Movement of material through the occupied building,
- Releasing of passengers trapped in lifts.

1.37.3 **Occupational Health and Safety Act Mandatory:** In terms of the Occupational Health and Safety Act, the Lift-Contractor as the "Mandatory", issue the necessary documentation pertaining to its on-site duties and appoint a Safety Officer who shall regularly inspect the site, and ensure safe working conditions and procedures at all times.

1.37.4 **Mandatory:** Enter into the Employer's Occupational Health and Safety Mandatory Agreement prior to starting on-site work. The completed OHS Mandatory Agreement shall be tabled for signature after appointment for the upgrade works.

1.37.5 Security: Abide-by and adhere to the strict building security measures. Security measures implemented and accepted shall pertain to all staff involved on this project.

1.37.6 Barricading / off Landings / Foyers:

- Provide barricades and safety notices for the area / foyer where upgrade work is in progress. Signage to warn persons of unsafe conditions related to work in progress on lift foyers shall not be regarded as sufficient without physically barricading off the working area.
- Barricading / Hoarding shall be rigidly secured and supported **WHITE 16-mm** plywood. The colour shall be verified and approved by the Employer before placing the order for the material to construct the barricading.
- The height of the hoarding shall be as follows:
 - **2100-mm** where no structural and/or wet works is required and
 - **3000-mm** where structural and/or wet works is required on the landings.
- The quantities shall be as determined and as deemed necessary by the Lift-Contractor to meet the safety requirements of the Works Information.

1.38 STATEMENT OF INSTALLATION

Submit at tender stage, informative technical information and drawings relevant to the type, design, method of installation, Builder's Work (electrical, structural and mechanical) and the method of installing the position of the landing buttons and signals.

1.39 SANS-1545 SAFETY REQUIREMENTS

At Works Completion, all lift equipment shall comply with all the relevant and published South African National Standards including but not limited to the **SANS-1545Part-1 or Part-2** as the case may be.

1.40 BUILDER'S WORK

1.40.1 Provide all Builder's' Work, structural, mechanical and electrical work which is necessary for the proper and complete installation of the equipment. Builder's Work to be considered shall include but shall not be limited to:

1.40.2 Visit the site to clearly determine the anticipated scope of the Builder's Work and provide such detail in the tender submittal under the heading "Builder's Work

1.40.3 Contingency Sum – Builder’s Work

1.40.3.1 In terms of the Works Information and at the discretion of the Consulting Lift Engineer and Principal Agent, a contingency sum shall be provided to cover unforeseen.

1.40.3.2 Claims against the contingency sum shall be clearly motivated and a detailed quotation(s) presented for approval by the Consulting Lift Engineer and Principal Agent prior to commencing with the associated work.

1.40.4 Make good any damage to the walls and floor that has resulted from the on-site work.

1.40.5 **Removal of Equipment:** Make provision to remove the existing lift equipment as required.

1.40.6 **Motor-Room-Less Lift’s Control Panel:** Consider the position of the MRL lift control panel on the landing and determine the extent of the structural and electrical work associated with the installation of this item.

1.41 RADIO FREQUENCY INTERFERENCE

Provide only equipment sufficiently suppressed so as not to interfere with building communication and/or building management systems. Equipment provided shall not be susceptible to EMI.

1.42 TESTING, CONFIDENCE TRIALS AND WORKS COMPLETION

1.42.1 **Works Completion Inspection:** The Lift-Contractor having satisfied itself that the works are complete in every respect and ready for testing, shall notify the Consulting Lift Engineer with reasonable notice in writing of the date after which the Works Completion Inspection and tests can take place. Unless otherwise agreed the Works Completion Inspection shall take place within **10-days** of such notice.

1.42.2 **Availability:** The availability of the unit(s) for testing and hand-over shall be as measured against the Works Information with regards to the stage(s) or phase(s) of completion.

1.42.4 **Works Completion:** Works Completion shall be regarded as having been attained on full compliance with the Works Information, on the satisfactory conclusion of the

Confidence Trial(s) and on issue of the Works Completion Certificate by the Consulting Lift Engineer or Principal Agent.

1.42.5 **Repeat Works Completion Inspections and Tests:** At the Works Completion Inspection, if any portion of the work is not ready for inspection or testing or fails to pass the tests, the Works Completion inspection shall be repeated within a reasonable time under the same terms and conditions save that all reasonable expenses incurred by the Employer which has resulted from repeat inspection and tests shall be deducted from the Contract Sum.

1.42.6 **Failure to pass Repeat Works Completion Inspections or Confidence Trials:** If the work or any section thereof shall fail to pass the tests on a repetition thereof, the Consulting Lift Engineer shall be entitled to:

- Order further repeat inspections and tests under the conditions of **Part-1.42.5&Part 1.42.6** or
- Reject the works as a Defect if the results of the inspection or tests shows that the work or any section thereof fails to meet the performance, operation and reliability as specified or
- Issue a Works Completion Certificate if the Employer so wishes, subject to such reduction of the Contract Sum as may be provided in the Works Information or failing such provision, as may be agreed by the Employer and Sub-Contractor or failing agreement, as may be determined by mediation/ arbitration.

Tenderer's Official's name (Print):	
Signature of Official	
Date:	

PART 2: OPERATION

2.1 GROUP AUTOMATIC OPERATION – TWO OR MORE LIFTS IN GROUP

- 2.1.1 The operation for groups of lifts shall be group automatic operation arranged, dispatched and controlled by a de-centralised group supervisory system. The lift system control shall be supervised by a flexible and intelligent re-programmable microprocessor system and re-programming shall be possible without making changes to the lift hardware or fixed wiring.

2.2 AUTOMATIC LANDING CALL BY-PASS

- 2.2.1 When the car loading exceeds a predetermined level, it shall automatically bypass all landing calls in the direction of service and shall respond only to car calls.
- Default setting: **65% of rated load.**

2.3 CAR HELD UP AT A LANDING

Should a lift be delayed at a typical floor beyond a pre-set software adjustable time period initially set at **Thirty (30) seconds**, the lift shall be disconnected from the group automatic operation and the assigned landing calls shall be re-assigned to an alternative operational lift.

2.4 CAR CALL CANCELLING

When the car has responded to the last call in the up or down direction, the car calls shall automatically be cleared from the system to maintain optimum efficiency.

2.5 LOAD WEIGHING

- 2.5.1 Each lift shall be provided with a strain gauge or load-cell type load-weighing device to ensure optimum service.

2.6 ANTI-NUISANCE CONTROL

When a lift with a loading level of less than **10-kg** arrives at a landing, all car calls shall be reset automatically.

2.7 OPERATION WITH INDEPENDENT SERVICE

- 2.7.1 A two-position Independent service key operated switch, with cylinder as approved by the Consulting Lift Engineer and Principal Agent and master-keyed to the building system, shall be readily accessible and mounted in the car operating station of each lift. When this switch is in the "On" position, the removal of the key from the barrel shall be prevented and the lift shall be operated from the car buttons only and independent of all other automatic or special operation modes.

2.8 OPERATION WITH INSPECTION

Provide a two-position switch on top of the car enclosure (car top working platform) to operate each lift manually during adjustment, inspection, maintenance and repair. The operating buttons shall be of the continuous pressure type and the speed of the lift when on inspection control shall **not exceed 0.63-m/s** and shall operate the car only when the car doors and all lift shaft doors are closed, and all safety circuits are operational.

2.9 EMERGENCY OPERATION

Provide a two-position switch in the motor room to operate each lift manually during emergency conditions, adjustment, inspection, maintenance and repair. The operating buttons shall be of the continuous pressure type and when on emergency operation, the speed of the lift shall **not exceed 0.63-m/s** and shall operate when the lift doors are closed, and when the inspection control on top of the car is switched to normal operation. It shall be permitted to over-ride the final limits, safety gear contacts, and governor contacts.

2.9.1 AUTOMATIC LOWERING OPERATION DURING POWER FAILURE

Provide a battery powered automatic lowering system which functions automatically in the event of a power failure. The automatic lowering system is to ensure that the lift is lowered to the nearest floor and opens the doors when floor level is reached. If the lift is not connected to backup generated power, the doors are to remain open and the lift is to remain stationary until such time that the normal power supply is returned to the lift.

2.10 FIREMAN'S OPERATION

2.10.1 Fire recall – Level 1:

- All lifts shall be equipped with Fire Control Level-1 and each group or single lift shall be equipped with a common Fire Control switch to recall the lifts (non-stop)

to the nominated evacuation landing, where it shall remain parked with open doors. The switch shall be mounted in a box with a break-glass front marked "Lift Fire Control".

- When the fire control switch is activated, lifts travelling away from the designated landing, shall stop and reverse direction at the next closest floor without opening its doors, and return non-stop to the designated fireman's floor.
- An illuminated indicator fitted inside the car shall indicate that the lift is on fire control and shall further instruct the passengers to evacuate the lift at the designated evacuation floor:
- When on standby power the fire control operation shall operate as detailed under this section in conjunction with the emergency standby power control sequenced evacuation.

2.11 OPERATION WITH STANDBY POWER

2.11.1 Emergency recall to main landing – Level 1:

- Provide a standby power operation which recognises the feeder arrangement and the standby power operation which automatically evacuates all lifts on each affected feeder by operating **One (1)** lift at a time to the main dispatching landing without responding to car or landing calls. The system shall subsequently permit automatic and manual selection of any lift to be released for normal operation with standby power.
- The lifts shall be capable of operation on standby power at **100%** of rated speed in both directions and **100%** of rated capacity without overheating.
- Provide all connections to the lift controls for standby power operation in the appropriate machine rooms and all the necessary interlocking interconnection wiring among machine rooms of different lifts.

2.11.2 Emergency Control Cables/Wiring: Provide all the cabling and the installation thereof to link motor rooms and control room. The site and relevant drawings shall be checked to determine the route and lengths of cable required. It is anticipated that the existing cabling shall be re-used or extended as required.

2.12 OVERLOAD PROTECTION

Provide overload protection for all lifts. If the load in the car enclosure exceeds the rated load, a buzzer shall sound, an overload Indicator will illuminate in the car-operating panel to indicate this condition, the lift doors shall remain open and the lift

blocked from travelling. The overload device shall not be active during the travel phase of the lift.

2.13 DRIVE CONTROL

2.13.1 Provide fully regulated distance dependant **closed loop AC VVVF** drive control system capable of constantly maintaining the floor levels and ride quality as specified. Lift acceleration, nominal speed and slowdown phases shall constantly be monitored and controlled against and with reference to, distance, speed, current and voltage feedback loops. The lift drive shall be capable of bringing the lift to a standstill after travel without a creeping-in or levelling-in phase (direct approach).

2.13.2 Driving machine and motor shall be controlled to operate the lift continuously at **100%** of contract speed in both directions without overheating or hunting during levelling.

2.13.3 **Levelling Tolerance:** Provide equipment to maintain levelling as shown below:

- Levelling Accuracy: **3-mm** maximum
- Re-levelling Accuracy: **3-mm** maximum

2.14 TRAFFIC HANDLING

The lift, drive and group controls shall constantly deliver the traffic handling performance times and percentages as specified herein.

2.15 DUTY RATE –TRIP COUNTER

In order to evaluate the duty rate (usage factor) in terms of the specification and subsequent maintenance agreements, provide external trip counters on each lift controller. Trip counters incorporated in to the lift control software if not easily accessible to building management personnel shall not be regarded as sufficient in terms of this section. As a minimum, the tip counters to incorporate a re-settable **7-digit** dual function display:

- Function-1: Record the total trips / starts - not re-settable
- Function-2: Re-settable tip counter

2.15.1 **Back-up Software:** Keep safe at a local office, full back-up software for the lift controls and remote monitoring system. Software replacement shall be deemed to be included under future maintenance agreements unless the replacement of the software

resulted from abuse or misuse of the equipment. It shall be accepted that by purchasing the lift equipment, the Employer has already paid for all development costs associated with replacement software.

PART 3: EQUIPMENT

3.1 EQUIPMENT AND LOCATION

- 3.1.1 Lifts with machines located directly over the lift shaft and machines below shall be mounted on steel beams on steel or concrete up-stands. Motor room less lift machines shall be mounted on steel beams at the top of the shaft and outside the projection of the car. The steel beams shall be provided by the lift supplier and shall be suitably rated for normal duty as well as for any maximum load which may be placed on the machinery during full load safety applications etc.
- 3.1.2 Provide all required templates, inserts and signal boxes in walls or floors.
- 3.1.3 Arranged that rotating elements, sheaves, etc., so that they can be removed for repairs or replacement, either by trolley hoist and dolly, or other conventional means, without dismantling or removing other equipment components in the same machine room.
- 3.1.4 Trolley beams shall not be utilised as the normal support of diverter sheaves.
- 3.1.5 Provide any additional structural members required for the installations of the equipment, such as shelf angles and steel beam supports for sheaves, governors, motor generator sets, controllers and dead-end hitch beams
- 3.1.6 Clearance around equipment located in each machine room shall comply with the applicable provisions of the relevant SANS codes.

3.2 Sheaves Situated in the Shaft: The Lift-Contractor shall provide all equipment necessary to meet the requirements of **SANS-1545** with regards to diverter sheaves situated in the shaft and positioned directly above the lift enclosure including but not limited to:

- Installation of working platforms to create separate sheave rooms if the existing head-room permits including sheave guards, lights and emergency stop switches.
- Supply and installation of remote activate / release governors if not accessible from outside the shaft.

3.3 HOISTING MACHINE

3.3.1 Traction Drives:

- **Main Brake:** The main brake shall be spring applied and electrically released by direct current. The main brake shall have sufficient power to hold the car at any landing with the normal amount of counterbalancing and with at least **150%** of contract load. Each brake shall be fitted with monitoring switches which shall be monitored by the main control CPU and the lift shall be immediately shutdown in the event of a malfunction of these switches.
- **Vibration Isolation:** Provide an effective sound reducing material / vibration isolation shall be installed between the bed-plate or supporting steelwork of an overhead, basement or motor room less driving machine and the beams, the structural concrete slab, shaft structure or the up-stands.
- **Duty Rate:** Driving machines, motors and drive controls shall have sufficient capacity to operate the lift continuously at **100%** of contract speed in both directions without overheating or hunting during normal operation and levelling.
- Equipment shall meet heavy usage requirements not less than the duty rates shown below:
 - **>= 240 starts per hour**
- **Noise and Vibration Levels for Conventional Machines:** Overhead and basement driving machinery situated in a machine room shall operate silently, without vibration and shall constantly maintain noise levels not **exceeding 56-DB (A)**. The machine noise level shall at all times remain at an acceptable level, shall be inaudible from the landings or the car enclosure and shall maintain the performance levels as specified herein.
- **Noise and Vibration Levels for Motor-Room-Less Lifts:** Motor room less driving machinery shall operate silently, without vibration and the noise generated by the control and machine on the landing shall not exceed **42-DB (A) maximum** and **38-DB (A) average**. The noise and vibration levels measured in the lift car shall not exceed the performance levels as specified herein.
- Provision shall be made for a safe method of moving the machine by hand in the event of a power failure. All the necessary equipment and signage required to carry out this task in terms of **SANS-1545**, shall be mounted neatly in the motor room and shall remain on site at all times.
- For protection against entanglement, a positive action emergency stop switch shall be supplied and installed in close proximity to the main driving sheave it controls.

3.4 CONTROLLERS

- 3.4.1 Provide re-programmable solid state operation and motion controller to control the operation, the starting, the stopping, the speed of the lift motor and to apply the brake automatically if any of the safety devices operate or the power fails. Three-phase protection shall be provided to the motor-generator set, driving motor or the solid state motion controller by the use of simultaneous tripping devices.
- 3.4.2 Provide solid state controllers enclosed in ventilated sheet metal cabinets with integral blowers. In order to maintain an acceptable control panel internal temperature, all power resistors and heat generating transformers shall be mounted in separate enclosures.
- 3.4.3 Each controller or the section of the controller supporting the main control contactors shall be vibration isolated from the motor room floor slab and building structure.
- 3.4.4 Provide only control systems which have been designed and manufactured for passenger carrying lifts. **PLC type controllers will not be accepted.**
- 3.4.5 Provide and install a Main Switch for each lift in a position where it is easily and rapidly accessible from the entrance to the machine room.
- 3.4.6 The Main Switch shall have a dual application namely:
- Motors connected directly to the mains shall be protected against short circuit. (Not required if motor protection is provided in the control panel),
 - The main switch shall be capable of breaking the supply to the lift by interrupting all the live conductors,
 - The main Circuit Breaker or Isolator provided in the motor room Distribution Board shall not be regarded as the Main Switch covered under this section,
 - The Main Switch shall not cut off the supply to the circuits feeding the car light, car ventilation and car, shaft, pit and motor room **220-volt** supply.
- 3.4.7 Control panels and machines of multi-lifts situated in a common area shall be clearly marked with numerical or alphabetical number at least **100-mm high**.

3.5 CONTROL SYSTEM

- 3.5.1 The control system shall be capable of constantly producing the performance criteria specified herein.
- 3.5.2 Provide drive control system capable of decelerating the lift to stand still without a levelling-in or creeping-in phase. Only lifts with direct floor approach capabilities shall be accepted.

- 3.5.3 Provide Variable Voltage Variable Frequency motor drive control units capable of providing a smooth acceleration, steady velocity and deceleration plus levelling to various floors within the time allowance and levelling tolerances as specified herein. This performance shall be consistent under all conditions of loading and in either direction of travel.
- 3.5.4 The motor drive unit control shall be equipped with all necessary monitoring circuits to maintain a safe and reliable operation. These shall include but are not limited to the monitoring of the load, direction of rotation, speed, supply voltage, and operating currents.
- 3.5.5 The hoist motor shall be provided with a thermostatically controlled blower if necessary, to dissipate accumulated heat so as to maintain the equipment below the maximum operating temperature rise specified by the Manufacturer.
- 3.5.6 The control system shall provide a consistent operation with the levelling accuracy at all landings from no load to full rated load in the lift. The specified operation shall be maintained for all lifts under stable conditions at maximum car start to car stop and floor approach times as specified.
- 3.5.7 A maximum of **0.5-second** shall be allowed from door close to car start.
- 3.5.8 Equipment shall be designed to operate at plus or minus **10%** of normal feeder voltage and plus or minus **5%** of feeder frequency without interruption and protective devices to prevent damage to equipment on over or under-voltage shall be provided.
- 3.5.9 The control system shall be designed to operate the lift continuously at **100%** of contract speed and at **100%** of contract load in both directions without overheating or hunting.
- 3.5.10 Lifts shall be adjusted as required to meet the performance requirements as specified within **10%** tolerance.

3.6 MACHINE ROOM INDICATORS / ROPE MARKERS MONITORS AND TEST TOOLS

- 3.6.1 **Monitors / Test Tools:** Monitor and key board or hand held testing instruments for commissioning, re-commissioning and fault analysis of the lift control systems shall be provided and shall remain on site at all times. If monitors are provided, each group of lifts shall be supplied with its own monitor.
- 3.6.2 **Emergency Floor Level Indicator:** As each lift travels through the lift shaft, its floor level position shall be indicated by an LED indicator mounted in a position clearly

visible from the machine. This indicator shall operate independently to the lift control and shall not be dependent on the lift supply for its operation.

- 3.6.3 Error logs:** The lift control system shall incorporate the equipment to generate error logs and fault reports. Error logs for each lift shall generate a history of at least **fifty (50)** of the most recent faults indicating the type of fault, lift number, date and time the fault occurred.

3.7. AUTOMATIC SELF-LEVELLING

Provide lifts with both a self-levelling and a re-levelling controls to automatically bring the lift to the floor landings within a tolerance of **3.0-mm** under no load to full rated load conditions without hunting. Self-levelling shall within its zone, be entirely automatic and independent of the operating device and shall correct for over-travel and rope stretch. The lift shall be maintained level with the landing, irrespective of load and while loading and unloading.

3.8 STOPPING DEVICES

- 3.8.1** Provide normal terminal stopping devices enclosed in dust-proof enclosures for each lift. These devices through operation shall bring the lift automatically to a smooth stop at the terminal landing.
- 3.8.2 End of Shaft Final Limits:** Provide final terminal stopping device at the top and at the bottom of each lift shaft. A fixed cam securely attached to the lift shall operate these final limit switches. These limit switches shall be independent of any other stopping devices and shall positively open without the use of springs to cut off all power from the driving machine motor and brake and shall prevent the lift operation in either direction. Limit switches shall be so located that they operate before lift or the counterweight engages the buffer.

3.9 ROPE GUARDS

- 3.9.1** Rope guards shall be provided on machine sheaves, secondary or deflector sheaves and governor sheaves to cover moving sheaves and ropes. Provide guards on rope hole openings in machine room and secondary level floors to prevent objects from falling into the lift shaft. Provide guards in secondary level where ropes and tapes or selector drives pass through to prevent accidental contact.
- 3.9.2** Rope guards shall be fitted to the top of main diverter and governor sheaves mounted in the shaft, pit or under-slung sheaves protruding past the projection of the car.

3.10 CAR AND LANDING DOOR OPERATOR

NOTE: For the purpose of this specification the door operator shall be interpreted as the entire door operator including all associated components on the car and landing excluding the door panels and sills.

- 3.10.1 The door operator is regarded as a **CRITICAL ITEM** and it shall be the Lift-Contractor's responsibility to select and supply equipment considered by the Manufacturer as **top of the range, low maintenance equipment** which is capable of meeting the highest operation, duty rates and performance levels. Only door operator considered by the Manufacturer as **heavy-duty**, with continuous operation capabilities will be accepted.
- 3.10.2 **Duty Cycle:**
- **Passenger Lifts:** Only door operators with heavy-duty guide rails / tracks shall be accepted for Passenger Lifts.
- 3.10.3 Incorrectly supplied or suspect door equipment with regards to clearly meeting the requirements shall be replaced with suitable equipment at no additional cost to the Employer.
- 3.10.4 Appointment for the Contract shall not be considered as acceptance of the equipment offered and it shall remain the Manufacturer's responsibility to select, supply and install the correct equipment in terms of this specification.
- 3.10.5 Doors on the lift car and at each landing opening shall be opened and closed quietly and smoothly by a fully regulated electric motor and driving mechanism.
- 3.10.6 Car doors shall be mechanically locked when fully closed under power. It shall not be possible to force the car doors open from within the car and interrupt the safety contact when the doors are fully closed under power.
- 3.10.7 Provide mechanical car door locks where the free distance from the car sill to the shaft front wall exceeds **120-mm**.
- 3.10.8 The motion of the door operator shall be accomplished with arms and appropriate linkages to the approximate centre of gravity of the driven door panel.
- 3.10.9 Each landing door shall be equipped with electro-mechanical interlocks so that the lift can operate only when the interlock circuit is established.
- 3.10.10 Each landing door panel shall be closed by an independent auxiliary self-closing device (door closer weight) whenever the door is not in the closed position and it is not restrained by the equipment relating to the car and landing door system.

- 3.10.11 An electric contact for the lift car door shall be provided which shall prevent the lift moving away from a landing, unless the door is in the closed position.
- 3.10.12 An electrical contact shall be fitted to the non-driving car and landing doors if its linkage is dependent on a steel rope, belt or chain.
- 3.10.13 Emergency Triangle access key mechanisms shall be provided on each entrance.
- 3.10.14 The opening time and closing time for lift doors shall be within **10%** of the values specified herein.

3.11 PASSENGER LIFT DOOR HANGERS

- 3.11.1 Hangers shall be equipped with ball bearing adjustable rollers to take the up-thrust of the doors. The hangers and rollers shall be designed to accommodate the size and weight of the doors operated with a high-speed door operator.
- 3.11.2 Either the running surfaces of the tracks or the sheaves shall be non-metallic.

3.12 CAR DOOR CONTROL

3.12.1 Door Motion Control:

Only door operators with a fully regulated VVVF motion controller shall be accepted.

3.12.2 Door Open and Close Times:

Door open and close times shall be regulated by software and shall be adjusted to meet the traffic requirements of the application.

- 3.12.3 **Door Anti-Nuisance Control / Forced Closing:** If doors are held open for an adjustable period of time by a passenger standing in the entrance or by constant pressure of the door open button, a buzzer shall sound and the doors shall start to close at a reduced speed and force level. When the doors touch an obstruction, they shall re-open.

3.12.4 Door Protection Devices

- **Leading Door Edge Protection:** Provide an electronic infra-red car leading edge protection device. The car door protection device shall extend at least **2100-mm** above the platform and its active surface/area shall project beyond the front edges of each leading car door panel. Should this device come in close proximity, or touch a person or object whilst the car doors are closing, the car and shaft doors shall return to their open position. Manual reversal of the doors while the lift is

on automatic operation shall be accomplished by pressing a door open button in a car-operating panel.

- The door protection device shall have the capabilities of detecting metal objects / trolleys.

3.13 LIFT SHAFT & PIT REQUIREMENTS

3.13.1 Provide access ladders into pit and for pit buffers as required to service the equipment. The pit ladder shall extend from the pit floor to **1100-mm** beyond the level of the lower entrance.

3.13.2 Provide the necessary rope, or selector tape guards in pit areas.

3.13.3 **Deep Pits:** Provide safe working platforms in pits with depths in excess of **Two (2) metres** and if necessary at the top of the shaft to create sheave room platforms. The working platforms shall comply with **the SANS 1545 (EN 81)** safety requirements pertaining to the depth/ height and free space of these areas. Access to the area below the pit working platform including lighting shall be provided to accommodate the checking of the lower section of car and counterweight guide, cleaning and checking of hoisting ropes if applicable for basement machines.

3.13.4 In terms of **SANS-1545 (EN 81)**, provide and install shaft lights in each lift shaft, the lower and highest light fitting shall be mounted no more than **500-mm** from the pit floor and shaft top respectively. These lights shall be switched from the lift motor room, top of shaft and pits and shall maintain a minimum lighting level of **50-Lux** measured at **1000-mm** above the car roof.

3.13.5 **Shaft Requirements:** shall apply if the existing equipment covered under this section is upgraded or if replaced:

- The positioning and fixing of all shaft steelwork shall be uniform and consistent throughout the shaft.

3.13.6 **Lower Shaft Dividing Screen:** Where the lift shaft contains several lifts and in terms of the **SANS-1545 (EN 81)**, provide ridged metal screens to separate the moving parts of the individual lifts. The metal screen shall be from the level of the first landing to a height of **2500-mm** and shall be the full width / depth of the shaft.

3.13.7 **Upper Shaft Dividing Screen:** Where the lift shaft contains several lifts and the running clearances of car and counterweight and car and counterweight of adjacent lifts in a common shaft do not meet the minimum requirements in terms of the **SANS-**

1545 (EN 81), provide ridged metal screens to separate the moving parts of the individual lifts.

3.13.8 Pit Dividing Screen: In terms of the **SANS-1545 (EN 81)**, provide ridged metal screens to separate the moving parts of the individual lifts situated in a common pits. The screens shall be the full depth of the shaft to the level of the first landing.

3.14 CAR AND COUNTERWEIGHT GUIDE RAILS

Notwithstanding the requirements pertaining to performance, ride comfort, retained car and counterweight guide rails (shaft steelwork), guides for prestige office buildings, **SANS 1545 (EN 81)**, Best Engineering Practice and the Manufacturer's requirements, **Part-3.14.1 to Part-3.14.8** shall apply if the existing equipment covered under these sections is modernised or if replaced.

3.14.1 Provide guide rails with brackets and sliding rail clips for each lift car and counterweight, suitably attached to the building structural members. Car guide rails and car frame shall be so located as to balance the car assembly in the guides.

3.14.2 Guide fixings: Provide any additional car and counterweight guide rail backing, intermediate steel and brackets fixed to the shaft wall with **two (2)** (minimum) bolts / Anchors per bracket as required between floors to maintain proper bracket spacing not exceeding **manufacturers specification**

3.14.3 Guide Bracing: Intermediate guide supports which use the guides of an adjacent lift and not the shaft wall or shaft trimmer as the supporting member, shall not be regarded as a guide fixing.

3.14.4 Fish Plates: Joints of car and counterweight rails shall be accurately machined with tongues and grooves in the ends of the rails at the centre of the railhead and base forming matched joints. Each rail joint gap, as installed, shall **not exceed 1.0-mm**. Each rail joint shall be fitted with machined fish-plates fastened to the back of each rail's machined surface with not less than a total of eight **(8) through-bolts**. Additional brackets with sliding rail clips between floor beams shall be provided as necessary to obtain proper rail rigidity and maintain the alignment for both the car and counterweight rails.

3.14.5 Shim packs shall be **20-mm** maximum and shall secure rail clip alignment and shall be so designed that they shall remain in position even though the fastening bolts may become loosened.

3.14.6 Building Settlement: Car and counterweight rails shall be cut off at the top and bottom with an allowance for building compression of **3.5-mm** per typical floor and a maximum of **300-mm** at Works Completion.

3.14.7 The final location of divider beams, with respect to each floor level, shall be coordinated under this section. Any additional steel members required for the installation of the lift equipment and not shown on the structural drawings, including their fabrication and installation shall be provided under this section. The reinforcement of structural steel to absorb rail forces and safety application applied at pinning floors, rather than in the pit, shall be provided under this section. Car and counterweight rail backing shall be provided as required by the code.

3.14.8 Shaft Trimmer: Shaft trimmers shall be (I) beams of adequate strength. Formed metal sections for example; (U) channels, (T) sections or Box Channels shall only be accepted on the submittal of the Manufacturer's design and fixing details.

3.14.9 The blade of car guides shall be machined.

3.14.10 The car and counterweight guide rails shall be provided and aligned so that the faces of the rails are plumb within plus or minus **5.0-mm** from top to bottom of the lift shaft. The maximum change in the distance between guides (DBG) shall not exceed **2.0-mm**.

3.14.11 Retained Car and Counterweight Guide Rails:

- The car and counterweight guide rails shall be aligned if necessary to provide smooth and vibration and jerk free ride throughout the length of travel.

3.15 HOIST AND GOVERNOR ROPES

3.15.1 Hoist ropes of sizes and numbers sufficient to comply with the requirements of the relevant code and traction requirements. The shop drawings shall indicate the number and sizes of ropes proposed, together with the name of the manufacturer, type, ultimate strength, the proper working load and that the core is of manila fibre. All hoist ropes shall be cut in sequence from the rope reel and tagged for sequential adjacent installation.

3.15.2 The ends of the hoist ropes shall be properly secured to the car and counterweight cross-head or to the dead-end hitch plates on **2:1-roping**, with adjustable rope shackles having approved sockets. Screw adjustment shall permit equalisation of the tension in all ropes.

3.15.3 **Governor Ropes:** Governor ropes shall be in accordance with **SANS-1545 (EN 81)**. The two ends shall be securely fastened together at the lift and shall be attached to the safety operating mechanism. The governor rope shall pass over the governor sheave and over an approved tensioner sheave in the pit. An electrical contact shall be fitted to the pit sheave and shall stop the lift if the governor rope becomes slack or breaks.

3.16 COUNTERWEIGHT

- 3.16.1 Each lift shall be suitably counterbalanced for smooth and economical operation. Cast iron or steel sub-weights shall be contained in a guided structural steel frame. The counterweight shall be equal to the weight of complete lift car plus at least **40%** of the contract load. The weights in the counterweight frame shall be balanced with the weight equally distributed across the width of the frame to equalise guide pressures. The sub-weights shall be welded or fastened together as necessary to prevent rattling.
- 3.16.2 If the main ropes are to be replaced or renewed as part of this project or in terms of the Maintenance Agreement, blocking between the counterweight and the buffer striker plate shall be provided equal to **300-mm per 30-meters** of hoist rope between car and counterweight.

3.17 CAR AND COUNTERWEIGHT GUIDE ROLLERS OR SHOES

3.17.1 **Guide Shoes:** Part-3.17.1 shall apply if the existing equipment covered under this section does not comply with the requirements of this section or if modernised or if replaced:

- If the speed and load specified allows and guide rollers are not required, provide car and counterweight spring loaded shoe guides. The spring tension shall be adjusted so as to maintain the lift in the centre of the rails and provide continuous contact with the corresponding rail surface under all conditions of loading and operation. The shoe guides shall be lined with a durable resilient material, which shall ensure a quiet and smooth ride.
- If the speed and load allows, spring tensioned guide shoes on the counterweight may be replaced with an alternative approved system.
- The car and counterweight guide rollers / shoes shall constantly provide the ride quality as specified.
- **Guide / Sliding Shoe Noise:** The guide and sliding shoe arrangement in conjunction with the guide rails selected for both the car and counterweight shall be designed and manufactured to limit all guide noise to a level not audible in the car enclosure or on the landings during travel.

3.18 COMPENSATION CABLES

Provide compensation cables when required by manufacturer's specification and in order to maintain traction on driving sheave throughout the length of travel.

3.19 BUFFERS

New buffers shall be provided

- 3.19.1 Lifts operating at speeds of up to and including **1,0m/s** shall be provided with buffers of the energy accumulation type, at speeds of up to and including **1,6m/s** shall be provided with buffers of the energy accumulation with buffered return type, and at speeds exceeding **1,6m/s** shall be provided buffered of the energy dissipation type, placed at the bottom of the hatchway for both the car and the counterweight.

3.20 SAFETY GEAR AND GOVERNOR

New safety gear and/or governor shall be provided.

- 3.20.1 Over speed governors and safety gear shall be arranged to stop the lift whenever excessive descending speed is attained. The safety gear shall be released by moving the lift in the up direction.
- 3.20.2 The governor rope system, including the governor and tension sheave, shall be arranged so that the carrier shall not release due to system dynamics when the lift is subjected to an emergency stop.
- 3.20.3 Car and counterweight safety gear shall be provided with a switch to cut off power from the motor and apply the brake if the safety gear applies without tripping of the governor.
- 3.20.4 The governor shall be provided with an electrical contact, which shall cut off power from the motor and apply the brake if a speed of **110% nominal speed** is reached in either direction before tripping the governor.
- 3.20.5 Rope guards and an electrical contact to monitor the rope stretch shall be provided on governor rope tension sheaves.
- 3.20.6 If an accessible space exists below the car or counterweight, the counterweight shall be equipped with safety gear in terms of this section.
- 3.20.7 Safety gear supplied and installed shall comply with **SANS-1545 (EN 81)**.

3.20.8 **Ascending Over-Speed Brake / Safety Gear:** shall be provided for all installation where there is a required upgrade or replacement of the main driving machine.

As required in terms of **SANS-1545 (EN 81)** the lift speed in the upward direction shall be controlled by one of the following:

- Ascending safety gear fitted to the car,
- Governor and safety gear fitted to the counterweight,
- Main hoisting rope brake / clamp fitted to the machine bed-plate,
- Brake fitted to the main drive sheave.

3.21 **PIT SAFETY STOP SWITCHES**

3.21.1 Each lift pit shall be provided with positive action pit safety switches easily accessible from the entrance to the pits without the necessity of entering. Pit switches shall comply with **SANS-1545 (EN 81)**.

3.22 **CAR PLATFORM AND SLING**

Should a new lift car be required, provide new platform and sling complying to **SANS 1545 (EN 81)**

3.22.1 **Static Balancing:**

- The car platform with enclosure of each lift shall be balanced by arranging balancing weights to equalise the guide pressure front to back and side to side so that the pressure on any guide shoe roller does **not exceed 18-kg** without load in the car. (**Statically balanced**).
- It shall be accepted that the level of ride comfort is directly related to the static balancing of the car / sling. Therefore, as requested by the Lift Consulting Engineer, the Lift-Contractor shall demonstrate that the free hanging car / sling has as a minimum, been statically balanced in accordance with the requirements of this specification.
- As required the work related to meet the requirements of this section shall include but shall not be limited to:
 - Re-positioning and/or installation of balancing weights,
 - Repositioning of steady brackets,
 - Repositioning and/or adjustment of guide shoes / rollers and
 - Repositioning of the rope hitch.