



AIRPORTS COMPANY
SOUTH AFRICA

NEC3 Engineering and Construction

Short Contract (ECSC3)

A contract between **Airports Company South Africa**
VAT Reg No. 493 013 8393

and _____

for **UPS upgrade on Parking System at George airport.**

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Maintenance Manager
George Airport

C1 Agreements & Contract Data

C1.1 Form of Offer and Acceptance

Offer

The Employer, identified in the Acceptance page signature block on the next page, has solicited offers to enter into a contract for the procurement of:

The objective of the Employer is to appoint an experienced contractor for the UPS upgrade on the Parking System at George airport.

The tenderer, identified in the signature block below, having examined the documents listed in the Tender Data and addenda thereto as listed in the Tender Schedules, and by submitting this Offer has accepted the Conditions of Tender.

By the representative of the tenderer, deemed to be duly authorised, signing this part of this Form of Offer and Acceptance the tenderer offers to perform all of the obligations and liabilities of the Contractor under the Contract including compliance with all its terms and conditions according to their true intent and meaning for an amount to be determined in accordance with the conditions of contract identified in the Contract Data.

The offered total of the Prices exclusive of VAT is	
Value Added Tax @ 15% is	
The offered total of the Prices inclusive of VAT is	
(in words)	

This Offer may be accepted by the Employer by signing the form of Acceptance overleaf and returning one copy of this document including the Schedule of Deviations (if any) to the tenderer before the end of the period of validity stated in the Tender Data, or other period as agreed, whereupon the tenderer becomes the party named as the Contractor in the conditions of contract identified in the Contract Data.

Signature(s)

Name(s)

Capacity

**For the
tenderer:**

(Insert name and address of organisation)

Name &
signature of
witness

Date

Tenderer's CIDB registration number (if applicable)

Acceptance

By signing this part of this Form of Offer and Acceptance, the Employer identified below accepts the tenderer's Offer. In consideration thereof, the Employer shall pay the Contractor the amount due in accordance with the conditions of contract identified in the Contract Data. Acceptance of the tenderer's Offer shall form an Agreement between the Employer and the tenderer upon the terms and conditions contained in this Agreement and in the Contract that is the subject of this Agreement.

The terms of the Contract, are contained in:

- Part 1 Agreements and Contract Data, (which includes this Form of Offer and Acceptance)
- Part 2 Pricing Data
- Part 3 Scope of Work: Works Information
- Part 4 Site Information

and drawings and documents (or parts thereof), which may be incorporated by reference into the above listed Parts.

Deviations from and amendments to the documents listed in the Tender Data and any addenda thereto listed in the Tender Schedules as well as any changes to the terms of the Offer agreed by the tenderer and the Employer during this process of Offer and Acceptance, are contained in the Schedule of Deviations attached to and forming part of this Form of Offer and Acceptance. No amendments to or deviations from said documents are valid unless contained in this Schedule, which must be signed by the duly authorised representative(s) for both parties.

The tenderer shall within one week of receiving a completed copy of this Agreement, including the Schedule of Deviations (if any), contact the Employer's agent (whose details are given in the Contract Data) to arrange the delivery of any securities, bonds, guarantees, proof of insurance and any other documentation to be provided in terms of the conditions of contract identified in the Contract Data at, or just after, the date this Agreement comes into effect. Failure to fulfil any of these obligations in accordance with those terms shall constitute a repudiation of this Agreement.

Notwithstanding anything contained herein, this Agreement comes into effect on the date when the tenderer receives one fully completed copy of this document, including the Schedule of Deviations (if any) together with all the terms of the contract as listed above.

Unless the tenderer (now *Contractor*) within five working days of the date of such receipt notifies the *Employer* in writing of any reason why he cannot accept the contents of this agreement, this agreement shall constitute a binding contract between the Parties.

Signature(s)

Name(s) _____

Capacity _____

**for the
Employer**

(Insert name and address of organisation)

Name & signature of witness _____ Date _____

Note: If a tenderer wishes to submit alternative tender offers, further copies of this document may be used for that purpose, duly endorsed, 'Alternative Tender No. _____'

Schedule of Deviations

Note:

1. To be completed by the Employer prior to award of contract. This part of the Offer & Acceptance would not be required if the contract has been developed by negotiation between the Parties and is not the result of a process of competitive tendering.
2. The extent of deviations from the tender documents issued by the Employer prior to the tender closing date is limited to those permitted in terms of the Conditions of Tender.
3. A tenderer's covering letter must not be included in the final contract document. Should any matter in such letter, which constitutes a deviation as aforesaid be the subject of agreement reached during the process of Offer and Acceptance, the outcome of such agreement shall be recorded here and the final draft of the contract documents shall be revised to incorporate the effect of it.

No.	Subject	Details
1		
2		
3		
4		
5		
6		
7		

By the duly authorised representatives signing this Schedule of Deviations below, the Employer and the tenderer agree to and accept this Schedule of Deviations as the only deviations from and amendments to the documents listed in the Tender Data and any addenda thereto listed in the Tender Schedules, as well as any confirmation, clarification or changes to the terms of the Offer agreed by the tenderer and the Employer during this process of Offer and Acceptance.

It is expressly agreed that no other matter whether in writing, oral communication or implied during the period between the issue of the tender documents and the receipt by the tenderer of a completed signed copy of this Form shall have any meaning or effect in the contract between the parties arising from this Agreement.

	For the tenderer:	For the Employer
Signature	_____	_____
Name	_____	_____
Capacity	_____	_____
On behalf of	_____ <i>(Insert name and address of organisation)</i>	_____ <i>(Insert name and address of organisation)</i>
Name & signature of witness	_____	_____
Date	_____	_____

C1.2 Contract Data**Data provided by the *Employer***

Clause	Statement	Data
General		
10.1	The <i>Employer</i> is (Name):	[Airports Company South Africa] (reg no: [493 013 8393]), a juristic person incorporated in terms of the company laws of the Republic of South Africa
	Address	Registered office at [ACSA Corporate Office]
	Tel No.	
	Fax No.	
	E-mail address	
11.2(11)	The <i>works</i> are	UPS upgrade on Parking system at George airport
11.2(13)	The Works Information is in	the document called 'Works Information' in Part 3 of this contract.
11.2(12)	The Site Information is in	the document called 'Site Information' in Part 4 of this contract.
11.2(12)	The <i>site</i> is	George airport
30.1	The <i>starting date</i> is.	Upon signature of the contract by ACSA
11.2(2)	The <i>completion date</i> is.	For a period of 18 months or upon depletion of contract value
13.2	The <i>period for reply</i> is	7(seven) business days
40	The <i>defects date</i> is	12 (twelve) months after Completion of the whole of the <i>works</i>
41.3	The <i>defect correction period</i> is	2 (two) weeks
50.1	The <i>assessment day</i> is the	15th day of each successive month
50.5	The <i>delay damages</i> are	Amount per day is 0.05%, to the maximum of 10% of the Contract value
50.6	The retention is	5% of the Contract value
51.2	The interest rate on late payment is	The prime lending rate of the Nedbank Bank. as determined from time to time
80.1	The <i>Contractor</i> is not liable to the <i>Employer</i> for loss of or damage to the <i>Employer's</i> property in excess of	
82.1	The <i>Employer</i> provides this insurance	Refer to the Insurance Clauses which is attached at the end of the Contract Data

82.1	The minimum amount of cover for the third insurance stated in the Insurance Table is:	whatever the <i>Contractor</i> deems necessary in addition to that provided by the <i>Employer</i>.
82.1	The minimum amount of cover for the fourth insurance stated in the Insurance Table is:	As prescribed by the Compensation for Occupational Injuries and Diseases Act No. 130 of 1993 and the <i>Contractor's</i> common law liability for people falling outside the scope of the Act
	Does the United Kingdom Housing Grants, Construction and Regeneration Act (1996) apply?	No
93.1	The <i>Adjudicator</i> is (Name)	The person appointed jointly by the parties from the list of adjudicators contained in the Z clauses below.
93.2(2)	The <i>Adjudicator nominating body</i> is:	The current Chairman of Johannesburg Advocate's Bar Council.
93.4	The <i>tribunal</i> is:	arbitration.
	The <i>arbitration procedure</i> is	the latest edition of Rules for the Conduct of Arbitrations published by The Association of Arbitrators (Southern Africa) or its successor body.
	The place where arbitration is to be held is	South Africa
	The person or organisation who will choose an arbitrator	
	- if the Parties cannot agree a choice or	the Chairman for the time being or his nominee
	- if the arbitration procedure does not state who selects an arbitrator, is	of the Association of Arbitrators (Southern Africa) or its successor body.

The conditions of contract are the NEC3 Engineering and Construction Short Contract (June 2005)¹ and the following additional conditions:

Z **The Additional conditions of contract are** **Z1 – Z17**

Amendments to the Core Clauses

Z1 **Interpretation of the law**

Z1.1 **Add to core clause 12.3:**

Any extension, concession, waiver or relaxation of any action stated in this contract by the Parties, the *Project Manager*, the *Supervisor*, or the *Adjudicator* does not constitute a waiver of rights and does not give rise to an estoppel unless the Parties agree otherwise and confirm such agreement in writing.

Z3 **Other responsibilities:**

Z4 **Extending the defects date:**

Add the following as a new clause 42.5:

- Z4.1** If the *Employer* cannot use the *works* due to a Defect, which arises after Completion and before the *defects date*, the *defects date* is delayed by a period equal to that during which the *Employer*, due to a Defect, is unable to use the *works*.
- Z4.2** If part of the *works* is replaced due to a Defect arising after Completion and before the *defects date*, the *defects date* for the part of the *works* which is replaced is delayed by a period equal to that between Completion and the date by when the part has been replaced.
- Z4.3** The *Project Manager* notifies the *Contractor* of the change to a *defect date* when the delay occurs. The period between Completion and an extended *defects date* does not exceed twice the period between Completion and the *defects date* stated in the Contract Data.

Z5 Termination

- Z5.1** **Add the following to core clause 90.2, after the words “or its equivalent”:** “or business rescue proceedings are initiated, or steps are taken to initiate business rescue proceedings”.

Additional Z Clauses**Z6 Cession, delegation and assignment**

- Z6.1** The *Contractor* shall not cede, delegate or assign any of its rights or obligations to any person without the written consent of the *Employer*, which consent shall not be unreasonably withheld. This clause shall be binding on the liquidator/business rescue practitioner /trustee (whether provisional or not) of the *Contractor*.
- Z6.2** The *Employer* may cede and delegate its rights and obligations under this contract to any person or entity.

Z7 Joint and several liability

- Z7.1** If the *Contractor* constitutes a joint venture, consortium or other unincorporated grouping of two or more persons, these persons are deemed to be jointly and severally liable to the *Employer* for the performance of the Contract.
- Z7.2** The *Contractor* shall, within 1 week of the Contract Date, notify the *Project Manager* and the *Employer* of the key person who has the authority to bind the *Contractor* on their behalf.
- Z7.3** The *Contractor* does not materially alter the composition of the joint venture, consortium or other unincorporated grouping of two or more persons without prior written consent of the *Employer*.

Z8 Ethics

- Z8.1** The *Contractor* undertakes:
- Z8.1.1** not to give any offer, payment, consideration, or benefit of any kind, which constitutes or could be construed as an illegal or corrupt practice, either directly or indirectly, as an inducement or reward for the award or in execution of this contract;
- Z8.1.2** to comply with all laws, regulations or policies relating to the prevention and combating of bribery, corruption and money laundering to which it or the *Employer* is subject, including but not limited to the Prevention and Combating of Corrupt Activities Act, 12 of 2004.

- Z8.2** The *Contractor's* breach of this clause constitutes grounds for terminating the *Contractor's* obligation to Provide the Works or taking any other action as appropriate against the *Contractor* (including civil or criminal action). However, lawful inducements and rewards shall not constitute grounds for termination.
-
- Z8.3** If the *Contractor* is found guilty by a competent court, administrative or regulatory body of participating in illegal or corrupt practices, including but not limited to the making of offers (directly or indirectly), payments, gifts, gratuity, commission or benefits of any kind, which are in any way whatsoever in connection with the contract with the *Employer*, the *Employer* shall be entitled to terminate the contract in accordance with the procedures stated in core clause 92.2. the amount due on termination is A1.
-
- Z9 Confidentiality**
-
- Z9.1** All information obtained in terms of this contract or arising from the implementation of this contract shall be treated as confidential by the *Contractor* and shall not be used or divulged or published to any person not being a party to this contract, without the prior written consent of the *Project Manager* or the *Employer*, which consent shall not be unreasonably withheld.
-
- Z9.2** If the *Contractor* is uncertain about whether any such information is confidential, it is to be regarded as such until otherwise notified by the *Project Manager*.
-
- Z9.3** This undertaking shall not apply to –
-
- Z9.3.1** Information disclosed to the employees of the *Contractor* for the purposes of the implementation of this agreement. The *Contractor* undertakes to procure that its employees are aware of the confidential nature of the information so disclosed and that they comply with the provisions of this clause;
-
- Z9.3.2** Information which the *Contractor* is required by law to disclose, provided that the *Contractor* notifies the *Employer* prior to disclosure so as to enable the *Employer* to take the appropriate action to protect such information. The *Contractor* may disclose such information only to the extent required by law and shall use reasonable efforts to obtain assurances that confidential treatment will be afforded to the information so disclosed;
-
- Z9.3.3** Information which at the time of disclosure or thereafter, without default on the part of the *Contractor*, enters the public domain or to information which was already in the possession of the *Contractor* at the time of disclosure (evidenced by written records in existence at that time);
-
- Z9.4** The taking of images (whether photographs, video footage or otherwise) of the *works* or any portion thereof, in the course of Providing the Works and after Completion, requires the prior written consent of the *Project Manager*. All rights in and to all such images vests exclusively in the *Employer*
-
- Z9.5** The *Contractor* ensures that all his Subcontractors abide by the undertakings in this clause.
-
- Z10 Employer's Step-in rights**
-
- Z10.1** If the *Contractor* defaults by failing to comply with his obligations and fails to remedy such default within 2 weeks of the notification of the default by the *Project Manager*, the *Employer*, without prejudice to his other rights, powers and remedies under the contract, may remedy the default either himself or procure a third party (including any subcontractor or supplier of the *Contractor*) to do so on his behalf. The reasonable costs of such remedial works shall be borne by the *Contractor*

Z10.2 The *Contractor* co-operates with the *Employer* and facilitates and permits the use of all required information, materials and other matter (including but not limited to documents and all other drawings, CAD materials, data, software, models, plans, designs, programs, diagrams, evaluations, materials, specifications, schedules, reports, calculations, manuals or other documents or recorded information (electronic or otherwise) which have been or are at any time prepared by or on behalf of the *Contractor* under the contract or otherwise for and/or in connection with the *works*) and generally does all things required by the *Project Manager* to achieve this end.

Z11 Liens and Encumbrances

Z11.1 The *Contractor* keeps the Equipment used to Provide the Services free of all liens and other encumbrances at all times. The *Contractor*, vis-a-vis the *Employer*, waives all and any liens which he may from time to time have, or become entitled to over such Equipment and any part thereof and procures that his Subcontractors similarly, vis-a-vis the *Employer*, waive all liens they may have or become entitled to over such Equipment from time to time

Z12 Intellectual Property

Z12.1 Intellectual Property ("IP") rights means all rights in and to any patent, design, copyright, trademark, trade name, trade secret or other intellectual or industrial property right relating to the Works.

Z12.2 IP rights remain vested in the originator and shall not be used for any reason whatsoever other than carrying out the *works*.

Z12.3 The *Contractor* gives the *Employer* an irrevocable, transferrable, non-exclusive, royalty free licence to use and copy all IP related to the *works* for the purposes of constructing, repairing, demolishing, operating, and maintaining the works

Z12.4 The written approval of the *Contractor* is to be obtained before the *Contractor's* IP made available to any third party which approval will not be unreasonably withheld or delayed. Prior to making any *Contractor's* IP available to any third party the *Employer* shall obtain a written confidentiality undertaking from any such third party on terms no less onerous than the terms the *Employer* would use to protect its IP

Z12.5 The *Contractor* shall indemnify and hold the *Employer* harmless against and from any claim alleging an infringement of IP rights ("**the claim**"), which arises out of or in relation to:

Z12.5.1 the *Contractor's* design, manufacture, construction or execution of the Works

Z12.5.2 the use of the *Contractor's* Equipment, or

Z12.5.3 the proper use of the Works.

Z12.6 The *Employer* shall, at the request and cost of the *Contractor*, assist in contesting the claim and the *Contractor* may (at its cost) conduct negotiations for the settlement of the claim, and any litigation or arbitration which may arise from it.

Z13 Dispute resolution:

Z13.1 Appointment of the Adjudicator

An *Adjudicator* is appointed when a dispute arises, from the Panel of Adjudicators below. The referring party nominates an Adjudicator, which nomination is either accepted or rejected by the other party. In the instance of a rejection of the nominated *Adjudicator*, the referring Party refers the appointment deadlock to the Chairman of the Johannesburg Bar Council, who appoints an *Adjudicator* listed in the Panel of Adjudicators below

The Parties appoint the *Adjudicator* under the NEC3 Adjudicator's Contract, April 2013

Name	Location	Contact details (phone & e mail)
Adv. Ghandi Badela	Gauteng	+27 11 282 3700 ghandi@badela.co.za
Mr. Errol Tate Pr. Eng.	Durban	+27 11 262 4001 Errol.tate@mweb.co.za
Adv. Saleem Ebrahim	Gauteng	+27 11 535-1800 salimebrahim@mweb.co.za
Mr. Sebe Msutwana Pr. Eng.	Gauteng	+27 11 442 8555 sebe@civilprojects.co.za
Mr. Sam Amod	Gauteng	sam@samamod.com
Adv. Sias Ryneke SC	Gauteng	083 653 2281 ryneke@duma.nokwe.co.za
Mr. Emeka Ogbugo (Quantity Surveyor)	Pretoria	+27 12 349 2027 emeka@gosiame.co.za

Z13.2 Appointment of the Arbitrator

An *Arbitrator* is appointed when a dispute arises from the Panel of Arbitrators below. The referring party nominates an Arbitrator, which nomination is either accepted or rejected by the other party. In the instance of a rejection of the nominated *Arbitrator*, the referring Party refers the appointment deadlock to the Chairman of the Johannesburg Bar Council, who appoints an *Arbitrator* listed in the Panel of *Arbitrators* below

The Parties appoint the *Arbitrator* under the NEC3 Arbitrator's Contract, April 2013

Name	Location	Contact details (phone & e mail)
Adv. Ghandi Badela	Gauteng	+27 11 282 3700 ghandi@badela.co.za
Mr. Errol Tate Pr. Eng.	Durban	+27 11 262 4001 Errol.tate@mweb.co.za
Adv. Saleem Ebrahim	Gauteng	+27 11 535-1800 salimebrahim@mweb.co.za
Mr. Sebe Msutwana Pr. Eng.	Gauteng	+27 11 442 8555 sebe@civilprojects.co.za
Mr. Sam Amod	Gauteng	sam@samamod.com
Adv. Sias Ryneke SC	Gauteng	083 653 2281 ryneke@duma.nokwe.co.za
Mr. Emeka Ogbugo (Quantity Surveyor)	Pretoria	+27 12 349 2027 emeka@gosiame.co.za

Z14 Notification of a compensation event

Z14.1 Delete "eight weeks" in clause 61.3 and replace with "four weeks". Delete the words "unless the event arises from the Project Manager or the Supervisor giving an instruction, issuing a certificate, changing an earlier decision or correcting an assumption."

Z15 BBEE and Tax Clearance Certificates

Z15.1 The *Contractor* shall be expected to annually present a compliant BEE and Tax Clearance Certificate. Failure to do adhere to these requirements shall be considered a material breach of the conditions of this Contract, the sanction for which may be a cancellation of this Contract.

Z16 **Communication**

Z16.1 **Add a new Core Clause** 14.5 and 14.6 to read as follows:
The *Project Manager* requires the written consent of the Employer if an action will result in a change to the design, scope, and Works information that is 5% or more

Z16.2 The *Project Manager* requires the written consent of the Employer if an action will result in the Completion Date being extended by more than 30 days.

Z17 **Delegation**

As stipulated by Section 37(2) of the Occupational Health and Safety Act No. 85 of 1993 as amended the *Contractor* agrees to the following:

Z17.1 As part of this contract the *Contractor* acknowledge that it (mandatory) is an employer in its own right with duties as prescribed in the Occupational Health and Safety Act No 85 of 1993 as amended and agree to ensure that all work being performed, or Equipment, Plant and Materials being used, are in accordance with the provisions of the said Act, and in particular with regard to the Construction Regulations

Data provided by the *Contractor* (the *Contractor's Offer*)

The tendering contractor is advised to read both the NEC3 Engineering and Construction Short Contract (June 2005) and the relevant parts of its Guidance Notes (ECSC3-GN)² in order to understand the implications of this Data which the tenderer is required to complete. An example of the completed Data is provided on page 26 of the ECSC3 Guidance Notes.

Completion of the data in full is essential to create a complete contract.

10.1	The <i>Contractor</i> is (Name): Address Tel No. Fax No. E-mail address	-
63.2	The percentage for overheads and profit added to the Defined Cost for people is	___%
63.2	The percentage for overheads and profit added to other Defined Cost is	___%
11.2(9)	The Price List is in	the document called 'Price List' in Part 2 of this contract.
11.2(10)	The offered total of the Prices is [Enter the total of the Prices from the Price List]:	R excluding VAT [in words] excluding VAT

INSURANCE CLAUSES

The successful bidder must source the following insurance cover, which is the deductible in the ACSA insurance cover:

- Aviation liability insurance cover for an indemnity limit not less than R300 000 (three hundred thousand rands).
- Submit proof of insurance to ACSA before the work starts, and annually for the duration of the project.

-

1. INSURANCE REQUIREMENTS FOR PROJECTS WITH A VALUE BELOW R50 million AND DURATION NOT EXCEEDING 36 MONTHS ON THE AIRSIDE

1.1 Contract Works Insurance

- The contractor must secure a contract works insurance cover for a limit not less than R250 000, for each and every claim
- The contractor must submit to ACSA proof of cover in the form of a certificate of insurance before a contract is signed between ACSA and the contractor

1.2 Public Liability Insurance

- The contractor must secure Public Liability insurance cover for 3rd party property damage, for a limit not less than R525 000, for each and every claim;
- The contractor must secure Public Liability insurance cover for removal of lateral support, for a limit not less than R750 000, for each and every claim;
- The contractor must secure Public Liability insurance cover for damage to aircraft, for a limit not less than R750 000, for each and every claim
- The contractor must submit to ACSA proof of cover in the form of a certificate of insurance before a contract is signed between ACSA and the contractor

1.3 Professional Indemnity Insurance

- All consultants must secure Professional Indemnity cover for a limit of not less than R5 million;
- Contractors who have a material design element, excluding typical P & G related work, as part of their scope, must secure Professional Indemnity cover for a limit not less than R5 million;
- The consultant must submit to ACSA proof of cover in the form of a certificate of insurance before a contract is signed between ACSA and consultant.

C2 Pricing Data

C2.1 Pricing assumptions

Entries in the first four columns in the Price List are made either by the *Employer* or the tendering contractor

If the *Contractor* is to be paid an amount for the item which is not adjusted if the quantity of work in the item changes, the tenderer enters the amount in the Price column only; the Unit, Quantity and Rate columns being left blank.

-

If the *Contractor* is to be paid an amount for the item of work which is the rate for the work multiplied by the quantity completed, the tenderer enters the rate which is then multiplied by the expected quantity to produce the Price, which is also entered.

All Prices are to be shown excluding VAT unless instructed otherwise by the *Employer* in Tender Data or in an instruction the *Employer* has given before the tenderer enters his Prices.

If there is insufficient space in the Price List which follows, state in which document the Price List is contained.



C2.2 Price List

George Airport

Item no.	Description	Unit	Quantity	Rate	Price
PART AA	PRELIMINARY AND GENERAL (ELECTRICAL)				
8500/AA1	CONTRACTORS FIXED CHARGES				
AA1.1	Contractual Requirements	Item	1,0		
AA1.2	Compliance with the Occupational Health and Safety Act Regulations	Item	1,0		
AA1.3	Testing and commissioning	Sum	1,0		
AA1.4	Operating and maintenance manual (two copies)	Sum	1,0		
AA1.5	AS built information in GIS format	Item	1,0		
8500/AA2	CONTRACTORS TIME RELATED ITEMS				
AA2.1	Project Management & Works Supervision	Sum	1,0		
PART BB	ELECTRICAL-LOW VOLTAGE NETWORK				
8500/BB1	ESSENTIAL DB IN TERMINAL SUBSTATION				
BB1.1	80A 3 phase circuit breaker 10kA for future UPS2	each	1		
BB1.2	25mm ² 4 core SWA PVC cable from new Essential DB to backup UPS2	m	15		
BB1.3	Termination of 25mm ² 4 core SWA PVC cable at Essential DB and UPS2	each	2		
BB1.4	Labelling of all incoming & outgoing LV cables and feeders according to specification to indicate size, type, source, etc.	each	1		
8500/BB2	UPS AC DB IN TERMINAL SUBSTATION				
BB2.1	100A Incoming 3 phase isolator	each	1,0		
BB2.2	25mm ² 4 core SWA PVC cable from UPS2 to UPS DB	m	2,0		
BB2.3	Termination of 25mm ² 4 core, SWA PVC cable at UPS DB & UPS2	each	2,0		
BB2.4	Labeling all incoming & outgoing LV cables and feeders according to specification to indicate size, type, source, etc.	each	1		
8500/BB3	GENERAL LV				
BB3.1	Complete LV testing and commissioning inter alia earth resistance, insulation tests, voltage recordings, Employer checklists, etc.	sum	1		
BB3.2	All other items deemed necessary to complete the works. (Specify):	sum	1		
	(Specify) 1				



	(Specify) 2				SOUTH AFRICA
	(Specify) 3				
	(Specify) 4				
PART CC	UPS SYSTEM				
8500/CC1	TERMINAL SUBSTATION BUILDING				
	Supply and installation of Standby UPS system similar or equal to the PowerMan PM33-HF025R model:				
CC1.1	25KVA On-Line 3-phase UPS with internal 8A Charger Module	each	1,0		
CC1.2	Battery Cabinet with 8 x 64V50Ah LiFePo4 batteries	each	1,0		
CC1.3	Network Management card	each	1,0		
CC1.4	UPS Assembly & DC Installation Services Including Travel & Accommodation	each	1,0		
CC1.5	Delivery & Rigging of UPS & Batteries	each	1		
8500/DD1	DATA RELATED ITEMS				
DD1.1	Single mode 12 pair fibre optic cable	m	270		
DD1.2	Cat 6 cable	m	125		
DD1.3	8 Port switch	each	1		
DD1.4	Fibre to Copper converter	each	1		
	Sub- Total A: The total of the Prices (excluding VAT):				

Item no.	Description	Price
1.	Sub-Total A	
2.	Health and safety requirements (including safety file)	
3.	Contingencies (10% of Sub-Total A)	
4.	Provisional sum for Permits and Access control	R30 000
	Final: The total of the Prices (excluding VAT):	



C3: Scope of Work

C3.1 Works Information

1. Description of the works

The Project requires the installation of a backup (spare) UPS + battery, into a primary (main) UPS installation. The primary UPS installation forms part of a different project ("Bollard Project"), whose electrical design makes provision for this backup UPS + battery to be installed afterwards ("future"). Refer to the attached drawings.

The back UPS (25kVA) must be of the same specifications or similar (PowerMan PM33-HF025R model) as the primary UPS installation. Additionally, make provision for a battery pack that can provide 2 hr backup of 75% of the full capacity of the UPS. Also make provision for a network management card.

The upgrade of power supply from the existing substation in the terminal building to the existing Pay Station in the parking area (part of the Bollard Project) is a fundamental requirement to ensure a secure and sustainable supply. This project (procurement) aims to improve the redundancy of that power supply even further by installing a second (spare) UPS and battery pack. This spare UPS must be synchronised with the primary UPS so that automatic sharing (and/or transfer) of the load can be achieved accordingly. The installation of this backup UPS unit into the design of the UPS power supply (single-point backup supply to the parking security system) will take place in the Terminal Substation building.

The project consists *inter alia* of the following sections:

1. The supply, installation and commissioning of a backup (2nd) 25kVA 400v AC UPS system (including the battery pack + network management card + synchronization module) in the existing terminal building substation to act as a synchronized backup UPS to the primary UPS.
2. The supply, installation and commissioning of cables from the "Essential Extension DB" to the backup UPS (+ battery) and from the backup UPS to the "UPS DB", in the existing terminal building substation.
3. The supply, installation and commissioning of Circuit breakers in the "Essential DB" and an Isolator in the "UPS DB".
4. Installation of fiber optic connection (Fiber optic and CAT 6 cable installations and related equipment) from the Terminal Substation to the IT core room.
5. The substation is not on the airside, however due to the essential supplies involved, work will only be allowed when the airport is closed.
6. The typical operating hours of the airport is summarized as follows:
 - a. Between 06:00 and 19:00 during the week.
 - b. Between 06:00 and 15:00 on Saturdays.
 - c. Between 07:00 and 19:30 on Sundays.
7. Contractors shall be allowed to execute the works outside the airport operating hours:
 - a. Between 15:00 on Saturday and 05:00 on Sunday.
 - b. Between 19:00 and 12:00 during the week.

Tender prices shall allow and include for the execution of the works outside the airport operating hours. No additional claims will be entertained in this regard after appointment of the successful Tenderer.



Relative Humidity	%	95% max, 5% min
Atmosphere	-	Salt laden Dry in summer Damp in winter
Monthly average rain	mm	15
Prevailing wind direction	-	Summer - south easterly Winter - north westerly
1:50 Year quantiles of annual maximum gusts	m/s	35-40
1:50 Year quantiles of annual maximum hourly mean wind speeds	m/s	20-25
Distance from sea	km	5.8
Air dust maximum (not existent, low, medium, high, extremely high)	-	Medium dusty
Soil average thermal resistivity		1,2 EC m/W may reach 3,0 EC m/W
Lightning stroke density	/km ² /year	<2
Earthquake category		N/A
Noise general work area	dB (A)	Up to 100 at ramming machine
Noise control room	dB (A)	Not Defined
Noise increase at fence	dB (A)	5

Electrical network status	Value
Maximum short circuit current at the Substation	11 kV - 25 kA 400 V – 35 kA
System nominal voltage	11 / 0.400 / 0.230 kV
System highest voltage	12 / 0.45 / 0.26 kV
Contractual voltage	11 / 0.42 / 0.242 kV
Frequency + possible variation	50 Hz ± 1%
Neutral grounding system	Solid
Settings of upstream protection relays	200A cut-out fuses

4. AC Assemblies

4.1 All equipment and services supplied shall also comply with the standards of the Standard Specification: Low Voltage Assemblies in Annexure D.

4.2 The indoor AC Boards shall be fabricated from 3CR12 with a minimum thickness of 2 mm. The box shall be vermin proof, with a minimum IP3X rating. The box must be seam welded. Cognisance shall be taken of the fact that any area where water or dirt can accumulate such as inadequate welds, bolted surfaces and sharp areas will result in accelerated corrosion if any iron filings is not completely removed after manufacturing and/or installation. All doors shall have a stainless steel earth stud. Trunking used in the AC Board must be permanently secured using nuts and bolts.



- 4.3 The assemblies shall be provided with front and back access swing doors. The back access doors shall be provided with a castle key or similar and equal Approved locking mechanism.
- 4.4 The paint finishing colour scheme shall match the existing colours for the specific type of assembly.
- 4.5 The gland plate (heavy duty galvanized Unistrut) shall be placed 400 mm above the bottom of the panel. Each circuit's terminals shall be pre-wired with welding cable to the appropriate circuit breaker.
- 4.6 Circuit breakers accommodating cables bigger than 70 mm² in size shall be pre-fitted with insulated bus bar extensions, extended horizontally backwards, and vertically down to create termination points as close as possible above the gland plate.

- 4.7 The design of AC Boards shall comply to clause 5.1.1 of SANS 10142-1, which states that:

It shall not be possible to touch any live part within arm's reach with the standard finger test.

- During normal operation, or
- When a cover is removed, unless the cover is removed with the use of a tool or a key.

- 4.8 All metal parts shall be connected individually and direct to the earth bar via a green 4mm² PVC copper conductors. All terminal rails should be fitted with an earthing terminal. All electrical components that have a provision for earth, must be earthed. Looping of the earth wire between metal parts will not be acceptable. Each metal part shall have its own earth connected to the earth bar or earth stud. A 40 x 40 x 3mm copper pad shall be brazed to the outside of the box. All gland plates shall be earthed to the predrilled earthing bar by means of a braided tinned copper earthing strap with an effective copper cross-sectional area of 12 mm². The contact resistance between the main earth bar/stud and any earth stud located on doors, gland plates etc., must not exceed 0.1 ohms. All earth connections shall be as short as possible and shall not be coiled.

- 4.9 Spare space shall be allowed for future circuits as indicated on the drawings.

- 4.10 Essential DB Classification and electrical characteristics:

#	PARAMETER	SCHEDULE A	SCHEDULE B
1	Manufacturer	-	
2	External design	Enclosed, multi-cubicle	
3	Place of installation	Indoor, closed room	
4	Conditions of installation	Stationary	
5	Degree of protection	IP3X	
6	Type of enclosure	Metal clad, front & rear access swing doors	
7	Gland plate	Heavy duty galvanized Unistrut	
8	Cable terminations	Extended circuit breaker busbars and terminals	
9	Method of mounting	Floor standing, over cable duct	
10	Busbars	Panel widths sections on top	
11	Cable entry & exit	Bottom	
12	Measure of protection of persons	Direct, indirect & protective circuits	
13	Form of internal separation	3b	
14	Type of electrical connections of functional units	FFF	



#	PARAMETER	SCHEDULE A	SCHEDULE B
1	Rated operational voltage	230/400V ±10%	
2	Rated insulation voltage	1000V	
3	Rated impulse withstand voltage	6kV	
4	Rated current (busbar rating RWB)	400A	
5	Busbar current density at full load	1.6A/mm ²	
6	Rated current (busbar rating N)	300A	
7	Fault level	25kA	
8	Rated diversity current	0.9	
9	Rated frequency	50Hz	

4.11 UPS DB Classification and electrical characteristics:

#	PARAMETER	SCHEDULE A	SCHEDULE B
1	Manufacturer	-	
2	External design	Enclosed, multi-cubicle	
3	Place of installation	Indoor, closed room	
4	Conditions of installation	Stationary	
5	Degree of protection	IP3X	
6	Type of enclosure	Metal clad, front access swing doors	
7	Gland plate	Heavy duty galvanised Unistrut	
8	Cable terminations	Extended circuit breaker busbars and terminals	
9	Method of mounting	Floor standing, over cable duct	
10	Busbars	Panel widths sections on top	
11	Cable entry & exit	Bottom	
12	Measure of protection of persons	Direct, indirect & protective circuits	
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1	Rated operational voltage	230/400V ±10%	
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3	Rated impulse withstand voltage	6kV	
4	Rated current (busbar rating RWB)	200A	
5	Busbar current density at full load	1.6A/mm ²	
6	Rated current (busbar rating N)	150A	
7	Fault level	25kA	
8	Rated diversity current	0.9	
9	Rated frequency	50Hz	

5. UPS

A 25kVA on-line 3 phase UPS with internal 8A charger module shall be provided and installed as depicted on the drawings. The system shall be similar or equal to the PowerMan PM33-HF025R model.

The battery unit shall consist of 8x 64V 50Ah LiFePo4 batteries.

A 24-hour remote monitoring and control network management card with supporting software shall be provided for integration with the existing server.



6. Polyethylene Kiosks and pole boxes

Kiosks shall be 6-way linear low-density polyurethane type with wooden backboard divider with a IP54 rating. Kiosks will have two 130° opening doors with front labelled as Electrical & rear labelled as Data. The data side is to be provided with a blue dedicated switch socket outlet. Kiosk 1C is to be provided with a fibre converter & network hub for boom station equipment and CCTV camera connections. Poles boxes shall be 400(W) x 450(H) x 190(D) low-density polyurethane type with wooden backboard divider with a IP54 rating. Kiosks will have two 130° opening door.

7. Communication Networks

Install communication network from the existing IT Core room on the 1st floor of the Terminal building (on ACSA Administration side). Engage with ACSA IT on how to configure and commission communication.

8. Electrical Cabling

All cable and cabling equipment and services supplied shall comply with the standards listed below:

- SANS 1507 Part 1: General - Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1900/3300 V).
- SANS 1507 Part 2: Wiring Cables - Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1900/3300 V).
- SANS 1507 Part 3: PVC Distribution cables - Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1900/3300 V).
- SANS 1507 Part 4: XLPE Distribution cables – Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1 900/3300 V).
- SANS 1507 Part 5: Halogen-free Distribution Cables - Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1900/3300 V).
- SANS 1507 Part 6: Service cables - Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1900/3300 V).
- SANS 10198 Parts 1-14 :2004 The selection, handling, and installation of electric power cables of rating not exceeding 33 kV Part 1 to 14.
- SANS 1213 Mechanical Cable Glands.
- SANS 1339: Electric cables-Cross-linked polyethylene (XLPE) insulated cables for rated voltages 3.8/6.6 kV to 19/33 kV.
- SANS 97 Electrical Cables Impregnated paper insulated metal-sheathed cables for rated voltages 3,3 kV to 19/33kV.
- NRS 074-1/2 Low Voltage cables systems.

9. LV Cabling

The selection, handling and installation of electric cables shall meet the requirements of SANS 10198 Part 1 to Part 14.

The LV cables shall be PVC insulated PVC bedded SWA PVC sheltered 600/1000V cables manufactured to SANS 1507.

10. Earthing



The Contractor shall conduct tests on the earthing system to fully verify compliance to specifications and the safety of the site.

3. Management of the Works

1. Contractual

The Electrical Contractor shall be the Main Contractor and any sub-contractors must be defined. An approved Health and Safety File (Plan) is required (Permit to Work) before commencement of any Works.

2. Drawings

The Drawings applicable to this tender is as follows:

- GRG-510/RT/SC/02: Schematic Diagram & Typical Detail Layouts
- GRG-510/RT/BL/04: Terminal Substation Layout.

The Contractor shall update these drawings to include the works in this project.

3. Contractor's Guarantee

The complete installation with associated assemblies and equipment shall be fully guaranteed against manufacturing defects for a period of 12 months, commencing from the date on which the Works Completion Certificate has been issued by the Employer.

The final take over inspection and defects list will be done after the 12-month guarantee period. The Final Approval Certificate will only be issued after rectification of the defects to the satisfaction of the Employer.

Should any item or any of its constituents fail because of construction or manufacturing defects within the abovementioned period the Contractor shall be responsible for locating and repairing the fault and testing and re-commissioning the unit/item at no cost to the Employer. Such component which has to be replaced or repaired shall then be guaranteed for an additional 12-month period from date of re-energizing or repair.

The latent defects period is 10 years.

4. Documentation

1.1 GENERAL

The following documentation and drawings shall be submitted to the engineer prior to the manufacturing of Assemblies and related equipment as applicable:

- Cable block diagrams.
- General arrangement and elevation drawings, compartment door layouts, typical component mounting plate layouts, and foundation plans.
- Electrical schematic diagrams showing all equipment and components incorporated into the Assembly. Known circuitry outside of the Assembly and connected to it, shall be shown on all drawings. All contacts shall be cross-referenced to their associated components using a grid / line reference system.



- Protective device grading for overcurrent, short circuit, and earth fault / leakage devices incorporated within the Assembly, together with a schedule of proposed settings that will ensure discrimination.

PLC software and configuration documentation; including ladder logic diagrams and HMI display screens, etc. The documentation shall be complete and annotated with purpose, function, duty, cross-references, and descriptions, etc.; sufficient to guide an unfamiliar person through the operation of the software.

5. Certificate of Compliance

A COC shall be provided for the Assemblies and completely new installation. The original COC shall go to the client's electrical representative. A copy of the COC shall be included in the O&M Manual.

6. Operating and Maintenance Manual

One copy of the draft O&M manual and spare parts list shall be provided at an agreed date; in advance of the date of the start of the final testing and commissioning, for acceptance by the Employer. Two copies of the final editions shall be provided to the Employer by an agreed date before successful completion of final testing and commissioning. The O&M manual shall be bound into a suited hard-backed ring binder and shall be provided with an index of all drawings pertinent to the Assembly. The index shall include each drawing's origin, number, issue, status, and the Client's drawing number (where issued by the Employer).

7. Spares

Not required. A recommended spares list must be submitted.


Annexures:

Title	Date or revision	Tick if publicly available
<u>A Health and Safety requirements:</u>		
<u>B Environmental requirements:</u>		
<u>C Safety file requirements:</u>		
<u>D Standard Specification Low Voltage Assemblies:</u>		
<u>Technical specifications:</u>		
Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)	1993	Yes

4. Constraints on how the *Contractor* Provides the Works

- Work needs to be completed against a tight program with a practical completion date of **30 November 2024**
- Works must not influence airport operations
- All work must predominantly be scheduled for after operational hours

4.1 Meetings

1. Project kick-off meeting between ACSA and the appointed *Contractor* on the agreed date.
2. 1st site meeting to occur within a week after kick-off meeting and then 1 meeting per week until project completion

4.2 Use of standard forms

NEC standard forms apply

4.3 Invoicing and payment

In terms of core clause 50 the *Contractor* assesses the amount due and applies to the *Employer* for payment. The *Contractor* applies for payment with a tax invoice addressed to the *Employer* as follows:

The *Contractor* includes the following information on each tax invoice:

- Name and address of the *Contractor*
- The contract number and title;
- *Contractor's* VAT registration number;
- The *Employer's* VAT registration number (Vat Reg No. 4930138393);
- The total Price for Work Done to Date which the *Contractor* has completed;
- Other amounts to be paid to the *Contractor*;
- Less amounts to be paid by or retained from the *Contractor*;
- The change in the amount due since the previous payment being the invoiced amount - excluding VAT, the VAT and including VAT;
- ACSA Purchase Order No. to be included on every tax invoice submitted



The *Contractor* attaches the detail assessment of the amount due to each tax invoice showing the Price for Work Done to Date for each item in the Price List for work which he has completed.

Payment schedule	% of contract value	Rand value
Total		

4.4 Records of Defined Cost

The contractor must provide the records off personnel paid; plant and materials; sub-contracted work and equipment. These will need to be provided in the form of a excel sheet consolidating the amounts. This must be attached to each Payment Certificate submitted for review.

4.5 BBBEE and preferencing scheme

The appointed Contractor is to maintain or improve on its BBBEE status as per verification certificate.

4.6 Facilities to be provided by the Contractor

The Contractor shall be provided with an area where they will set up the site camp. The electrical and water supply points will be provided by the employer.

4.7 Title to material from excavation and demolition

The contractor to notify in writing the ACSA project manager regarding all material that is to be removed from site as a result of this project

4.8 Design by the Contractor

Minimum 2 preliminary design options must be presented to the ACSA key stakeholders for final selection based on optimum aesthetics: safety and airport operations. The final design must adhere to all applicable compliances and certifications.

5. Requirements for the programme

The appointed Contractor is to supply the ACSA project manager with:

- a) Project time line/schedule at the kick-off meeting
- b) A detailed method statement/activity schedule by the first project site meeting.

The appointed Contractor is to notify the ACSA project manager in writing regarding any deviations to the above.

6. Services and other things provided by the Employer

Not applicable

Item	Date by which it will be provided
N/A	N/A


INTERPRETATION AND TERMINOLOGY

DESCRIPTION	ABBREVIATION / INTERPRETATION
Alternating Current	AC
Certificate of Compliance	COC
Contract Price Adjustment	CPA
Control and Management System	CMS
Direct Current	DC
Engineering Procurement and Construction	EPC
Factory Acceptance Testing	FAT
Low Voltage	LV
Medium Voltage	MV
Operating and Maintenance	O&M
Provisional Acceptance Test	PAT
Terminal Building Substation	TBS
Approved	Approved in writing by the Employer
Certificate of Completion	When the outstanding items on the practical Completion Certificated is repaired and signed-off by the Engineer. Also referred to as Works Completion Certificate
Commencement date	The date that the Agreement, made in terms of the Form of Offer and Acceptance, comes into effect
Commencement of Works	When the Contractor commence executing the Works, following instruction by the Engineer
Contract	The documentation of the agreement between the parties in terms of the Form of Offer and Acceptance
Contractor	The successful Tenderer appointed to execute the Contract
Defects Liability Period	The 12-month period commencing from the issue of the Certificate of Completion
Document	This complete set of bound conditions, specifications, Bill of Quantities, and schedules also referred to as the Tender Document
Drawings	Drawings issued with the Tender Documentation
As Built Drawings	As-Built Drawings of the complete plant including civil works and equipment installation specifications
Employer	The Employer or ACSA
Engineer	The Chief Engineer of the ACSA
Erect	To place or mount and fix in position
Final Completion	When the Final Approval Certificate is issued by the Engineer stating the date on which the Works were completed, and all defects corrected in accordance with the Contract
Grid	Existing 11kV electrical reticulation network
Handover	When the Contractor is given permission to enter the site
Install	To erect, connect, and commission, complete with related accessories
Indicated, Shown, Noted	As indicated or shown on drawings
Performance Guarantee	Form of Guarantee issued by the Contractor
Point of Supply	Point where the Plant connect to the Grid
Practical Completion	When the whole or portion of the Works has reached a state of readiness fit for the intended purpose, and occupation without danger or undue inconvenience to the Employer, although some work may be outstanding
Project Specification	This Scope of Work also serves as the Project Specification
Scope of Work	The document that specifies and describe the Works which are to be provided, and any other requirements and constraints relating to the way the work is to be carried out



DESCRIPTION	ABBREVIATION / INTERPRETATION
Site	The building or land and other places made available by the Employer, for the purpose of the Contract, on, under, over, in or through which the Works are to be executed
Similar or Equal	Equal or better in efficiency or performance and compatibility with the installation as specified
Specification	The complete tender Document including this Scope of Work
Subcontractor	Sub-contractors appointed or utilised at the full responsibility of the Contractor
Successful Tenderer	The Tenderer appointed as Contractor
Supply	To purchase or procure and deliver complete with all necessary and additional specified accessories
Works Completion Certificate	Refer to the Certificate of Completion
Works	The Permanent Works together with such Temporary Works as may be necessary for the execution of the Works

CONTRACTOR'S RESPONSIBILITY

This document sets the general technical requirements for the Detailed Design, Procurement, Construction, Commissioning and Maintenance during the Defects Liability Period of the installation. The design definitions and guidelines, plant performance requirements, quality management and minimum codes and standards, but not limited to, forms part of this document. The tendered prices shall include all costs incurred in meeting these requirements.

All materials supplied must carry a guarantee and be new. The installation must comply with this Specification and the Standardised Specifications (refer to Section 4). Workmanship must be of the best quality and be carried out in accordance with the Occupational Health and Safety (Act 85 of 1993).

The Project Specification and Drawings show the general nature of the work and not all details are shown. The responsibility lies with the Contractor to provide for all equipment and materials in order to furnish a complete functional installation.

Over and above the compulsory site inspection, prospective Tenderers must visit the site and must make sure of the circumstances of the installation. No claims due to lack of knowledge in this regard will be entertained after appointment of the successful Tenderer.

STATUTORY REQUIREMENTS SPECIFICATIONS AND STANDARDS

The construction activities and final Works shall comply with the statutory requirements as amended and relevant guidelines, inter alia:

Standards and Specifications of the ACSA.
 The Occupational Health and Safety (Act 85 of 1993).
 Environmental Conservation Act (Act 50 of 2003).
 Civil Aviation Act (Act 13 of 2009)
 Municipal bylaws and regulations.
 Applicable relevant standards and codes of practice, whether BS, IEC, NRS or SANS.

CONFLICT BETWEEN SPECIFICATIONS AND DRAWINGS

Should there be conflict between the Specifications and the Drawings then sections shall be considered in the following order of priority:

Bill of Quantities
 Scope of Work (Project Specification)
 Drawings

Standard Technical Specifications

Should the Contractor note an inconsistency between the Project Specification and Drawings he shall be responsible for notifying the Engineer and obtaining clarification or instructions prior to ordering or installing equipment.

ITEMS REQUIRING SPECIAL ATTENTION

As the work progresses, the Contractor shall keep an accurate record of any variation or deviation from the original design, bill of quantities and drawings.

Within 14 (fourteen) days after the Practical Completion of the project by the Contractor, a Certificate of Completion, test certificates and a set of co-ordinated "As Built" drawings must be handed over to the Employer. It is important to note that the contract is not completed until such completion documentation is in the possession of the Employer.

All test certificates of the various manufacturers/suppliers as well as tests on site must be provided to the Employer before equipment and or material will be accepted.

Factory acceptance tests is required for specific items and/or equipment. Items delivered to site without Factory acceptance certification will not be accepted.

OCCUPATIONAL HEALTH AND SAFETY ACT (Act 85 of 1993)

The Contactor shall meet the health and safety requirements as stipulated in health and safety plan specification.

The Contractor shall be obliged to sign an OHS Mandatory agreement.

It is confirmed that the Engineer will not act as agent for the Employer as contemplated in Section 4.5 of the Construction Regulations, promulgated in terms of the Occupational Health and Safety Act 85 of 1993. A suitably qualified competent person shall be appointed by the Employer to undertake the responsibilities of the Employer Client as laid down in these Regulations.

SAFETY PROCEDURE: NETWORK SWITCHING

Any switching of existing power supplies shall be arranged beforehand with the Responsible Person of the ACSA.

The Contractor shall not perform work on any portion of a network until such portions have been isolated and earthed.

The Contractor shall request a written "Work Permit" from the Responsible Person, which shall be completed in duplicate. The original "Work Permit" shall be retained by the Contractor until completion of his work. Upon completion of the work, the Contractor shall sign a statement to this effect. He shall hand this statement, as well as the used "Work Permit" to the Responsible Person, to enable the latter to re-energise the relevant portion/portions of the network.

SCHEDULES TO BE COMPLETED

All schedules included in this tender document must be completed and signed.

C4: Site Information

C4.1: Information about the *site* at time of tender which may affect the work in this contract

1. Access limitations

All work for this project is to be conducted within the proximity of the terminal building (incorporating both landside & airside). Therefore, the contractor shall:

- a) Adhere to all Health and safety requirements
- b) Give advance notice to the Employer when work is to take place. 24 Hour notice should be the minimum notice period.
- c) The Contractor must submit a health and safety file to the ACSA project manager prior to any work on site for approval and issue of a "Works Permit". Refer to the Annexures for the generic list of safety file requirements – which is applicable against the Scope of Work.

2. Ground conditions in areas affected by work in this contract

N/A

3. Hidden and other services within the *site*

Prior to any excavation the contractor must scan for possible underground services. Any damage to underground services must be repaired immediately prior to the continuation of the project activities. All repairs will be for the contractor's account.

4. Details of existing buildings / facilities which *Contractor* is required to work on

Existing building plans will be issued to the contractor after the award of the tender. The contractor must verify the drawings against the actual conditions on the ground.

5. ACSA Environmental Work Instruction

Refer to the attached Annexures

ANNEXURE A: HEALTH & SAFETY REQUIREMENTS

OHS Specification Minor Works

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2. Objectives
3. Definitions
4. Mandatary agreement
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7. Health and Safety Plan
8. Administrative Controls and the Occupational Health And Safety file
9. Health and Safety Representatives
10. Health and Safety Training
11. Internal/External Audits
12. Penalties

1. Scope:

This document is applicable to all contractors working at any ACSA Airport that do not trigger the definition of Construction work as determined by the Construction Regulations 2014

2. Objective

- a) To ensure that ACSA Service Providers and Contractors comply with the requirements of the Occupational Health and Safety Act No. 85 of 1993, General Administrative Regulations and the General Safety Regulations. Other applicable requirements relating to relevant standards and SANS codes of practice also apply.
- b) To minimise and eliminate contractor's health and safety risks.
- c) To ensure that contractors submitting tenders make provision for the cost of health and safety measures to be implemented during the duration of the contract /during the construction process.
- d) When the scope of work changes to include Construction Work as defined by the Construction Regulations 2014 then the Mandatary is to contact ACSA Safety to update their paperwork

3. Definitions

Client means any person for whom construction work is performed.

Contractor (also referred as Mandatary), is any employer who performs construction work:

Competent person means any person having the knowledge, training, experience and qualifications specific to the work or task being performed. Qualifications and training must be in line with the South African Qualification Authority Act No. 58 of 1995.

Employer means subject to the provisions of subsection (2), any person who employs or provides work for any person and remunerates him, but excludes a labour broker as defined in section 1(1) of the Labour Relations Act , 1956 (Act 28 of 1956).

Ergonomics means application of scientific information concerning humans to the design of objects, systems and the environment for human use in order to optimize human well-being and the overall system performance

Hazard means a source of or exposure to danger

Hazard identification means the identification and documenting of existing or expected hazards to the health and safety of persons, which are normally associated with the type of construction work being executed or to be executed

Risk means the probability that injury or damage will occur

Risk assessment is an activity conducted by competent person which includes



- (a) the identification of the risks and hazards to which persons may be exposed to;
- (b) the analysis and evaluation of risks and hazards identified;
- (c) a documented plan of safe work procedure to mitigate, reduce or control the risks and hazards that have been identified;
- (d) monitoring plan; and
- (e) a review plan

4. Registration with Workman's Compensation or Federated Employers Mutual Association

Contractors shall ensure that ACSA is provided with a valid letter of good standing including a registration number with the Compensation for Occupational Injury and Diseases Fund or an alternative scheme approved in writing by the Commissioner to the COID Fund at least 10

days prior commencement of construction work. It shall remain the Principal contractor's responsibility to furnish ACSA with a valid letter of good standing or keep a copy available for perusal by a Client, client representatives or any other person authorised thereto.

5. Mandatory Agreement

A duly signed mandatory form also referred to as 37.2 shall be obtained from ACSA Safety Department. It must then be signed & submitted back to ACSA by the Principal Contractor at least 10 days prior to commencement of construction work. A Principal Contractor shall ensure that all its sub-contractors have completed a similar document and a proof of such signed documents is submitted to ACSA for reference purposes. No Principal Contractor shall appoint a contractor to conduct construction work unless she/he is reasonably satisfied that the contractor s/he intends to appoint has the necessary competencies and resources to perform the construction work safely.

6. Letters of appointment

A written letter of appointment must be forwarded to ACSA duly signed by responsible persons at least 3 days prior commencement of construction work for the following duties: **(Further appointments could become necessary as the project progresses and as per the requirements of OHS Act 85/1993)**

- (a) Person assigned duties in terms of the 16.2 appointees of the Act
- (b) Risk Assessor CR9(1)
- (c) Fire Equipment Inspector CR29(h) - *where applicable*
- (d) First Aider GSR3(4) -- *where applicable*
- (e) Stacking Supervisor (CR28(a)) (GSR2(a))
- (f) Ladder Supervisor and Inspector (GSR13(a) - *where applicable*)
- (g) Supervisor of Machinery (GMR1) - *where applicable*
- (h) Safety Representatives (OHS Act Sec.17 - *where applicable*)
- (i) Hazardous Chemical Substances Controller/Coordinator HCSR10 - *where applicable*
- (j) Incident Investigator (GAR9(2))

7. Health and Safety Plan

A contractor shall provide ACSA with a Health and Safety Plan document that shall include but not limited to the following during tendering process, before commencement of construction work and during construction:

7.1 Contractor's Health & Safety Policy

A Contractor shall provide a health & safety policy signed by the Chief Executive Officer (CEO) which outlines contractor's commitment towards health and safety.

7.2 Health and Safety Organogram

A Contractor shall provide a health & safety organogram which outlines the 16.1 appointee, 16.2 appointee, team leaders, work supervisor, assistant work supervisor, safety representatives, safety



committee members and other related appointments in terms of the OHS Act. The contact numbers should also be provided for easy reference.

7.3 Risk assessment

A risk assessment shall be conducted by a competent person and is to include:

7.3.1 Identification of risks and hazards to which persons may be exposed; this is also to include ergonomic related risks

7.3.2 Hazard analysis and evaluation of the identified risks and hazards;

7.3.3 A documented plan of safe work procedure to mitigate, reduce or control the risks and hazards that have been identified;

7.3.4 A monitoring and review plan of risks and hazards

7.3.5 Relevant personal protective equipment or clothing to be provided which is SABS approved.

The contractor shall ensure that all employees are informed, instructed and trained by a competent person regarding any hazard and the related procedure before any work commences and records thereof to be kept in the contractor's health and safety file.

7.4 Health and Safety Representatives

A contractor shall ensure that Health and Safety Representative(s) is/are elected and delegated in writing and necessary training has been provided by a competent person. A proof of training certificate shall be provided to ACSA prior commencement of construction work.

Health and Safety Representatives shall conduct regular inspections by completing a mutually acceptable form of checklist developed by the contractor. Safety defects noted shall be recorded and reported to the supervisor for remedial action. Health and Safety Representative Inspection findings shall be made available to ACSA for reference and audits purposes.

Health and Safety Representatives and their reports shall form part of the safety committee which shall meet on a regular basis as stated by the contractor.

7.5 Health and Safety Committee

A contractor shall hold health and safety meetings on site. Minutes of such meetings and action taken by management shall be kept on file and made available to ACSA for reference purposes. Members of the committee shall receive proper training and a proof of such training shall be made available.

The contractor shall ensure that ACSA Safety Department is invited to such meetings. These meetings do not substitute for Contractor's Site meetings.

8. Health and Safety Training

8.1 Environmental Health and Safety Induction

The contractor shall conduct an induction training session prior commencement of construction work. An attendance register shall be kept in the contractor's health and safety file.

For any construction work to be conducted on the airside an airside Safety Induction training shall be attended by all persons entering who are to enter Airside and a course fee determined by ACSA shall be paid by the Contractor. A security permit to access airside shall be issued on production of proof of attendance.

8.2 Induction Conducted by a Contractor and Competent Person

A contractor must make sure that their personnel and persons visiting the site undergo an induction conducted by a competent person prior commencement of construction work. Every employee on site shall be in a possession of proof of the health and safety induction training. A contractor shall ensure that all visitors to a construction site undergo health and safety induction pertaining to the hazards prevalent on the site.

A manual /copy of such training shall be provided to ACSA for reference purposes.

As determined by the risk assessment, a contractor shall ensure that all employees under his/her control are trained by a competent person and a proof of such training is kept on file for reference.

8.3 Toolbox Talks

A Contractor shall ensure that employees attend a formal Toolbox conducted at least on a weekly basis. Toolbox Talks shall cover a wide variety of topics related to health and safety. An



attendance register shall be completed by employees who attended such Talks. The register shall indicate the topic covered presenter, date and signatures of employees attended. Records for Toolbox Talks shall be kept in a health and safety file and be made available to ACSA for perusal.

8.4 First Aid Training

A contractor shall appoint competent First Aider(s) in writing where more than 10 employers are employed. A letter of appointment shall be kept on file for reference made available to ACSA Safety. Duly designated First Aider(s) shall undergo for training conducted by an accredited institution prior commencement of construction work and a proof of certificate be submitted to ACSA for reference.

The Contractor shall ensure that the first aid box(es) is/are controlled by qualified First Aider(s) and kept fully stocked with necessary first aid contents related to the hazards and risks identified. A first aid box must be accessible and location of such boxes) is clearly displayed on site.

8.5 FIRE PREVENTION AND PROTECTION

A contractor shall ensure that adequate fire equipment is provided in strategic places (that is, where there is a mobile distribution board, flammable liquids, vessels under pressure, confined spaces, hot work etc). A contractor shall ensure that such equipment is inspected by a competent person on a regular basis and such inspections are recorded on a register. A contractor shall ensure that all fire equipment is serviceable and person(s) have been properly trained on how to use the equipment. A proof of such training shall be provided prior commencement of construction work.

8.6 EMERGENCY PREPAREDNESS

A contractor shall provide ACSA with an emergency plan and procedure which will include, but not limited to emergencies such as fire, bomb threat, civil unrest, medical treatment, environmental incidents, accidents to employees and other persons other than their employees.

Emergency procedure shall be communicated to employees and a proof of such training shall be kept on file for reference. A list of emergency contact numbers shall be conspicuously displayed on site for ease reference. An evacuation plan shall be displayed in strategic places.

A contractor shall provide ACSA Safety with a full record of any incidents which may occur on site.

8.7 Incident or Accident Reporting and Investigation

A Contractor shall ensure that all incidents/accidents (this includes near miss, first aid cases and section 24 cases) are reported by employees immediately to the Construction Work Supervisor for further investigation and remedial action. A Contractor shall ensure that all section 24 incidents/accidents and incidents other than employees are reported to the Department of Labour immediately and preliminary investigation is conducted by a competent person within seven days. If construction work will be finished within 3 days after occurrence, an investigation shall be conducted before such construction work is ceased. Proof of such records shall be submitted to ACSA immediately or within 24 hours.

8.8 PERSONAL PROTECTIVE CLOTHING/EQUIPMENT

A contractor shall ensure that personal protective equipment or clothing needs analysis is conducted and incorporated into the risk assessment. Records shall be provided by the contractor prior commencement of construction work. A contractor shall ensure that SABS approved personal protective equipment or clothing is provided to personnel. The contractor shall ensure that no personnel are allowed to work on site without necessary personal protective equipment or clothing. A contractor shall ensure that PPE or Clothing is kept in good working order. A contractor shall clearly stipulate procedures to be followed when PPE or Clothing is lost or stolen, worn or damaged. ACSA shall remove any person from construction site who is working without necessary personal protective equipment and/or clothing. Worn or tattered personal protective clothing shall not be permitted on airport premises.



9. GENERAL ADMINISTRATIVE HEALTH & SAFETY REQUIREMENTS

9.1 ROOF WORK

A contractor shall ensure that all necessary health and safety precautions stated in the General Safety Regulations and Construction Regulations are taken into consideration when conducting any roof work. A contractor shall ensure that no person(s) is /are permitted to work on roof during inclement weather conditions.

9.2 STRUCTURE

A contractor shall provide ACSA with necessary precautionary safety measures to be taken as stipulated in Construction Regulation 9 to obviate any uncontrolled collapse of new structure or existing structure or any part thereof which may become unstable or is in temporary state of weakness or instability due to carrying out of construction work.

9.3 DESIGNER

The Designer shall conduct regular inspections to ensure that a contractor is erecting a structure according to the designs and records of inspections shall be kept on site for reference. The frequency of inspections shall be determined by the nature of construction.

A designer can stop any contractor from executing any construction work which is not in accordance with the relevant design. A certificate of commissioning shall be issued by the designer after completion of structure.

9.4 SCAFFOLDING ERECTION/DISMANTLING

A contractor shall ensure that scaffolding is erected and dismantled under the supervision of a competent person. A letter of appointment of the scaffold erector and inspector and their proof of competency shall be provided prior commencement of work. A contractor shall ensure that all safety standards stipulated in Construction Regulation 2014 are adhered to.

A proof of weekly inspections and inspection conducted after inclement weather shall be kept on file for reference.

9.5 EXCAVATION WORK

A contractor shall ensure excavation work is conducted under supervision of a competent person who has been appointed in writing. A letter of appointment shall be provided to ACSA Safety prior commencement of work. A risk assessment outlining safe work procedures to be adhered to if excavation is more than 1.5m deep must be provided to ACSA prior commencement of work. A contractor shall ensure that no person works in an excavation which is not adequately braced or shored.

A contractor shall ensure that every excavation including bracing and shoring are inspected daily prior each shift starts and such records are kept on site for reference.

A contractor shall ensure that all precautionary measure as stipulated for confined spaces as stated in the General Safety Regulation of OHS Act 85/1993 are complied with when entering any excavation. A contractor shall ensure that warning signs are conspicuously displayed where excavation work involves the use of explosives and a method statement developed by a competent person is provided to ACSA prior commencement.

A contractor shall ensure that safe and convenient means of access is provided to every excavation when required. Such access shall not be further than 6m from the point where any worker within the excavation is working.

A contractor shall communicate, train and enforce safe work procedures pertaining to excavation work to his/her employees.

9.6 DEMOLITION WORK

A contractor shall ensure that a detailed structural engineering survey is conducted by a competent person and a method statement on the procedure to be followed is provided to ACSA Safety. A contractor shall ensure that demolition work is conducted under the supervision of a competent person appointed in writing, and in accordance to Construction regulation 14 of OHS Act 85/1993.

A contractor shall ensure that safety precautionary measures stipulated in Asbestos Regulations is adhered to if demolition work involves asbestos material and that asbestos work is conducted under the supervision of a registered Asbestos Contractor.

9.7 EXPLOSIVE POWER TOOLS

A contractor shall ensure that no person uses explosive power tools unless they have been properly trained, tools are properly guarded and inspected daily before use by a competent person who has been appointed in writing. A proof of such appointment and competency is kept on file for reference. A contractor shall ensure that warning signs are conspicuously displayed when explosive power tools are in use. A contractor shall ensure that all safety precautions are adhered to as stipulated in the Explosive Regulations and Construction Regulations 21.

9.8 PORTABLE ELECTRICAL TOOLS AND ELECTRICAL INSTALLATION

A contractor shall ensure that all portable electrical tools are properly maintained, inspected before use by a competent person who is appointed in writing to perform such duties.

A contractor shall ensure that the electrical power tools are provided with earth leakage protection and are of double insulated type.

A contractor shall ensure that portable electrical tools are numbered and identified and entered onto a register. Regular inspections shall be recorded onto a register and kept on site.

A contractor shall ensure that prior notice is given to ACSA Electrical Engineer of any work involving electrical isolation. A lock-out certificate shall be issued to the relevant Contractor. A contractor shall ensure that a lock-out procedure is adhered to by his/her employees whenever required. A contractor shall ensure that safety measures stipulated in the Electrical Installation Regulations, Machinery Regulations, General Machinery Regulations and Construction Regulations are adhered to at all times.

9.9 LIFTING EQUIPMENT, TACKLE, MATERIAL HOIST AND CRANES

A contractor shall ensure that all lifting equipment and tackle is inspected before use and a monthly register is completed by a competent person. Proof of such inspections shall be recorded and kept on file for reference. A contractor shall ensure that a safe working load is conspicuously displayed on lifting equipment and tackle and service certificate is provided prior commencement of work. A contractor shall ensure operators are properly trained on how to operate the above mentioned equipment and a proof of competency is provided prior commencement of work.

A Contractor shall provide information on procedures to be followed in the case of:

- (a) Malfunctioning of equipment; and
- (b) Discovery of a suspected defect in the equipment

A contractor shall ensure that safety measures stipulated in Driven Machinery Regulation and Construction Regulation with regard to above equipment are adhered to at all times.

9.10 LADDERS

A contractor shall ensure that all ladders are numbered, inspected before use and weekly inspections are recorded in a register. A contractor shall ensure that a competent person who carries the above inspections is appointed in writing.

9.11 STORAGE OF FLAMMABLE LIQUIDS

A contractor shall ensure that a competent person is designated in writing to control the storage and usage of Hazardous Chemical Substances (HCS). A letter of appointment shall be provided prior commencement of construction work.

A contractor shall ensure that material safety data sheets (MSDS) of chemical substances brought on site are kept on site and such documents have been communicated to the chemical substance users and First Aiders.



A contractor shall ensure that safety measures stated in Hazardous Chemical Substances Regulations, General Safety Regulation, Construction Regulation and Community Safety Fire By-law are applied at all times.

9.12 PRESSURE EQUIPMENT

A contractor shall ensure that pressure equipment is identified, numbered and entered in a register. A contractor shall ensure that inspections are carried out and test of certificates are available and kept on file as per the Regulations.

9.13 EMPLOYEES EXPOSED TO EXCESSIVE NOISE

A contractor shall ensure that all employees exposed to excessive noise (equal or above 85 dB(A)) have undergone a baseline audiometric test prior commencement of employment work and SABS approved ear protection is provided and worn at all times. Where staff work in noise zones they are to undergo annual audiograms if exposed to noise between 85 dBA and 105dBA. In areas where the noise exceeds 105 dBA then bi-annual audiograms are required to be conducted for a period of 3 years until it can be proved that the employees hearing is not being compromised.

9.14 STACKING AND STORAGE

A contractor shall ensure a competent person is appointed in writing with a duty of supervising all stacking and storage on a construction work or site. A proof of such appointment shall be provided prior commencement of construction work. A contractor shall ensure that stacking is conducted under supervision and good housekeeping is maintained at all times

9.15 ABLUTIONS/CHANGING/EATING FACILITY

A contractor shall ensure that sufficient shower, sanitary, changing facilities for each sex and sheltered eating area(s) are provided for the employees. The above facilities must be kept in a clean, hygiene, safe condition and in good state of repair.

9.16 HOUSEKEEPING ON SITES

A contractor shall ensure that good housekeeping is maintained and enforced at all times. A contractor shall ensure that safety precautionary measures stipulated in Environmental Regulations for Workplaces and Construction Regulations and Construction Environmental Specification are adhered to at all times.

9.17 PUBLIC SAFETY AND SECURITY

A contractor shall ensure that notices and signs are conspicuously displayed at the entrance and along the perimeter fence indicating "No Unauthorised Entry", "Visitors to report to office", "helmet and safety shoes" etc

Health and safety signage must be well maintained throughout the project. This shall entail cleaning, inspection and replacement of missing or damaged signage.

A contractor shall ensure that nets, canopies, fans etc are provided to protect the public passing or entering the site. A contractor shall ensure that Security guard is provided where necessary and provided with a way of communication and an access control measures or register is in place.

A contractor shall ensure that all visitors to a construction site undergo health and safety induction pertaining to the hazards prevalent on the site.

9.18 NIGHT WORK

A contractor shall ensure that necessary arrangements have been made with ACSA before conducting any night work. A contractor shall ensure that there is adequate lighting for any work conducted at night and failure to do so shall result in work being stopped.

9.19 HOT WORK

A contractor shall ensure that ACSA Fire & Rescue Department is notified of any hot work to be conducted during construction work. A hot work permit accompanied with a gas free certificate shall be issued to the relevant contractor by ACSA Fire & Rescue Department when satisfied that



the area is safe and that the Contractor understands the procedure. A contractor shall ensure that a hot work procedure is adhered to at all time by his/her employees.

9.20 CONSTRUCTION VEHICLES

A contractor shall ensure that all construction vehicles are maintained in a good working order, regular inspections are conducted and such records are kept on site. A contractor shall ensure that construction vehicle(s) is/are operated by only certified competent and authorised persons. A contractor shall ensure that s/he complies with the safety measures stipulated in Construction Regulation 2014 and National Road Transport Regulations, 2000.

9.21 HIRED PLANT AND MACHINERY

A contractor shall ensure that any hired plant and/or machinery brought to site is inspected by a competent person before use and records confirming that it is safe for use are provided prior usage of such equipment. A contractor shall ensure that such plant or machinery complies with the requirements of the Occupational Health & Safety Act. A contractor shall ensure that hired operators receive induction prior commencement of work. A contractor shall ensure that hired operators have proof of competency. A Contractor shall provide information on procedures to be followed in the case of:

- (a) Malfunctioning of equipment; and
- (b) Discovery of a suspected defect in the equipment

9.22 ROAD WORK

A contractor shall ensure that work conducted on the public road all necessary caution signage, cones, flag man etc are provided as stipulated in the Road high Ordinance is adhered to. The caution signage to be conspicuously displayed to warn the drivers of any construction work ahead shall be provided at least at 75 m away from the cones; flag man; actual construction work etc.

9. GENERAL ADMINISTRATIVE HEALTH & SAFETY REQUIREMENTS

9.1 Intoxication A contractor shall ensure that no person is allowed on site that appears to be under the influence of intoxicating liquor or drugs. A contractor shall encourage his/her workforce to disclose the medication that poses a health and safety threat towards his/her fellow employees. No person shall be allowed to enter the site and work if the side effects of such medication constitute a threat to the health or safety of the person concerned or others at such workplace. No dangerous or firearms allowed on site.

9.2 First Aid and First Aid training A Contractor must ensure that there is a first aid box where there are more than 5 employees employed. Where there are more than 10 staff members then a trained first aider is required to be appointed in writing. A letter of appointment must be kept on file for reference made available to ACSA Safety. Duly designated First Aider(s) must have attended training at an accredited institution prior commencement of work and a proof of certificate be submitted to ACSA for reference. The Contractor must ensure that the first aid box(s) is/are controlled by qualified First Aider(s) and kept fully stocked with necessary first aid contents related to the hazards and risks identified. A first aid box(s) must be accessible and location of such box(s) is clearly displayed on site.

10. OCCUPATIONAL HEALTH MEDICAL SERVICES

A contractor shall ensure that when a hazard identification and risk assessment (HIRA) is conducted occupational health hazards are clearly identified and health & hygiene measures are clearly outlined to ensure compliance. A contractor shall ensure that where certificate of fitness is required it is provided to ACSA Safety prior commencement of work.

In case of medical and/or fire emergency contact ACSA Fire & Rescue Services:



11. INTERNAL/EXTERNAL AUDITS

A contractor shall conduct monthly safety, health and environment audits and such records shall be kept on site. A contractor shall ensure that corrective measures are taken to ensure compliance.

ACSA shall conduct regular audits and defects noted shall be reported to the relevant contractor for remedial action. Inspections shall be conducted by ACSA and non-conformances noted shall be recorded and provided to the relevant contractor for remedial action. ACSA shall stop any contractor from executing any work which is not in accordance with the health and safety plan. A contractor shall ensure that all necessary documents stipulated in this document are kept on the health and safety file and made available when requested.

12. PENALTIES

Penalties shall be imposed by ACSA on Contractors who are found to be infringing these specifications, legislation and safety plans. The Contractor shall be advised in writing of the nature of the infringement and the amount of the penalty. The Contractor shall determine how to recover the fine from the relevant employee and/or sub-contractor. The Contractor shall also take the necessary steps (e.g. training) to prevent a recurrence of the infringement and shall advise ACSA accordingly.

The Contractor is also advised that the imposition of penalties does not replace any legal proceedings the Council, authorities and land owners.

Penalties shall be between R200 and R20 000, depending upon the severity of the infringement.

The decision on how much to impose will be made by the ACSA SHE Representative, and will be final. In addition to the penalties, the Contractor shall be required to make good any damage caused as a result of the infringement at his/her own expense.

The preliminary list below outlines typical infringements against which ACSA may raise penalties; however this list must not be construed as final:

- Failure to keep a copy of OHSACT on site.
- Failure to maintain an up-to-date letter of good standing with the Compensation Commissioner / FEM.
- Working on site without attending Safety Induction Training.
- Failure to conduct Safety Induction for personnel and visitors on site.
- Failure to issue and wear Personal Protective Clothing and Equipment.
- Failure to fully stock first aid box in accordance to the risks identified.
- Failure to disclose or report first aid cases and /or minor/major/fatalities as prescribed by the OHSACT.
- Failure to adhere to written safe work procedure as stipulated in the Hazard Identification and Risk Assessment and safety plan.
- Failure to maintain records and registers as per the OHS Act of 1993 and its regulations.
- Failure to conduct audits and inspections as required by legislation.
- Keeping un-serviced fire equipment on site.
- Failure to make use of ablution facilities.
- Failure to remove personnel on site who appears to be under the influence of intoxicating liquor or drugs.
- Failure to close out previously raised non-conformances.
- Failure to make and update legislative appointments.
- Failure to adhere to the OHS Act of 1993 and its regulations.

I, _____ (name & surname) of
 _____(company) agree to the above conditions and
 acknowledge ACSA's right to impose penalties should I or any of my employees or sub-contractors
 fail to comply with these conditions.

Signed: _____



On this date: _____ (dd/mm/yyyy)

At: _____ (airport name)

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ANNEXURE B: ENVIRONMENTAL REQUIREMENTS
Environmental Terms and Condition
**ACSA SERVICE & MAINTENANCE CONTRACTORS
 ENVIRONMENTAL TERMS AND CONDITIONS TO COMMENCE WORK - EMS 048**

The following Environmental Terms and Conditions shall be strictly adhered to by all contractors when conducting works for ACSA. ACSA shall audit contractor activities, products and services on an ad hoc basis to ensure compliance to these environmental conditions. Any pollution clean-up costs shall be borne by the contractor.

ISSUE	REQUIREMENT
Environmental Policy	ACSA's Environmental Policy shall be communicated, comprehended and implemented by all ACSA appointed contractor staff.
Storm water, Soil and Groundwater Pollution	<ul style="list-style-type: none"> • No solid or liquid material may be permitted to contaminate or potentially contaminate storm water, soil or groundwater resources. • Any pollution that risks contamination of these resources must be cleaned-up immediately. Spills must be reported to ACSA immediately. Contractors shall supply their own suitable clean-up materials where required. • Washing, maintenance and refuelling of equipment shall only be allowed in designated service areas on ACSA property. It is the contractor's responsibility to determine the location of these areas. • No leaking equipment or vehicles shall be permitted on the airport.
Air Pollution	<ul style="list-style-type: none"> • Dust: Dust resulting from work activities that could cause a nuisance to employees or the public shall be kept to a minimum. • Odours and emissions: All practical measures shall be taken to reduce unpleasant odours and emissions generated from work related activities. • Fires: No open fires shall be permitted on site.
Noise Pollution	<ul style="list-style-type: none"> • All reasonable measures shall be taken to minimize noise generated on site due to work operations. • The Contractor shall comply with the applicable regulations regarding noise.
Waste Management	<ul style="list-style-type: none"> • Waste shall be separated as general or hazardous waste. • General and hazardous waste shall be disposed of appropriately at a permitted landfill site should recycling or re-use of waste not be feasible. • Under no circumstances shall solid or liquid waste be dumped, buried or burnt. • Contractors shall maintain a tidy, litter free environment always in their work area. • Contractors must keep on file: <ol style="list-style-type: none"> 1. The name of the contracting waste company 2. Waste disposal site used 3. Monthly reports on quantities – separated into general, hazardous and recycled 4. Maintained file of all Waste Manifest Documents and Certificates of Safe Disposal 5. Copy of waste permit for disposal site <p>This information must be available during audits and inspections.</p>
Handling & Storage of Hazardous Chemical	<ul style="list-style-type: none"> • All HCS shall be clearly labelled, stored and handled in accordance to Materials Safety Data Sheets. • Materials Safety Data Sheets shall be stored with all HCS.



Substances (HCS)	<ul style="list-style-type: none"> All spillages of HCS must be cleaned-up immediately and disposed of as hazardous waste. (HCS spillages must be reported to ACSA immediately). All contractors shall be adequately informed with regards to the handling and storage of hazardous substances. Contractors shall comply with all relevant national, regional and local legislation regarding the transport, storage, use and disposal of hazardous substances.
Water and Energy Consumption	ACSA promotes the conservation of water and energy resources. The contractor shall identify and manage those work activities that may result in water and energy wastage.
Training & Awareness	The conditions outlined in this permit shall be communicated to all contractors and their employees prior to commencing works at the airport.

Penalties

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Penalties shall be imposed by ACSA on Contractors who are found to be infringing these requirements and/or legislation. The Contractor shall be advised in writing of the nature of the infringement and the amount of the penalty. The Contractor shall take the necessary steps (e.g. training/remediation) to prevent a recurrence of the infringement and shall advise ACSA accordingly.

The Contractor is also advised that the imposition of penalties does not replace any legal proceedings, the Council, authorities, land owners and/or members of the public may institute against the Contractor.

Penalties shall be between R200 and R20 000, depending upon the severity of the infringement. The decision on how much to impose will be made by ACSA's Airport Environmental Management Representative in consultation with the Airport Manager or his/her designate and will be final. In addition to the penalty, the Contractor shall be required to make good any damage caused due to the infringement at his/her own expense.

I, of agree to the above conditions and acknowledge ACSA's right to impose penalties should I or any of my employees or sub-contractors fail to comply with these conditions.

Signed: _____ on this date: _____ (dd/mm/yyyy)

at:


ANNEXURE C: SAFETY FILE REQUIREMENTS

The generic safety requirements are detailed below – which must be completed in full referencing this project scope of work and services. The safety file must be submitted within 7 days from award to be reviewed by the ACSA OHS department. Upon approval of the safety file the OHS department will issue a “Works Permit” prior to the start of any physical work on-site.

ACSA SHE FILE REVIEW FORM

Contractor/Stakeholder Name:		Contract Number	
Project Manager:		Airport:	
Area where work is to be performed:			
Scope of Work			

No.	Document requested	Status received (Yes/ No/N/A)	Compliance Status/ Comments
1.	Mandatory OHS appointments		
	Section 16(1), 16(2) & 8(2)		
	SHE Representative		
	First Aider(s) (Must have formal competency)		
	Fire Marshall		
	Supervisors		
	Lifting supervisor		
	Construction 5(k)		
	CR 8(1) Construction work Manager (Must have formal competency)		
	CR 8(2) Assistant Construction work Manager		
	CR 8(5) Construction H&S Officer (Must have formal competency)		
	CR 8(7) Construction work Supervisor		
	CR 8(8) Assistant Supervisor (Must have formal competency)		
	Fall protection planner (Must have formal competency)		
	CR 13(1)(a) Excavation Supervisor (Must have formal competency)		
	Risk Assessor (Must have formal competency)		
	Incident Investigator		
	CR 16(1) /SANS 085 Scaffolding Inspector (Must have formal competency)		
	CR 18(1) Rope Access Supervisor (Must have formal competency)		
	CR 24 & EMR 9 Electrical Tool Inspector		
	CR 29(H) Fire Fighting Equipment Supervisor (Must have formal competency)		
	CR 23 Construction Vehicles & Mobile Plant Operator		
	GSR 13 Ladder Inspect		
	Portable (Hand) Tool inspector		



	CR 28(a) Stacking and Storage Supervisor (Must have formal competency)		
	HCS Supervisor (HCS Regulations)		
	OHS 19 SHE Committee Members (If more than 2 SHE Reps on site)		
	Covid-19 compliance officer		
2.	Scope of work		
3.	Covid-19 Policy		
4.	Risk assessments with covid-19 risks		
5.	Equipment and tools list		
6.	Safe working procedures including covid-19 response procedure		
7.	Procedure for employees refusing to work due to covid-19		
8.	Toolbox talks		
9.	Induction records of employees on covid-19		
10.	Reporting of OHS Surveillance Data to DoH		
11.	Vulnerable employees declaration process		
12.	Daily screening process for employees and visitors		
13.	MoU or contract for secondary screening of symptomatic persons at work		
14.	PPE issue records for employees (inclusive of cloth masks)		
15.	ACSA Safety, Health and Environmental Induction		
16.	Signed Section 37(2) Agreement (ACSA & Principal Contractor/Principal contractor & Sub contractor is sub-contracting)		
17.	Valid Letter of Good Standing		
18.	Method Statement		
19.	Project Specific SHE Plan		
20.	Fall protection and rescue plan where applicable		
21.	Lifting plan where applicable		
22.	Valid Medicals fitness certificates as per Annexure 3 of the CR 2014 regulations		
23.	ID copies of the employees on-site		
24.	Pre-populated WCL2 form		
25.	Emergency Plan and Contact details for emergencies		
26.	Proof of competencies		
27.	Notification of construction work or Construction Permit if applicable.		
28.	Signed Environmental Terms and Conditions to Commence Work – EMS 048 attached		
29.	Approved Airside Safety Plan		
30.	Register of sub-contractors and activities to be undertaken		



31.	Select relevant high-risk activity to be performed <ul style="list-style-type: none"> • Work at Heights • Hot Work • Work on Electricity • Work in Confined Space • Excavation • Work on machinery • Other 		
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MANDATORY REQUIREMENTS FOR STAKEHOLDER CONTRACTOR SHE FILE REVIEW(ONLY COMPLETE THESE SECTION IF IT IS A STAKEHOLDER'S CONTRACTOR SHE FILE FOR VETTING BY ACSA

No.	Document requested	Status received (Yes/ No/N/A)	Compliance Status/ Comments
1.	Valid Letter of Good Standing		
2.	Signed Section 37(2) Agreement between Client & Principle Contractor		
3.	Signed Section 37(2) Agreement for Sub Contractor where one is used		
4.	Signed CR 5(k) Appointment letter from Client to Principle Contractor		
5.	Risk Assessment for the project		
6.	Signed ACSA EMS 048 Environmental Terms & Conditions (Please find attached)		
7.	OHS appointment letters (with proof of competencies where required) that is relevant to the work that will be performed in the project.		
8.	Client OHS Specification (Stakeholder to provide its own specification)		
9.	Method Statement		
10.	Medical fitness certificates of contractor employees as required by the Construction Regulations		
11.	Notification of construction work or Construction Permit (where required)		
12.	Emergency Response procedure & Contact details.		
13.	Valid Letter of Good Standing		
14.	Signed Section 37(2) Agreement between Client & Principle Contractor		
15.	Signed Section 37(2) Agreement for Sub Contractor where one is used		
16.	Signed CR 5(k) Appointment letter from Client to Principle Contractor		
17.	Risk Assessment for the project		
18.	Signed ACSA EMS 048 Environmental Terms & Conditions (Please find attached)		
19.	Daily screening process for employees and visitors		
20.	MoU or contract for secondary screening of symptomatic persons at work		

EMERGENCY WORKS SHE FILE REVIEW(ONLY COMPLETE THIS SECTION IF IT EMERGENCY WORK)

No.	Document requested	Status received (Yes/ No/N/A)	Compliance Status/ Comments
1.	Valid Letter of good standing		
2.	Section 37 (2) Mandatary Agreement (Attached-to be signed)		
3.	EMS 048 Environmental Terms & Conditions (Attached-to be signed)		
4.	ACSA OHS Specification (Attached-to be signed)		
5.	Activity based risk assessment		
6.	Emergency contact details		
7.	Valid Letter of good standing		
8.	Daily screening procedure for employees and visitors		
9.	MoU or contract for secondary screening of symptomatic persons at work		

Verification Status

SHE File Verified	Yes	No	Date	
General comments				
Details of SHE File reviewer				
Full name and Surname:			Signature:	
Designation:				
Acknowledgement by the Contract Manager				
Full name and Surname:			Signature:	
Designation:				
Acknowledgement by Contractor				
Full name and Surname:			Signature:	
Designation:				

NB*The contractor remains responsible and accountable for the contents and compliance of the safety file


ANNEXURE D: STANDARD SPECIFICATIONS: LOW VOLTAGE ASSEMBLIES
1. APPLICATION

This Standard Specification defines the requirements for the design, construction, installation, inspection, testing and commissioning of any purpose-built switchgear and control equipment, including distribution switchgear, motor control centres (MCCs), single standalone starters or controllers, control panels / desks, SCADA / telemetry panels, and similar control equipment; each hereafter referred to as an Assembly. Where this type of electrical equipment is incorporated within a plant supply package, the provisions of this Specification shall be applied to all applicable electrical equipment supplied under that package.

2. GENERAL REQUIREMENTS

The completed Assembly shall incorporate all components and equipment necessary to reliably achieve the functionality defined in the Technical Data Sheets and this Specification under all foreseeable conditions; whether they have been explicitly detailed, to provide the end user of the Assembly or the end user's nominated representative (hereafter referred to as the Client) with a fully working installation. All materials, components, and equipment used in the manufacture of the Assembly shall be new and unused, shall be of current manufacture, and shall be free from any defects or imperfections.

3. APPLICABLE STANDARDS

The Assembly and all its constituent components and equipment shall specifically comply with the latest published edition of all relevant international, harmonised European standards, national and industry standards, and codes of practice, including the following:

SANS

- SANS 1019:
Standard voltages, currents and insulation levels for electricity supply.
- SANS 1091:
National colour standards for paint.
- SANS 1973:
Low-voltage switchgear and control gear Assemblies Part 1 to 4.
- SANS 9000:
Quality management systems.
- SANS 10108:
The classification of hazardous locations and the selection of apparatus for use in such locations.
- SANS 10142:
Standard Regulations for Wiring of Premises.
- SANS 1765:2003:
Low-voltage switchgear and control gear assemblies (distribution boards) with a rated short-circuit withstand strength up to and including 10 kA.
- SANS 60044:
Instrument Transformers.
- SANS 60146:
Semiconductor converters: General requirements & line commutated converters.
- SANS 60186:
Voltage Transformers.

- SANS 60204:
Safety of machinery. Electrical equipment of machines.
- SANS 60269:
Low-voltage fuses.
- SANS 60439:
Low-voltage switchgear and control gear assemblies Part 1 to 5
- SANS 60439-1 to 5 / IEC 60439-1 to 5:
Low-voltage switchgear and control gear assemblies Parts 1 to 5.
- SANS 60529:
Degrees of protection provided by enclosures (IP Code) SANS 60730: Automatic electrical controls for household and similar use
- SANS 60694:2003/IEC 60694:2002:
Common specifications for high-voltage switchgear and control gear standards.
- SANS 60742:
Isolating transformers and safety isolating transformers.
- SANS 60947:
Low-voltage switchgear and control gear.
- SANS 61000:
Electromagnetic compatibility (EMC).
- SANS 61643-1:
Low-voltage surge protective devices Part 1: Surge protective devices connected to low-voltage power distribution systems
- SANS 61800:
Adjustable speed electronic power drive systems.
- SANS 61131:
Programmable Controllers.
- SANS 62271- 100 / IEC 62271 – 100:
High-voltage switchgear and control gear – Alternating Current Breakers.
- 240-56227516–LV switchgear and control gear assemblies and associated equipment for voltages up to and including 1000 V AC and 1500 V DC Standard.
- SANS 60947 /IEC 60947:
Low-voltage switchgear and control gear.

Other Standards

- IEC 60439-1 to 5:
Low-voltage switchgear and control gear assemblies Parts 1 to 5.
- IEC 60529:
Specification for degrees of protection provided by enclosures (IP code).
- IEC 60898:
Electrical accessories - circuit breakers for overcurrent protection for household and similar

installations.

- IEC 60947:
Low-voltage switchgear and control gear.
- IEC 60269:
Low-Voltage fuses.
- IEC 61009:
Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's).
- IEC 157-1:
Low voltage switchgear and control gear: Circuit breakers.
- IEC 416:
General principles for the creation of graphical symbols.
- BS 88:
Cartridge fuses for voltages up to and including 1kV AC and 1.5kV DC.
- BS 142:
Electrical protective relays.
- BS159:
Busbars and busbar connections.
- BS 1433:
Copper for electrical purposes. Rod and bar.
- BS 2950:
Cartridge fuse links for telecommunication and light electrical apparatus.
- BS 3938:
Current transformers.
- BS 4794:
Control switches (Switching devices, including contactor relays, for control & auxiliary circuits, for voltages up to & including 1kV AC & 1.2kV DC)
- BS 5378:
Safety signs and colours.
- BS 5472:
Low voltage switchgear and control gear for industrial use. Terminal marking and distinctive number. General rules.
- BS 5486:
Low voltage switchgear and Control gear assemblies.
- BS 6231:
Specification for PVC insulated cables for switchgear & control gear wiring.
- BS 7671:
Requirements for electrical installations. IEE Wiring Regulations.
- BS EN 418:
Safety of machinery. Emergency stop equipment, functional aspects. Principles for design.
- BS EN 954:

Safety of machinery. Safety related parts of control systems.

- BS EN 50082-1:
Electromagnetic compatibility. Generic immunity standard; residential, commercial and light industry.
- BS EN 60051:
Direct acting indicating analogue electrical measuring instruments and their accessories. Definitions and general requirements common to all parts.
- BS EN 60073:
Basic and safety principles for man-machine interface, marking and identification. Coding principles for indicators and actuators.
- BS EN 60831:
Shunt power capacitors of the self-healing type for AC systems having a rated voltage up to and including 1kV. General. Performance, testing and rating. Safety requirements. Guide for installation and operation.
- 240-56227516–LV:
- Switchgear and control gear assemblies and associated equipment for voltages up to and including 1000 V AC and 1500 V DC Standard.

4. LOW VOLTAGE SWITCHGEAR AND CONTROLGEAR FOR DISTRIBUTION BOARDS, MOTOR CONTROL CENTRES, CUBICLES, AND PANELS

4.1 GENERAL

Switchgear, control gear and instrumentation shall be rated for the system voltage, frequency and number of phases and for the load current and applicable maximum prospective fault current as specified on the drawings, Technical Schedules and the Project Specification.

4.2 LIGHTNING ARRESTERS

Lightning arresters shall be provided for each phase in all boards, connected to each phase of the incoming cables. Lightning arresters shall conform to SANS 61643 and Eskom Specification NWS 1108, shall bear the SABS mark, and shall be solidly earthed directly onto the cubicle earth bar by means of a copper strap and be as short and straight as possible.

4.3 AIR CIRCUIT BREAKERS

Air circuit breakers shall be of the metal-clad three-pole withdrawable type complying with BS 4752 and IEC 157.

The air circuit breakers shall have an adjustable thermal overload trip unit and an adjustable magnetic short-circuit trip unit. All trip units shall be direct acting. Both trip units shall be replaceable by units of different ratings.

The circuit breakers noted on the drawings as "selective" shall incorporate an adjustable time-delay on the magnetic short-circuit trip unit.

The circuit breakers shall be designed for trip-free manual closing and electrical tripping of the type specified in the project specification or drawings, e.g. shunt, remote or under voltage tripping; delayed contacts; AC or DC coil voltage.

Interlocking shall be provided to ensure that the circuit breaker is fully isolated before access to any live terminals can be obtained.



The circuit breakers shall be horizontally withdrawable allowing full maintenance and tests without the breaker having to be removed from the withdrawal mechanism.

Incorporate interlocks to allow the circuit breaker to be operated in the withdrawn maintenance/test position, and to prevent the circuit breaker from being closed unless fully in the engaged or test position and from being moved when the mechanism is closed.

Special equipment should not be required to remove the circuit breaker from its withdrawal mechanism for transporting. If special equipment is required, it must be provided with the circuit breaker.

Lockable safety shutters shall be provided to screen the fixed contacts and shall operate automatically with the movement of the circuit breaker.

All non-current-carrying metal parts of the circuit breaker shall be solidly interconnected and connected to an earth contact which shall engage with a copper plate connected to the main earth bar of the cubicle, and the arrangement shall be such that the circuit breaker frame is earthed before the circuit breaker contacts engage with the live fixed contacts.

Incorporate a mechanically operated "ON/OFF" of ("I/O") position indicator.

Provide facilities for padlocking in the "off" position.

Provide two normally open and two normally closed spare auxiliary contacts, unless otherwise noted. It shall also be possible to install a change-over contact if required at a later stage.

Auxiliary contacts shall be capable of making and carrying continuously 1A AC or DC.

They shall be capable of breaking 500 VA AC at 0,2 PF and 20 watts DC at an L/R of < 40 ms.

Provide where noted on the drawings "Lowe and Fletcher", "Ronis" or approved alternative, key interlocking facilities.

4.4 MOULDED CASE CIRCUIT BREAKERS (mccb's)

Moulded case circuit breakers shall comply with SANS 156. Mccb's shall be of flush panel mounting type.

Mccb's with ratings of 100 A and less shall be suitable for mounting on a DIN rail.

Mccb's with ratings more than 100 A for distribution networks shall each have an adjustable thermal overload trip unit and an adjustable magnetic short-circuit trip unit.

Both trip units shall be replaceable by units of different ratings.

Mccb's for motor starter circuits shall be of the current limiting type with an adjustable magnetic short circuit trip unit.

Mccb's with ratings of 600 A or more shall have extension type operating handles.

Mechanically coupled single-pole circuit breakers used as double or triple-pole circuit breakers are not acceptable unless overload releases are internally coupled.

The fault current interrupting rating of mccb's shall not be less than the maximum prospective fault current and not less than 5 kA.

Neutral bars associated with each bank of mccb's shall be positioned below each bank and shall be wired in the same sequence as the mccb's.



Mccb's with shunt release shall have an auxiliary contact arranged to interrupt the shunt release current at the end of the opening operation.

Mccb's with an under-voltage release shall be equipped with a time delay relay when specified.

Mccb's shall be fitted with the specified number of spare auxiliary contacts. Where spare auxiliary contacts are not called for, it shall nevertheless be possible to fit at least one normally open and one normally closed contact or a change-over contact at a later stage.

Auxiliary contacts shall be capable of making and carrying continuously 1A AC or DC. They shall be capable of breaking 500 VA AC at 0,2 PF and 20 watts DC at an L/R or < 40 ms.

Where called for, mccb's shall be capable of remote closing using the specified control voltage.

Where specified, it shall be possible to lock the mccb in the "off" position. A separate locking device may be used for this facility.

Current limiting mccb's will be acceptable as an alternative offer for alternating current applications.

Where mccb's are of the current limiting type the Contractor shall determine, and offer suitable ratings in collaboration with the mccb supplier, to ensure discrimination and adequate short-circuit current capability.

Calculations shall be submitted with the tender indicating the degree of current limiting and discrimination achieved as well as techniques used. Full details shall be submitted of the current limiting characteristics of each mccb rating offered.

Mccb's for DC application shall be of the current limiting type and shall have at least one pole in the positive and one pole in the negative circuit. Where additional poles are required in series to meet requirements of the specified application, the series connections between poles of like polarity shall be such that they cannot be removed without special tools.

4.5 ISOLATORS

All isolators shall be of the "load-break-fault-make" type i.e. be switch disconnectors complying with SANS 152.

The isolators shall have the ratings specified on the drawings.

The handle of the isolator shall form part of the panel door. It shall not be possible to close the isolator without the door being closed and it shall not be possible to open the door without the isolator being switched off.

Isolator handles shall have an integral key lock or padlocking facility.

The fault carrying capability of the isolators shall be equivalent to or higher than the fault level of the associated busbar but not less than 5 kA.

4.6 SWITCHES AND SELECTOR SWITCHES

Switches and selector switches shall be switch disconnectors complying with SANS 60947.

Switches and selector switches shall be capable of carrying, making and breaking the full rated current and of making onto the maximum prospective fault current.

The fault rating of switches and selector switches shall not be less than the maximum prospective fault current and not less than 5 kA.



The operating knob and indicator plate shall be manufactured of insulating material and the switch positions must be clearly and indelibly marked thereon.

The switches and selector switches shall be provided with substantial contact and the terminals must be clearly marked and arranged for easy wiring.

The voltmeter or ammeter selector switch shall be mounted directly below the associated volt or ammeter.

Voltmeter selector switches must be arranged so that voltages between phases, and phases to neutral, can be read. Voltmeter selector switches shall be of the break-before-make type. The voltmeter selector switch shall have one "off" and six "metering" positions and must be suitable for panel mounting in such a way that the operation knob and indicator plate can be mounted on the front of a panel and the switch itself at the back of the panel.

Ammeter selector switches shall be of the make-before-break type with one "off" and four metering" positions arranged to read the current in each phase and in the neutral. When in the "off" position, the metering circuit shall be short-circuited.

The physical construction of ammeter selector switches shall conform to that of voltmeter selector switches.

Switch enclosures shall be provided with an interlocked cover to ensure that the switch is in the "Off" position before the cover can be opened for inspection or fuse removal. It shall not be possible to close the switch without the cover being closed.

Switches shall be provided with a clear "ON/OFF" or "I/O" position indicator.

4.7 BUS-SECTION SWITCHES

Bus-section switches shall be interlocked with the incoming switchgear by means of "Lowe and Fletcher", "Ronis" or an approved alternative key interlocking facility when specified.

Bus-section switches of rating less than 1 000 A shall comprise isolators.

Bus-section switches of rating of 1 000 A and higher shall be air circuit breakers incorporating magnetic short-circuit trip units without thermal overload trip units.

Busbar selector or change-over switches shall be provided with suitable position indicators.

4.8 TIME SWITCHES

The contacts shall be silver-to-silver or other approved single-pole changeover contacts rated at 16A and operated by a spring-driven clockwork, electrically wound with a spring reserve of 8 hours minimum.

Time switches shall be fitted with a manual overriding switch.

An external bypass switch shall be provided in each time switch circuit.

Time switches shall have the following features:

- daily programmable with minimum 30 minute "on" and "off" control facilities.
- weekly programmable with day omission facilities of minimum 12 hours, i.e. mornings or afternoons.

The whole mechanism shall be totally inclosed in a dust-proof enclosure.

4.9 PHOTO SWITCHES

Photo switches shall comply with NRS 025.

Photo switches shall have silver to silver or other approved single-pole changeover contacts rated to switch a reactive load of 1 800 A at 230 V and 50 Hz.

An external bypass switch shall be provided in each photo switch circuit.

The photo-electric cells shall have a time delay of not less than 30 seconds.

Photo-electric cells shall be completely waterproof and shall be of robust construction.

The material of the cover shall not crack, deform or deteriorate in any way whatsoever and shall be colour-fast in all weather conditions.

The photo-electric cells shall be provided with built-in lightning arrestors.

Samples of photo-electric cells shall be submitted to the Engineer for approval prior to the ordering thereof.

The prices for the erection of photo-electric cells shall include the supply and delivery and the connection of the cables, etc., from the photocells to LV cubicles, DB's or minisubs.

4.10 COMBINATION FUSE-SWITCH (CFS) UNITS

The fuse-switch units shall comply with SANS 60947 or BS 5419 and shall be fitted with high rupturing capacity (HRC) cartridge type fuses-links complying with SANS 172.

Fuse-switches shall be capable of breaking the full rated current and shall have a fault current rating of not less than the maximum prospective fault current and not less than 10 kA for one second.

Fused isolators, i.e. fuse-switches which rely on the fuses to reduce the fault current through the switch portion to provide a higher fault current rating, are not permitted.

Fuse-gear with the fuses mounted in the cover of the unit, with one cover forming the operating lever, are not permitted.

Fuse-switch units shall have chassis and be signed to accommodate HRS fuse links. Fuse-switch units shall be of the double air-break, quick-make, quick-break type and shall have a spring mechanism smoothly driven by springs on both sides of the mechanism.

The fixed contacts shall be shrouded and arranged so that when the switch is in the open position the double-break isolates the HRC fuse links so that they can be replaced in complete safety.

Fuse-switch units shall be triple-pole units and neutral links shall be provided inside the back of the distribution boards to facilitate routine testing.

All components shall be capable of continuously carrying rated current without excessive temperature rise.

Fuse-switch units shall be provided with interlocks such that:

- the cover panel cannot be opened whilst the switch is closed; and
- the unit cannot be operated with the cover open unless an interlock is purposely defeated.

The fuse-switch shall have a handle and an ON/OFF position indicator mechanically operated by the moving contacts to ensure accurate and positive indication.

Provide facilities for padlocking in the "OFF" position.

In all cases, the top terminal of fuses shall be the live terminal.
Six spare fuses shall be provided for each rating fitted.

4.11 FUSE LINKS AND HOLDERS

Fuse links shall be high-rupturing capacity (HRC) cartridge type fuse links conforming to SANS 60269, SABS 172, IEC 282 and BSS 2692.

HRC fuse link holders shall be of the withdrawable bakelite type and shall conform to SANS 172.

Each fuse link and holder shall incorporate a visual inspection eye for fault location.

Fuses protecting a specific instrument shall be mounted as a group in close proximity to the relevant instrument.

A label with the rating of each fuse shall be mounted in close proximity to the relevant fuse holder or fuse switch.

Striker pin switches shall be provided if specified in the project specification in order to trip the associated breaker or contactor to prevent the occurrence of single phasing.

Six spare fuses shall be provided for each rating fitted.

The spare fuses shall not be used by the contractor during erection, commissioning or maintenance.

4.12 EARTH LEAKAGE PROTECTION UNITS

Earth leakage protection units shall conform to SANS 60730.

All single and three phase socket outlets shall be provided with earth leakage protection devices unless specifically excluded in the Code of Practice for the Wiring of Premises.

All units shall have test push buttons and, unless otherwise specified, the sensitivity shall be 30 mA.

Earth leakage shall be arranged to disconnect the faulty circuit from both phase and neutral of a single phase system, and from all three phases of a three phase system.

4.13 CONTACTORS

All contactors for low voltage shall be of the electro-magnetic operated air-break type with specific requirements as specified in the project specification or drawings e.g. AC or DC coil voltage; dipproofing, latched contacts, etc

Contactors shall be in accordance with SANS 60439V and/or IEC 158-1. Category AC3 or DC2 shall in general be used, whichever is applicable. Category AC4 and DC3, whichever is applicable, shall be used for heavy plugging and inching duty systems, e.g. cranes, etc.

Contactors shall have suitable capacities for direct-on-line starting, star delta starting or any other form of starting, whichever is specified in the project specification and the drawings. The contactors shall be rated for at least 130% of the associated load current.

Each contactor shall be provided with at least two normally open and two normally closed auxiliary contacts, unless otherwise specified.

Contactors shall be suitable for remote and automatic operation where specified. Where the number of auxiliary contacts required for remote and automatic operation is greater than can be accommodated on the contactor, an auxiliary relay or an additional contactor, shall be provided.



Each contactor shall be capable of carrying, making and breaking overcurrents during the operating time of its own overcurrent tripping devices at a recovery voltage of 90% of the specified system voltage.

Motor starting applications:

All contactors for starting squirrel-cage motors direct-on-line shall be rated to break 10 times the full-load running current of the motor.

The contactor shall be coordinated with the short circuit protective device to ensure adequate protection for the specified operational current, voltage and the corresponding utilisation category according to "Type 2 Coordination as per IEC 1947", i.e. that under short-circuit conditions, the contactor or starter shall cause no danger to persons or installation and shall be suitable for further use.

5. BUSBAR AND BUSBAR TRUNKING -

The main distribution circuit through the Assembly shall comprise a main and distribution busbar system, comprising of 3 phase and neutral busbar system. The rated current of the busbar system shall match the rating of the main incomer

All main and distribution busbars, risers and droppers shall be air-insulated and shall be fabricated from hard drawn, high-conductivity copper. Aluminium busbars will not be permitted. Busbars shall be tinned for coastal applications. If pre-tinned copper work is provided, cut surfaces may remain bare, providing the current path is unaffected and suitable contact lubricants are used before tightening joints.

Main busbars shall be enclosed together within the top of the Assembly. No other conductors shall be run in the busbar compartment. Access to the busbars shall be through covers, requiring the use of a tool for removal. All internal fixings shall be held captive. No components shall be placed in a busbar compartment.

Main and distribution busbars shall be continuous over each section, extending to over the full length of the Assembly with the same current rating and cross-sectional area throughout their length.

Main busbars, distribution busbars and all flexible connections, shall be adequately sized, braced and supported to withstand any electromagnetic forces and thermal effects to which they may be subjected, including the occurrence of fault currents, up to the full fault levels specified.

The vertical riser buses shall be copper full height and rated for the section total load. Small openings in the vertical barriers shall permit the plug-on control unit contacts to pass through and engage with the vertical bus bars. Unused plug-on openings in the vertical barriers shall be equipped with plastic snap-in closing plugs.

All busbar connections shall use joints secured against loosening. Joints and Tee-off Connections in busbars shall be made by means of high-tensile bolts, nuts and approved locking washers. A minimum of two such bolts shall be used per joint or tee. The joints shall not be taped in order to facilitate visual inspection and checking of bolt tensions. The joint contact areas shall be smooth, very flat and polished or tinned for dry jointing.

Busbars shall be provided with phase colour markers, red, white, blue (and black in the case of four wire systems). Such colour identification may take the form of coloured bands at intervals along the busbar run of not more than 800 mm. The combined width of the colour bands per phase shall not be less than 300 mm per 800 mm busbar length. The use of the convention, Red, Rear, Right shall be employed.

The maximum length of any cable connections from a busbar shall be 1000 mm.

A cabled 'busbar' system of the specified radial or closed ring arrangement may be offered as an alternative to a conventional system if:

- The Assembly has a rated short-time withstand current or rated conditional short-circuit current not exceeding 10 kA; or
- The Assembly is protected by current limiting devices having a cut-off current not exceeding 17 kA at their rated breaking capacity.

This will generally mean that the rated current of such an Assembly will be less than or equal to 100 A.

6. WIRING IN CUBICLES, DB'S, MCC'S AND PANELS, ETC

In general, all internal wiring in the cubicles shall be carried out in 600 V PVC insulated copper multi-strand conductors. If the internal ambient temperature of the cubicle is likely to exceed 50°C silicon rubber insulated stranded copper conductors shall be used. The minimum cross-sectional area for control circuits shall be 1,5 square mm and 2,5 square mm for load and CT circuits. The current carrying capacity of conductors shall be determined in accordance with Table B of SANS 1042 taking the appropriate correction factors for ambient air temperatures, grouping and condition of used into account.

Where several conductors are used, these shall be neatly grouped and bound together by means of "Helvin Strap" or equivalent in groups not exceeding 10 conductors and shall be arranged in neat vertical or horizontal rows or installed in PVC trunking with slotted sides. Wiring shall follow the board construction features as far as possible without the twisting or crossing of conductors.

No joints will be allowed in internal wiring, and all connections to busbars or earth bars shall be made with approved tinned copper cable lugs soldered or crimped to the ends of the conductors and bolted to busbars by means of cadmium-plated high tensile steel bolts and nuts provided with spring washers.

Connections of conductors to equipment i.e. circuit breakers, isolators or contactors shall be made by a ferrule of correct size or by the soldering of the end of the conductor. conductors connected to terminal blocks need not to be soldered or ferruled.

Conductors terminating on meters, fuse holders and other equipment with screwed terminals shall be fitted with pre-insulated lugs. The lugs shall be soldered or crimped to the end of the conductor. The correct amount of insulation shall be stripped from the end to fit into the terminal. Strands may not be cut from the end of the conductor.

Crimping tools used shall be of the ratchet type and indent an identifying symbol on the terminal insulation.

All wiring is to be kept free and away from any exposed terminals or other uninsulated current carrying parts. Wiring shall also be kept free from metal edges and shall be protected where they cross metal edges. Grommets shall be installed in each hole in the metalwork through which conductors pass. Connections to equipment on swing doors shall be arranged so as to give a twisting motion and not a bending motion to the conductors.

Only wires of the same potential shall be grouped together, and power control circuit wiring shall be in separate wiring channels. Wiring channels shall not be more than 60% full.

Wires shall be clearly marked at all termination points in accordance with the numbering of the board manufacturer's wiring diagram, by means of "Bowthorpe Hellermann" or approved alternative cable markers.

Additional red cable markers marked "T" in white must also be fitted on wires associated with trip circuits.

When the board main disconnect or local disconnect is switched off, no live incoming or other wiring shall be accessible. The incoming terminals must be screened or inaccessible. Where connections are taken from the incoming sides of the main switch, they shall be screened by a



screen marked "ISOLATE FEEDER BEFORE REMOVING SCREEN". If any circuits are energised from other sources, clear warning notices to that effect shall be fitted and such terminals shall be clearly marked.

All control terminals shall be accessible from the rear, except in the case of front access boards.

Where neutral connections are looped between the terminals of instruments a common lug or ferrule shall be used to ensure that the neutral is not broken when the instruments are removed.

The supply end connections to all equipment shall always be at the top and the load end connections at the bottom.

Solid copper busbars shall be used to connect equipment to the main busbars where the current rating exceeds 200A and shall be insulated by means of at least two half lapped layers of PVC tape.

A maximum of two conductors shall be used per equipment terminal.

Where small leads are connected directly onto busbars, such as for voltmeters, etc. they shall be provided with a 20A fuse mounted directly on the busbar and a 2 Amp fuse at the piece of equipment on the front of the panel.

Unless otherwise approved, the following insulation colours shall identify wiring:

-	Red phase of 3-phase circuits	:	red
-	White phase of 3-phase circuits	:	white
-	Blue phase of 3-phase circuits	:	blue
-	Live of single-phase circuits	:	red
-	Neutral	:	black
-	Earth	:	green / yellow
-	Alarm circuits	:	orange
-	AC control circuits	:	red
-	DC control circuits	:	blue
-	Instruments	:	grey

7. GLANDS AND GLAND PLATES FOR PVC AND PILOT CABLES

GLANDS

Mechanical cable glands shall comply with SANS 1213 and flameproof glands shall comply with SANS 808.

When specified in the project specification glands shall be weatherproof, dust ignition proof, hose-proof or for use on type "e" enclosures i.e. use in explosive gas atmospheres.

Glands shall be provided with brass locknuts and double outer sealing in corrosive environments. Areas which are classified as highly corrosive shall be equipped with H-C (Hydrocarbon resistant) or UV-C (Ultra-violet and chemical resistant) "Enviroseals" from Pratley or equivalent as may be applicable.

Glands and components shall be manufactured of non-corrosive material such as nickel plated brass.

Adjustable cable glands as manufactured by "Pratley" or approved equivalent of the correct size designation shall be provided in switchboards for all cable types as specified.

Glands shall be equipped with cable or armour gripping devices as may be applicable and shall be constructed to ensure electrical earthing continuity between the armour of the cable and the gland plate or the metallic structure. Glands shall be provided with an earthing bond attachment of acceptable rating.



It shall be possible to convert glands for armoured cables to be suitable for unarmoured cables by replacing the cone bush and compression ring with a rubber compression bush and rings.

Where cables with metal screens or metal sheaths are specified, the gland shall be designed to earth the screen or sheath through the gland on the earth bar. It shall be possible to bring earth continuity conductors through glands for ECC cables without having to cut grooves in the barrel or cone bush. Suitable replacement parts shall be used.

Glands for outdoor use shall be equipped with a waterproofing shroud and an inner seal kit. All pilot cable ends shall be made off in glands as prescribed by the manufacturer, of correct size and complete with neoprene shrouds if used outdoors at minisubs or outdoor cubicles. The armouring shall be clamped between substantial tapered sections, which form an integral part of the gland, secured by lock nuts to give an wastearth connection.

GLAND PLATES

Gland plates for cable entries to boards will be from above and/or from below as specified in the drawings of project specifications.

Gland plates shall be at least 200 mm above the normal floor level with a minimum thickness of 3 mm for galvanised plate.

Gland plates shall be from non-ferrous material with a minimum thickness of 5 mm, where single core cables are terminated.

8. WIRING-, CABLE TERMINATIONS, TEST TERMINAL BLOCKS AND LUG

GENERAL

Electrical terminal blocks shall comply with SANS 1433 and shall be indelibly marked as stated in this specification in respect of ratings, conductor sizes and identification symbols. Terminal metal parts, bolts and screws shall be of non-corrosive material, enclosed in fire resistant, moulded plastic insulating bodies. No metal part shall project beyond the insulating material to ensure protection against accidental contact by personnel, against short circuits and tracking.

The terminal blocks shall have a temperature rating of at least T40 for indoor and T55 for outdoor switchgear.

RAIL-MOUNTED WIRING TERMINAL BLOCKS

The construction of the terminal blocks and mounting rail shall be of robust construction as to ensure a firm and positive location of the terminal blocks. It shall be possible to add additional terminal blocks or replace blocks within the terminal sequence without having to disconnect or dismantle the terminal block or adjacent terminal blocks or having to loosen any fastening device at the rear of the mounting rail. The terminal blocks shall be held in position by means of an end barrier or a shield to insulate the open end.

It shall be possible to use terminals for different sizes of conductors on the same mounting rail. Where smaller terminal blocks occur adjacent to larger terminal blocks, suitable shielding barriers shall be inserted to cover the terminals that might otherwise be exposed.

Terminals shall be sized and rated to match the conductors that are connected to them.

Each terminal blocks shall have provision for clip-in numbering or labelling strips to be installed, together with clear protective caps and shall be clearly marked in accordance with the Board Manufacturer's drawings and wiring diagrams.



All outgoing circuits of the switchboards shall be provided with suitable terminal strips of the shoe clamping type, a rating of at least 15A and wired in such a manner that all incoming cables installed at the site can easily be connected. Terminals which rely on pinch screws rotating on wire strands shall not be acceptable.

Terminal strips for auxiliary power, control alarm and trip circuits etc. shall be kept separate to ensure that cables can be made off without disturbing power cables.

Full details and samples of terminal strips shall be submitted to the engineer for prior approval.

Petroleum-jelly filled pilot cables shall be terminated and jointed in moisture-proof, blocking type terminations/joints which shall prevent the ingress of moisture, as well as the escaping of petroleum-jelly from the cable. Epoxy-filled terminations and joints will be acceptable. However, prior approval of terminations and joints shall be obtained from the Engineer.

POWER CABLE TERMINALS

The terminal strip shall consist of a metal mounting strip onto which cable connecting modules are fixed. The terminals for power cables shall be equivalent to the "Klipon Type SAKG" range, with bolt fixing, complete with arc shields and suitably rated for the applicable cable sizes. For cables up to and including 10 mm², clamp type terminals may be provided, but the type where the clamp screws are in direct contact with the conductor will not be acceptable.

The terminals for power cables shall be large enough for the terminating lugs of the cable sizes specified.

Terminals for power circuits, including the neutral connection, shall be arranged in a straight horizontal line with adequate clearance between live and earth connections with the cable lugs fitted. Rigid barriers, not the thin flexible type, shall be provided between terminals.

Diagonal or vertical arrangement of terminals for power circuits will not be accepted.

Where aluminium core cables are used, suitable tinned, copper or aluminium lugs with Densal paste shall be used for the termination.

The cost for the supply and delivery of lugs and paste shall form part of the price for the erection of the cabinets.

The terminal strip for power cables shall be positioned at least 50 mm from the gland plate. The terminals to which a cable will be connected, shall be directly above/below the specific cable gland for bottom/top entry respectively.

Where terminals are mounted more than 400 mm from the gland plate, provision shall be made for bracing and for fixing the leads of smaller cables to prevent vibration.

The terminals of each individual circuit shall be clearly labelled with the circuit name and number.

TEST TERMINAL BLOCKS

Switchboards shall be equipped with a test terminal block, as English Electric/GED or otherwise approved manufacturer when specified in the Project Specification. The test block shall be mounted directly below the ammeters and voltmeters on the front panel of the board, and shall be wired in series with these instruments.

9. SWITCHBOARD ACCESSORIES

CONTROL PUSH BUTTONS

General



Push buttons shall comply with BS 4794 or equivalent IEC specification.

Push buttons shall be provided by a single reputable supply and shall be selected for the required rating, contact action, duty, environmental conditions e.g. temperatures and vibrations and mounting characteristics e.g. flush mounted, enclosed, self-contained, illuminated, etc.

All push buttons shall be of the same physical dimension and shall be interchangeable between normally open and normally closed contacts. Push buttons must preferably also be interchangeable with indicator lamps, key switches, etc. All push buttons shall be provided with replaceable lenses.

Push button terminals shall be suitable for conductor sizes to be used. Push button assemblies mounted on doors of control boards shall be enclosed to prevent inadvertent contact with the terminals and when the doors are open.

Contacts shall be silver-tipped or be constructed of an approved high quality material.

Push buttons shall be labelled by means of removable legend plates clearly indicating it's function. Legend plates shall be interchangeable.

When specified keylock push buttons shall be supplied with duplicate keys. The removal action of the key shall suit the application.

Illuminated push buttons shall comply with the specification for indicator lamps and lights.

Motor Control Centres

All motor control cubicles shall be provided with "STOP/START" push buttons as follows:

- | | | | |
|---|--------------|---|-------|
| - | Start Button | : | Green |
| - | Stop Button | : | Red |

When specified in the Project Specification*** or indicated on drawings the following push buttons shall be provided:

- | | | | |
|---|---------------------------|---|----------------------------|
| - | Tip Reset Button | : | Black |
| - | Emergency Stop Button | : | Red with yellow background |
| - | Lamp Test Button | : | White |
| - | Any Other Function Button | : | Pale Blue |

Start push buttons shall have normally open contacts. Stop push buttons shall have normally closed or normally open contacts, as may be required.

Switchgear

When specified in the Project Specification or indicated on drawings push buttons shall be provided as follows:

- | | | | |
|---|-----------------------------------|---|-----------|
| - | Electricity Controlled Switchgear | | |
| | Open Button | : | Green (O) |
| | Close Button | : | Red (I) |
| - | Reset Button | : | Black |
| - | Lamp Test Button | : | White |
| - | Any Other Function Button | : | Pale Blue |

SIGNAL LIGHTS

Indicator lights shall comply with SANS 1054 or IEC equivalent.

Indicator lights shall be provided as specified in the Project Specification*** and indicated on drawings.

Similar cluster multi-led (8 chip) long life signal lamp shall be provided for all indications.



LED's shall be selected and rated for the specified control voltage and shall be equipped with a suitable current limiting protection resistor. Each LED shall be provided with a Zener transient protection diode. Suitable LED's are type MDA 22 for AC applications under 110 V and DC applications from Mimic Crafts. Equivalentents shall be submitted for approval by the Engineer.

Indicator lights shall be labelled by means of a removable legend plate clearly indicating it's function.

Legend plates shall be interchangeable.

The following lens colours shall be used:

-	Circuit breaker, isolator closed or abnormal state	:	Red
-	Circuit breaker tripped (caution)	:	Yellow
-	Circuit breaker open (ready for operation)	:	Green
-	Interlocking	:	White
-	Other function	-	White

Painted lenses shall not be acceptable.

Where indicating lamps are supplied from the substation batteries, it shall be separately wired to an easily accessible terminal block at the back of the board and shall not form part of the wiring of the spring charge mechanisms of equipment or tripping circuits. The indicator lights shall be wired to a lamp test push button mounted on one of the cubicles, preferably a buscoupler or an incomer. The lamp test circuit shall be equipped with a timer (0-10 min) to prevent the unnecessary drainage of batteries.

Two spare lamps shall be provided for each type and colour lamp used on the boards unless otherwise specified.

The spare lamps shall not be used by the contractor during erection, commissioning or maintenance.

SEMAPHORES

Semaphores shall be provided if specified in the project specification.

Semaphores shall be of the electrically operated, totally enclosed type, suitable for the operation with the specified control voltage.

The semaphores shall be of the continuously energised type which will take up an abnormal position when de-energized, e.g. 56 deg. to the horizontal.

10. NAME PLATES AND LABELS

NAME PLATES

All equipment shall be provided with a manufacturer's name plate/plates fixed in an easily accessible and readable position on equipment or inside cubicles showing the following data:

- The manufacturer's name or trademark.
- Type, designation or identification number or other means of identification making it possible to obtain relevant information from the manufacturer of equipment.
- SABS or IEC Designation.
- Rated operational voltage.
- Short circuit strength in kA.
- Degree of protection IP rating.
- Maximum current carrying capacity of busbars.
- Maximum current carrying capacity of equipment.
- Voltage transformer ratio (where applicable).



- Current transformer ratio, burden, class and knee point voltage (where applicable).
- Current transformer connection instructions for various CT ratios (where applicable provide separate nameplate close to the relevant terminal blocks).

LABELLING

Labels shall generally have black lettering on a white background. Danger and safety notices shall have red lettering on a white back-ground and be in both official languages.

Labels shall be engraved "trafolite", aluminium or an approved alternative secured with screws, not glue, or in an approved aluminium guide rail.

Lettering shall generally be 6 mm high except that of "main switch", hoofskakelaar", "local switch" and "Plaaslike skakelaar" which shall be 10 mm high. The lettering of labels indicating names of panels shall be 20 mm high.

Each cubicle shall also be provided with labels of similar wording at the back of the cubicle.

Where possible labels shall not be fixed to removable panels or doors.

The manufacturer shall consider the wording on the drawings as preliminary only and shall obtain the correct final wording from the Engineer before the labels are manufactured.

All equipment situated inside the board, e.g. contactors, relays, fuses, timers and time switches, shall be clearly labelled indicating function and circuit controlled.

Typical labels are as follows:

- Cabinet: cabinet description.
- Incoming cables/ busbar: size and origin.
- Main disconnecter: "main switch", "hoofskakelaar" and danger notice.
- Local disconnecter: "local switch", "plaaslike skakelaar" and danger notice.
- Fuses and combination fuse switches: circuit designation and fuse rating.
- Circuit breakers: circuit designation and overcurrent adjustment where applicable.
- Earth leakage protection units: circuit designations.
- Contactors, relays, time-switches, timers, control fuses, etc: designation of control circuit and circuits controlled, function and fuse ratings.
- Push buttons: circuit designation and function.
- Indicating lamps: circuit designation and condition.
- Instruments and selector switches: circuit designation and phase colour.
- Meters (kVA and/or kWh): circuit designation and phase colours where applicable, reading description, and a single multiplication factor for each reading.
- Terminal blocks: terminal designations and function.
- Current transformers: ratios and terminal designations.

LEGEND CARDS FOR DISTRIBUTION BOARDS OR CUBICLES AND MOTOR CONTROL CENTRES

Install an index card in a holder, with a 2 mm thick transparent acrylic panel, screwed or welded inside a door, or where no doors are fitted, to the front plate of the cabinet. The legend card shall list the outgoing circuit designations in accordance with the layout and schematic drawings, functions and outlet locations.

11. METERING AND INDICATION EQUIPMENT

The Technical Data Sheets, MCC and Local Control Tables and I/O lists shall identify which functional units shall be provided with power/current and voltage measuring instruments, the type, and the facilities required.

Analogue display instruments used to indicate voltages and currents shall comply with BS EN 60051, be of the low-impedance type and have an accuracy class of 1.5. They shall be flush front of panel



mounted with a 90° quadrant minimum scale length, and be DIN96 size for power distribution functional units, and DIN96 or 72 sized for motor starter functional units. External zero adjustment shall be possible on all indicating instruments to facilitate adjustment without dismantling the instrument.

Instruments shall be scaled to 120% of the anticipated designed indication. Ammeters shall be provided with compressed scales to accommodate motor starting or other in-rush currents, and ammeters monitoring motor currents shall be provided with an adjustable red pointer to indicate full load current.

Meters and relays shall be capable of withstanding, without damage, the secondary currents associated with the maximum available through fault current.

Digital power meters shall be equal or similar to the PowerLogic Power Meter Series 700 with the capability to offer all the measurement capabilities required to monitor an electrical installation in a single 96 x 96 mm unit not extending more than 50 mm behind the mounting surface. It shall be possible to monitor and display all three phases and neutral at the same time. The minimum size of characters shall be 11mm high. Backlighting shall make easy reading even in extreme lighting conditions and viewing angles possible. Modbus communication via a RS485 port shall be available. The instrument shall comply with Energy class 1 as defined by IEC 61036.

Instruments shall be provided with shrouded connections to their rear, and ammeter circuits with full scale deflection in excess of 25A shall be connected via current transformers (CTs). Apart from CT and ammeter circuits, instrument circuits shall be fused.

Digital power meters used in power distribution circuits shall be flush front of panel mounted and shall provide selectable front of panel digital display at least the following measurements:

- voltage between phases and between phases and neutral
- current in each phase
- power (kW)
- kVA
- power factor
- consumption (kWh)

They shall provide data output signals for presentation to PLC, SCADA, telemetry, etc.

Where the Technical Data Sheets indicate that instruments shall provide fieldbus communication with a control system, this shall be via an open protocol compatible with the proposed PLC system.

Run hour meters shall be of a 5 digit minimum non-re-settable odometer type, with visual indication of operation, and a minimum resolution of one hour.

Current transformers (CTs) shall be air insulated, shall comply with BS 3938, and shall have short circuit ratings in excess of those prevailing at the point of connection. They shall bear individual rating plates, which shall clearly identify the winding polarities (primary or secondary), together with the connection details of any multi-ratio windings.

Current transformer accuracy classes shall be selected as follows:

Type of circuit	Class	Comments
Indication	3 or 5	To match the % accuracy of the instrument.
Measurement	0.5 or 1	To match the % accuracy of the instrument.
Motor protection	10P10	Or as required by protection device manufacturer.
Power system protection (e.g. DMTL)	10P20	Or as required by protection device manufacturer.



Power system protection (high accuracy, e.g. REF, generation, unit protection)	X	As specified by protection device manufacturer
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One pole of the secondary winding of each CT (or group of CTs) shall be connected to earth via a link. All connections to the CT secondary winding shall be made via a proprietary shorting terminal test block. Provision shall be made for attaching test links.

Current transformers shall be of the low-impedance type and shall, where ratio, class and output requirements permit, preferably be of the ring-type bar-primary design.

Current transformers shall be rated to withstand the thermal and magnetic stress resulting from the maximum available through fault current.

Bridging terminals for current transformers shall be provided at the outgoing terminals where external connections are required. In addition, terminal blocks shall be provided to permit secondary injection tests on protective relays.

12. CAPACITORS

Capacitors shall be of the non-toxic, dry, self-healing, metallised film type, and comply with SANS 60831.

Capacitors shall be fitted with a means of electrical discharge to reduce the residual voltage to less than 60 V within 5 sec