X-RAY SCREENING EQUIPMENT REQUIREMENTS AND TECHNICAL SPECIFICATIONS

1. INTRODUCTION

1.1 This specification describes the performance and design characteristics of the X-Ray screening equipment required. The purpose of the system is to facilitate security personnel to examine cargo, parcels and packages to ensure that no contraband or dangerous items are being transported into the premises/cargo.

2. TECHNICAL SPECIFICATIONS

Clause No.	Requirement	Remarks
1		
1.1	The vendor must submit all the operating manuals, brochures of features & technical specifications and customer references in Singapore of the proposed item.	
1.2	The proposed X-ray screening equipment **must** be the Approved/Qualified Technology under the Transportation Security Administration (TSA) Air Cargo Screening Technology of the X-ray Devices. **The vendor must submit a copy of the approved certificate for your proposed equipment.**	Critical Compliance.
1.3	The equipment and parts shall come with a minimum of 12 **months** warranty.	Critical Compliance.
1.4	Include at least 2 sessions of training. The vendor shall provide for all training materials both in softcopy and printed handouts. a. 2 sessions for general operator use. b. 2 sessions for maintenance users. c. 2 sessions for Supervisors users	Critical Compliance.
1.5	In summary, the submission among other requirements must include:- a. Conformity to this table of compliance. b. Equipment main quote (include training, warranty and standard supplied accessories - input & output extended rollers and console). c. Price listings and part numbers, of all the equipment's necessary consumables and spares. d. Brochures of features and tech specs of your proposed equipment. e. Letter from the relevant authorities certifying your proposed equipment. f. X-ray screening equipment Test Kit shall be provided as part of the deliverables.	Critical Compliance
2		
2.1	The system tunnel aperture shall be at least **1,000** mm wide by **1,000** mm high.	Critical Compliance
2.2	The system shall supply input and output rollers (1metre each) and console with table to house the LCD monitors.	
2.3	The system shall be mounted on heavy-duty castors (rollers) or	

Clause No.	Requirement	Remarks
	equivalent for the ease of transportation and shall be able to be fixed in place at the site of deployment.	
3	**SYSTEM PERFORMANCE SPECIFICATION**	
3.1	Shall be able to display a wire resolution of minimum 35 AWG (American Wire Gauge) (guaranteed).	Critical Compliance
3.2	Steel Penetration: Minimum 40 mm (guaranteed).	Critical Compliance
3.3	**X-ray Test Piece compliance to ECAC European Standard and ASTM US Standard**, shall be provided for each system with **Resolution, Penetration and Materials Separation Test** as part of the deliverable.	Critical Compliance
3.4	Conveyor Speed: 0.2 m/s or better	Critical Compliance
3.5	Conveyor in bi-directional operation	
3.6	Conveyor Load: 3,000 kg maximum evenly distributed at 220V	
3.7	Monitor: Dual 24" LCD colour monitor. One display imaging diagonal from side and the other display imaging diagonal from top to bottom. The monitors shall display the image with a minimum resolution of 1024 x 768 pixels.	Critical Compliance
3.8	Imaging Technology - The system features shall include a standard multi energy image display where materials of different atomic numbers are displayed in different colours, e.g. Organic in Orange; Mixed Material in Green; Inorganic in Blue; Not Penetrated in Black.	Critical Compliance
3.9	Electronic Platform - The system shall utilize a latest Windows-based Intel PC Processing system, with the following minimum requirement that is upgradeable: a. 2GB RAM b. Min 500GB Hard Disk c. DVD Drive d. 512MB Graphic Card e. 4 x USB ports	
3.10	Minimum Detection System: a. Multi Energy with 2 detector arrays; high and low energy. b. 2 sets of L shaped detector array with minimum 1408 diodes for individual set (contractor to specify details). c. Detector arrays shall be comprised of scintillator crystal detector diodes. d. The image shall be displayed without corner cut off.	Critical Compliance
3.11	X-Ray Generator: a. The system **shall consist of 2 generators providing 2 views; view 1: diagonal from side, view 2: diagonal from top to bottom**. b. Anode Voltage: Operating at 200 KV c. Tube Current: 1.0 mA. d. Cooling: Sealed oil bath with forced air or better. e. Protection: Over Voltage, Over Current & Over Temperature.	Critical Compliance

Clause No.	Requirement	Remarks
3.12	Software features shall have at least the following: a. The flow of image in the system shall be in real time for accurate reading.	
	b. The system shall have the capability of automatically detecting and alerting the operator the present of EXPLOSIVES; such as C4, Semtex, TNT, RDX, PETN, Ammonium Nitrate, Potassium Nitrate or equivalent grade with advanced algorithm analysis processing. The explosive on the image shall be ellipse and such detection shall be logged into the system for further and future investigation. The system shall also provide the capability for manual detection and identification of suspicious image.	Critical Compliance
	c. The system shall have the threat image projection (TIP) or any others advance image processing software that allows images of threats (e.g., guns, knives, bombs, and hazardous materials) to be inserted in the both view 1 & 2 displayed images of screening bags at configurable frequencies. The software shall provide the ability to assess operator proficiency by tracking their performance operations and history. It also raises the operator level of vigilance and routinely exposes them to threat images enabling them to become more proficient at recognizing threat items such as guns, knives, Improvised Explosive Devices (IEDs), and other threat items. The images in the library shall be minimum 1000 images.	Critical Compliance
	d. The system shall also have a user defined density threshold alerts that causes a visible alarm when an object exceeds the specified density. This feature can prevent opaque items from escaping search.	.
	e. The system shall have built in self-diagnosed function during booting up the system for easy troubleshooting.	
	f. View Previous Bag - The system shall be able to immediate recall up to at least 08 previous images with a single button without any assistance of review auto image archiving function. The date and time for the image scanning shall also be display accordingly.	
	g. Zoom - The system is able to zoom up to 16 times.	
	h. Zoom on the Fly - The system is able to allow the operator to perform the zoom in and out during the real time scanning without stopping the machine.	
	i. On top of the above features, the machine is to be able to perform at least the following image enhancement during real time scanning without stopping the machine: (1) Monochrome Imaging (2) Inverse Imaging (3) Organic Imaging (4) Inorganic Stripping (5) High Penetration (6) Variable Edge Enhancement (7) Variable Gamma (8) Variable Density (9) Variable Colour (10) Zooming	Critical Compliance

Clause No.	Requirement	Remarks
	j. User Login - The system is acceptable to provide multi-level of user access with password control.	
	k. Digital Image Archiving - Auto and manual archiving of images in digital format for retrieval with full picture/image (without cut-off) quality and manipulation capabilities. System shall be able to store minimum 100,000 images (Contractor to provide the details calculation to prove the storage capacity).	
	l. Digital Image Output - Auto and manual archiving of images shall be in standard BMP, JPEG and PNG format, etc. for storage locally or export to external USB storage devices.	
	m. The system shall have a diagnostics features that includes the following at least: (1) Photo-diode signal outputs with and without X-ray. (2) User set-up parameters such as the adjustment of the date and time and the change of the scroll direction. (3) X-ray generator KV and mA monitor. (4) Ramp up and ramp down time for X-ray generator. (5) Keyboard test. (6) Photo diode manual and automatic map out.	
	n. Health, safety and others standard: (1) The machine must be certified to be in full compliance with all radiation safety requirements. (2) The system shall comply with all applicable local and international health and safety regulations including USA FDA for cabinet X-ray systems (Federal Standard 2.1-CFR 1020.40) and the Health and Safety at Work Act 1974-Section 6, amended by the Consumer Protection Act 1987 (Contractor have to submit the required certificate in the tender). (3) The systems shall be provided with emergency stop buttons. (4) The system shall include a safety interlock system to prevent X-Ray generation in the event of a critical panel being removed. (5) The system shall provide sufficient heavy lead curtains at both entrance of the tunnel to prevent any harmful x-ray leakage to the surroundings.	Critical Compliance
4		
4.1	The equipment shall operate effectively within a temperature range of 0 and 40 ^{O}C.	
4.2	The equipment shall operate effectively within a humidity range of 5% to 95% (non-condensing)	
4.3	The system shall operate at the power supply of 230 Volts AC, 50-60 Hz	

The supplier and/or the contractor shall also possess a minimum of **BizSafe Level 3** certification.

3. PROJECT GENERAL DESCRIPTION

3.1 Hacking and Making Good

3.1.1 All necessary protection against damages or loss to equipment (whether installed or brought on Site) shall be carried out by the Contractor.

3.1.2 The Contractor shall take due care when drilling, hacking or cutting away existing facilities, and ensure that no adjacent facilities are unnecessarily damaged in any way. Any work damaged will be made good entirely at the expense of the Contractor.

3.1.3 Touching up of paint is required in areas where the paintwork has been affected.

3.2 Inspection and Replacement of Defective Work

3.2.1 At any time during or after the execution of the works, the Contractor shall, at the request of the Company and within such time as the Company shall name, open for inspection any Works that are covered up. If the Contractor fails to do so, the Company can employ other contractors to do so. The expense shall be borne by the Contractor.

3.2.2 If works done are inadequate, of poor workmanship or inferior materials, or in any way substandard, the Contractor shall rectify the works at no cost to the Company.

3.3 Workmanship

3.3.1 All works shall be carried out in accordance with the best engineering practices by qualified and experienced personnel of appropriate skills and qualifications.

3.4 Completion of Work

3.4.1 The Contractor shall leave every part of the Works included in this contract in a clean, sound and perfect condition, free of all flaws, cracks settlement whatsoever upon completion.

3.4.2 All sites and working areas shall be swept and tidied, and all construction equipment and materials and discarded materials shall be removed from the site.

3.5 Compliance

3.5.1 To allow evaluation on a common basis, the Contractor shall submit his quote based on full compliance with the Specifications. Failure to comply with this requirement will invalidate the quote submitted.

3.6 Warranty

3.6.1 The Contractor warrants that the Works shall be free of defects for a period of **not less than 12 months upon commissioning or as specified in the technical data specification.**

3.6.2 Any fault due to design, materials, workmanship or structural faults which may be observed during the warranty period shall be made good by the Contractor at its own expense, which shall include the cost of labour and replacement of parts.

3.6.3 The Contractor shall warrant that the Works comply with all relevant statutory provisions including approved building codes, fire prevention codes, safety codes of Singapore Laws and CAAS, and all pertinent statutory provisions issued by the government authorities of Singapore.

3.6.4 Contractor shall be contactable requiring urgent and emergency attendance at site to any defect and/ or fault encountered during operation for any rectification works during Warranty Period.

3.7 Miscellaneous

3.7.1 The Contractor shall (at its own costs):

a) Attend site meetings for site coordination as required.
b) Do all possible in order not to hinder, obstruct or delay operations in any way.
c) Report immediately any damage or loss done to the Company's building structures, services or finishes.

3.7.2 The Contractor shall not

a) Load any concrete structure, which has not achieved maximum strength without the Company's authorised representative's approval.
b) Store materials on site in areas other those allocated to the Contractor without prior approval by the Company.

4. STANDARDS AND REGULATIONS

4.1 The whole Works covered by these Specifications shall be carried out strictly in compliance with the requirements of the Building Control Act and other relevant authorities, and to the prevailing requirements of the various codes and standards.

4.2 All electrical works, material and equipment shall comply with the following:

a) Singapore Standard: CP5
b) Wiring of Electrical Equipment of Buildings
c) All relevant Singapore Standards
d) The Electrical Regulations (Public Utilities Act)
e) Changi Airport Group & CAAS Regulations
f) Any other Rules and Regulations in operation

4.3 All materials supplied shall conform to applicable British Standards and comply with Singapore standards.

PROJECT SCHEDULE

1.1 The Contractor shall submit a list of personnel who will be performing the Works before commencement of work in accordance to **Clause 5.1** to **5.3** of the Agreement.

1.2 **The Contractor is required to complete the whole Works by 30 December 2021**, including materials lead time, or any extensions as the Company may approve.

1.3 The Contractor shall submit a detailed work schedule to the Company at least two (2) weeks before work commences for approval.

BREAKDOWN OF PRICES, PRICE SUMMARY, PAYMENT AND TECHNICAL SCHEDULE

1 CONTRACT PRICE AND PRICE SUMMARY

1.1 The total Contract Price for the supply, delivery and training of X-Ray Screening equipment including all Works specified in this Agreement is S$_____ (excluding prevailing GST).

2 PAYMENT SCHEDULE

2.1 **A security deposit of 5% of contract sum** shall be submitted prior to work commencement in a form of a Banker's guarantee or a cheque made payable to [SATS Security Services Pte Ltd]. It shall be returned upon satisfactory completion of the Defects Liability Period

2.2 Under the Agreement, the payment will be honoured within 60 days of the receipt of invoice and certification by the Company's executive in charge for its release.

	STAGE	**% of Contract Price**
1.	Upon issuance of Letter of Award/Notice to proceed and receipt by the Company of the Security Deposit	10%
2.	Upon delivery of the X ray machine.	40%
3.	Upon testing and commissioning	20%
4.	Upon issuance of Final Acceptance Certificate	20%
5.	Upon resolution of written acceptance by the Company of all outstanding works/rectifications and contractual matters to the satisfaction of the Company.	5%
6.	Upon the Company's written certification stating the expiry of the Warranty Period or any extensions thereof.	5%
	TOTAL %	**100%**

3 BREAKDOWN OF PRICES

3.1 The Contractor shall perform the Works listed below and provide the corresponding prices:

S/NO	**DESCRIPTION**	**AMOUNT (S$)**
A	**PRELIMINARIES**	
A1	Preliminaries for the whole works to comply with the Company's requirements and specifications.	
A2	Provision for insurance as specified in the **Agreement Clause 19**. All deductibles to be borne by Contractor. Allow for compliance with general requirements and conditions listed.	
A3	Provision for maintenance manuals, as-fitted drawings and submission of materials to the relevant authorities, if necessary. Documents required for the purpose of handling over to the Company shall be submitted by the Contractor prior to the issuance of Final Acceptance Certificate. All drawings and documents submitted shall be in duplicates and duly endorsed by PE.	
A4	Clean and protect completed sections of the Works. Dispose of debris off-site and making good affected areas.	
	Total Cost for Preliminaries	
B	**SUPPLY, INSTALLATION AND COMMISSIONING**	
B1	Supply labour, tools, equipment to install X ray machine.	
B2	All, measurement, testing and commissioning as necessary to ensure all new installation/refitting/reinstatement works are fit before Turn-On. All measurement and test reports are to be submitted.	

C	**TRADE IN OF OLD X_RAY MACHINE**	
C1	Trade in of old x-ray machine is required	
Total Price of X-Ray Screening Equipment (including input & output extended rollers, console and screening test kit)		

ACCEPTANCE TEST PROCEDURE AND CRITERIA

1 TESTING AND ACCEPTANCE

1.1 The Company shall in accordance with the Project Schedule and Specifications, conduct system tests and acceptance test on the system.

1.2 Prior to such system tests and acceptance tests, the Company and the Contractor shall each nominate one or more representatives to be present during the respective tests, or if agreed between the Parties, available for consultation during the respective test period(s).

1.3 Following installation of the System, the Contractor shall submit the System to the system tests to ensure that the System conforms to the Specifications and is ready for the Acceptance Tests in accordance with the Project Schedule. The Contractor must rectify any non-conformance of the System with such requirements at no additional cost to the Company.

1.4 Acceptance of the System will take place on the date of the written acknowledgement by the Company to the Contractor of its acceptance of the System and this written acknowledgement shall be sent within ten (10) working days from the date of successful completion of the Acceptance Tests.

1.5 If the System fails the Final Acceptance Tests then the Company may require the Contractor to forthwith implement free of charge such alterations or modifications to the System as the Company shall in the circumstances reasonably judge necessary and in sufficient time to make possible the repetition of the Final Acceptance Tests by the Company in the presence of the Contractor's representative(s) within thirty (30) days of the date of failure (the "First Repeated Acceptance Tests") and at the Contractor's cost. The Contractor shall not charge the Company for the cost of attendance (by its representative(s)) at the First Repeated Acceptance Tests.

1.6 If the System fails the First Repeat Acceptance Test then the Company may at its option:

a) Require the Contractor by written notice to forthwith implement such further alterations or modifications to the System free of charge as the Company shall reasonably judge necessary to enable the System to pass repeat Acceptance Tests (the "Second Repeat Acceptance Tests") and at the Contractor's cost. The Second Repeat Acceptance Tests shall be carried out by the Company in the presences of the Contractor's representative(s)) at the second Repeated Acceptance Tests then the Company shall be entitled to proceed at its option under either clause 1.6 b) or 1.6 c) OR

b) Accept the System subject to such refund of the charges in respect of the System as the Contractor and the Company shall agree. If the Parties fail to agree to such refund within thirty (30) days of failure of the First Repeat Acceptance Test or Second Repeat Acceptance Tests pursuant to this Agreement the Company shall be entitled either to refer the matter for settlement in accordance with the dispute resolution procedures set out in Agreement.

c) Reject the System and terminate this Agreement without prejudice to any other rights or remedies to which the Company may be entitled hereunder or at law.

1.7 The issuance of any interim acceptance certificate for some parts of the System which have successfully completed the Acceptance Tests shall be without prejudice to the Company' right to reject the entire system in the event the other parts of the System and/or the entire system fails to pass the Acceptance Tests.

1.8 The Contractor shall provide the Company with all such assistance and advice as it shall from time to time required in the process of, or for the purpose of testing the System pursuant to this Agreement.

DOCUMENTATION

1.1 The Contractor shall submit two (2) sets of drawings, single-line diagrams and test reports and operation and maintenance manuals in hardcopy. The nature and contents shall be in accordance with the Specifications herein to the Company's approval.

1. Maintenance

1.1 The 12 months Warranty Period shall be inclusive of a quarterly “Preventive Maintenance” (PM). The PM is a general cleaning and inspection of the equipment, to ensure it is in good working order and operating at its optimal level.

OPTION 1 :

Comprehensive Maintenance for the above quoted equipment:

After 12 months Warranty	**Qty**	**Unit Price**	**Annual Cost**
1st Year	_____	_____	_____
2nd Year	_____	_____	_____
3rd Year	_____	_____	_____
4th Year	_____	_____	_____
5th Year	_____	_____	_____

OPTION 2 :

Non-Comprehensive Maintenance for the above quoted equipment:

After 12 months Warranty	**Qty**	**Unit Price**	**Annual Cost**
1st Year	_____	_____	_____
2nd Year	_____	_____	_____
3rd Year	_____	_____	_____
4th Year	_____	_____	_____
5th Year	_____	_____	_____

_____ _____ _____
Signature Date Company Stamp

_____
Name

_____
Designation

1. The project manpower shall be as follows:

Appendix C/CT2101E001
Annex H: Change Request

CHANGE REQUEST

Ref: ECR No. XXXX

S/no	Description	Cost Addition or Reduction	Impact to Project Schedule	Remarks

Reason for Change Required:

_____

_____

_____

Signed by: Date:

Representative of the Company

Signed by: Date:

Representative of the Contractor

WHS Rules And Regulations For Contractors

1.0 General

1.1 Contractors are responsible for ensuring their workers and sub-contractors have the required qualifications, competencies or licenses to carry out specific activities that may be required by Singapore's laws and regulations.

1.2 Contractors are responsible for ensuring all instruments, machineries; tools (including hand-tools, electrical and mechanical tools) or vehicles have the appropriate certificates, permits or licenses from the relevant authorities before being used inside SATS premise.

1.3 Contractors are responsible for ensuring all machineries, tools or vehicles are properly and safely used according to their intended purpose and design. No modification shall be made unless approved by the manufacturer or relevant authorities.

1.4 Use of SATS tools, equipment or machineries are not allowed without the prior approval of the Work Coordinator.

1.5 All operating permits, licenses or apparatus granted by the relevant local authority are to be submitted to the WHS Personnel upon request.

1.6 Contractors are to observe and adhere to all posted "Danger", "Warning", "Caution" and "Notice" signs.

1.7 Smoking is strictly prohibited within SATS premises except at Designated Smoking Areas.

1.8 Lockout and Tag out should be implemented when servicing, inspecting, repairing, cleaning or maintaining machineries or equipment in SATS where the unexpected energization, start-up or release of stored energy sources could cause injury to the worker.

1.9 Risk Assessment SHALL be conducted and established for works as prescribed in the WSH Risk Management Regulation.

1.10 Contractors shall comply with all applicable Singapore Workplace Safety and Health legislations, regulations and others requirements, inclusive of SATS safety rules and regulations.

2.0 Hazardous Areas

2.1 Certain areas/rooms and operations within SATS site where extra precautions shall be taken because of the nature of the hazards. Before entering any of the following areas or starting work on any operations within these areas, Contractors are required to check with the Work Coordinator for applicable WSH rules:

2.1.1 High Voltage Electrical Areas

2.1.2 Waste Water Treatment Plant

2.1.3 Chemical Storage Areas

2.1.4 Utility Shafts housing, Overhead Pipes and Ducts and Confined Spaces

3.0 Overhead Work

3.1 No overhead work over roadways or passageways shall commence until adequate precautions have been taken to ensure the safety of persons and property below.

3.2 Relocation of personnel shall be completed prior to commencement of work and maintained throughout the overhead work period. The contractor shall make all personnel relocation requests to the SATS Work Coordinator.

WHS Rules And Regulations For Contractors

3.3 Contractors are not permitted to crawl along and/or step on ductworks, cable trays, pipings or other building structures.

4.0 Housekeeping

4.1 Materials should be carefully located and stacked so that they does not block Aisles, Doors, Fire Fighting Equipment, Eyewash Stations, First Aid Boxes, SDS Stations, Chemical Spill Kit, Fixed Ladders, Electrical Equipment or Stairways.

4.2 Nails protruding from boards shall be removed.

4.3 Concrete form and scrap lumber and all other debris shall be kept clear from all work areas.

4.4 Combustible scrap, waste materials and debris shall be removed from the building or job site on a daily basis, preferably at the time of strip-out and disposed of at the designated collection points.

4.5 Overhead storage of debris, tools, equipment, pipes, etc. are prohibited. No loose material shall be left in the area above suspended ceiling panels.

4.6 The work area shall be kept free from any potential tripping hazards.

4.7 Do not obstruct passageways and exits.

5.0 Floor Openings

5.1 Substantial barriers, railings, and covering material shall be used to guard floor openings. Contractors shall supply all materials required for covering floor openings.

6.0 Chemicals

6.1 Contractors shall submit the most recent copies of the Safety Data Sheets (SDS) to the SATS Work Coordinator for any chemicals they plan to use in SATS premises. All SDS shall be submitted and approved for use by WSH Personnel prior to the contractor starting work.

6.2 All chemicals used shall be in their original container with the original vendor labels or properly-labeled secondary container. The labels shall include the chemical constituents, hazard information, safety precautions and specifications for proper use.

6.3 Contractors are responsible for conducting "Hazard Communication" sessions with their workers and Sub-Contractors in accordance with regulatory requirements.

6.4 All work with chemicals shall be carried out with minimal exposure to the contractors and SATS personnel.

6.5 All chemicals for the contract shall be purchased and supplied by the contractor, unless the contract specifically states otherwise. The proper disposal of used chemicals is at the expense of the contractor.

6.6 Contractors are advised that there are some areas of SATS where hazardous chemicals are present. It is the contractor's responsibility to review all areas of his work and determine if a hazard to his personnel exists. Upon request, SATS will provide the necessary information for the contractor regarding hazardous chemicals used in its facilities.

6.7 Contractors shall prevent contaminated water from escaping into open drains and/or public sewer or any chemical spillage causing water and soil contamination.

6.8 Contractors shall not store any chemicals at SATS premises, including overnight storage, unless prior approval by the Work Coordinator is obtained.

WHS Rules And Regulations For Contractors

6.9 Adequate ventilation shall be provided and maintained at all times where flammable and/or toxic chemicals are used.

6.10 Flammable, oxidizer and corrosive liquids shall never be stored together.

7.0 Ladders

7.1 Contractors are required to provide their own ladders, with their company's identification clearly visible. Under no circumstances shall contractors utilize SATS ladders for carrying out their work.

7.2 When using a ladder in aisles, lobby, cafeteria or any other areas which are freely accessible to personnel and are not designated as a "construction area", the area around the ladder are to be barricaded with ropes and stanchions or cones. Contractor may station their own employees to direct personnel around the ladder and work area.

7.3 The use of ladders with broken or missing steps/rungs, broken side rails or other faults and defects are prohibited.

7.4 Ladders shall not be placed adjacent to doors unless the doors are locked or guarded.

7.5 Metal ladders shall not be used when working on any electrical systems unless properly insulated.

7.6 Contractors shall not use any ladders in an unsafe manner. This includes, but is not limited to, standing on the top step, as well as no second party holding the ladder.

7.7 Ladders are not to be set-up and left unattended. Ladders not in use should be stored in a secure area.

7.8 Permit-To-Work at Height are required for any work above 2 (two) meters.

8.0 Compressed Gas Cylinders

8.1 All compressed gas cylinders brought into the SATS shall be in good condition, correctly labeled and its content identified.

8.2 Compressed gas cylinders shall be secured (roped or chained) in an upright position at all times. Use of forklift as a mean of transportation is prohibited unless a special structure is used to uphold the cylinders.

8.3 Cylinders shall be kept at a safe distance or shielded from welding and cutting operations. Cylinders shall not be placed where they can come into contact with electrical outlet or if outdoor exposed to the sun or rain.

8.4 Cylinder valve protection caps shall be firmly installed (hand tight) when compressed gas cylinders (empty or full) are transported or stored.

8.5 The correct regulators, in proper working order shall be used for each type of gas. Regulators or regulator connections shall not be modified in any way.

8.6 Dual Flashback arrestors shall be provided on each welding hose.

9.0 Tools

9.1 Contractor shall provide their own hand and power tools required for the work. Tools shall not be provided by or loaned from SATS.

9.2 Tools used shall be of safe construction and maintained.

9.3 When working near or inside flammable storage areas, spark resistant tools should be used to prevent the hazard of friction spark that may be an ignition source.

9.4 Defective tools shall not be used. They shall be tagged and removed from the work site immediately.

10.0 Scaffolds

10.1 Suitable and sufficient scaffolds should be provided to workers for all work that cannot be safety done at height from a ladder or by other means.

10.2 All types of scaffolds shall be erected and used by contractor with proper supervision and in accordance with Regulatory requirement.

10.3 Permit-To-Work at Height are required when contractor erects fixed or mobile scaffolds in SATS.

11.0 Cranes And Hoists

11.1 Contractors shall not be permitted to use SATS hoists without prior permission from SATS Work Coordinator.

11.2 Crane lifts shall not be attempted over or adjacent to any occupied areas. If such works are necessary, it shall be coordinated with the SATS Work Coordinator and the occupied area shall be cleared of all personnel prior to the lift.

11.3 Hoisting devices such as slings, chains, spreaders, grabs, etc., used in conjunction with hoists or cranes shall be designed and fabricated to meet the work requirements. Swivel type, self-catching safety hooks shall be used for the load hook.

11.4 Contractors' cranes and hoists used at SATS shall meet Regulatory requirements and have current certifications available for examination as required.

12.0 Electrical

12.1 The contractor shall not perform any work on **ENERGIZED** (Live) electrical panels, distribution boards, bus ways or other electrical devices, which may expose personnel to accidental contact with energized parts.

12.2 All electrical equipment should be equipped with electric grounding unless they are manufactured as double insulated equipment.

12.3 Extension cords shall be the three-wire type for grounded tools (two-wire is acceptable for double insulated tools) and shall be protected from damage. Worn or frayed cords shall not be used. Cords shall not be run through doorways where the door could cut or damage the cord. Spliced cords shall be connected with proper connector and not insulation tape.

12.4 No wiring shall be left on the floor ground or the floor where there is vehicular or human traffic. If unavoidable, the wiring shall have adequate mechanical protection to withstand the wear and abuse to which it may be subjected.

12.5 Portable electrical tools should be equipped with a Residual Current Device for earth leakage protection.

12.6 Do not overload any electrical circuit.

WHS Rules And Regulations For Contractors

13.0 Excavation

13.1 All excavation works shall be carried out in accordance with Regulatory requirements. The detection of underground utilities should be conducted prior to the excavation.

13.2 Contractors shall inform WSH personnel before the start of any excavation work.

14.0 Personal Protective Equipment

14.1 The type of protective equipment to be worn shall be determined by the degree of exposure to potential hazards. All protective equipment and clothing shall be provided by the contractor and shall comply with all applicable Regulatory requirements.

14.2 Suitable eye protection equipment shall be used while engaged in welding, cutting or grinding any material where flying particles may endanger the eyes.

14.3 Safety harness shall be worn when working above 2 (two) meters on unguarded platforms and on straight or extension ladders when the work involves pushing, pulling or action, which may dislodge the person from the ladder. DO NOT secure safety harness to sprinkler or utility pipings.

14.4 Hard Hat and safety shoes shall be worn at the designated areas. Hearing Protection shall be worn when using noisy equipment that generate noise of more than 85dBA or working in areas which are identified as high noise level. Areas with high noise level are identified with "Ear Protectors Shall Be Worn" Notice Sign.

15.0 Accidents And First Aid

15.1 Contractors who are injured shall be given prompt and proper medical attention at the SATS In-house Clinic or first aid station by certified first aiders.

15.2 Contractor shall notify their Work Coordinator immediately in case of any accidents/incidents or first aid cases.

15.3 Contractors shall cooperate with and assist the Work Coordinator in completing the Incident & Near-Miss Investigation Reports.

15.4 It is the contractors' responsibility to notify relevant authorities as required in compliance with Regulatory requirements.

16.0 Confined Space Entry

16.1 A Confined Space Entry Permit is required when contractors are carrying out work in confined spaces. Confined spaces are areas that may have atmospheric or physical hazards that could affect the safety of employees who enter them. It is not designed for continuous human occupancy and has a limited means of entry or exit. These areas include, but are not limited to pits, tanks, duct, manholes and trenches.

16.2 Contractors are responsible for the full compliance with the conditions stipulated in the approved Confined Space Entry Permit.

17.0 Hot Work

17.1 A Hot Work Permit is required when contractors perform Hot Work. Hot Works are defined as work that involves welding, flame cutting, gas soldering, brazing, burning or any work that generate sparks.

17.2 Contractors are responsible for the full compliance with conditions stipulated in the approved Permit.

18.0 Emergency Response & Action

18.1 Contractors shall be familiar with the escape routes and assembly area in case of any emergency. Check with the SATS's Work Coordinator to be aware of applicable *Emergency Evacuation Instructions*.

18.2 The main Contractor's Supervisor is responsible to account for their own employees and Sub-Contractors working in SATS in the event an emergency where evacuation is required. He/she shall inform SATS's Work Coordinator if any person is not accounted for.

18.3 Contractors shall be aware of the nearest location of the emergency response equipment such as eye wash station, first aid station and fire extinguishers etc.

- ***This SATS WSH Rules And Regulations shall continue to be enforced for all Contractors subsequent work engagement with SATS.***

- ***The Main Contractor shall be responsible for briefing these rules and regulations to any Sub-Contractors or any person contracted or employed by them.***

- ***The Main Contractor shall be responsible for the actions of its Sub-Contractors while inside SATS premises.***

Issued By : Mr Ajay Mishra, Assistance Vice President Risk Management
Representative on behalf of SATS

Acknowledged by : _____
Name of Representative (Top Management), Designation

_____
Signature

Company Name : _____

Date : _____

CONDITIONAL ACCEPTANCE CERTIFICATE

1. In accordance with Clause 9.10 of the Agreement by and between [CONTRACTOR] ("Contractor") and SATS Airport Services Pte Ltd ("Company") dated **[•],** 20[__] ("Agreement"), the undersigned Contractor hereby certifies as follows:

   1.1 Substantial completion of the Works have been achieved in accordance with the terms of the Agreement have been successfully completed;

   1.2 The Works have been completed in accordance with the Agreement except for the Works on the punch-list attached to this Conditional Acceptance Certificate as Appendix 1 which shall be completed no later than 30 (thirty) days from the date of this Conditional Acceptance Certificate;

   1.3 The Contractor has previously delivered to the Company this Conditional Acceptance Certificate for the Company's review and approval; and

   1.4 The Works have been tested and are capable of being safely and reliably operated in accordance with the terms of the Agreement.

2. This Conditional Acceptance Certificate shall only be valid and effective after the Company's final written acceptance of the Works as evidenced by the Final Acceptance Certificate issued by the Contractor and accepted by the Company;

3. This Conditional Acceptance of the Works does not release the Contractor from the warranties and guarantees provided for in the Agreement which will survive until their entire satisfaction;

4. Conditional Acceptance of the Works shall occur when the Company's duly authorised representative signs this Conditional Acceptance Certificate.

5. Capitalized terms used herein which are not defined shall have the meaning ascribed to such terms in the Agreement.

IN WITNESS WHEREOF, the Contractor has caused this Conditional Acceptance Certificate to be duly executed and delivered this **[insert date]**

CONTRACTOR

_____
By: [insert name and designation]
For and on behalf of [insert full name of Contractor]

Accepted by the Company on [insert date]

_____
By: [insert name and designation]
For and on behalf of **SATS Airport Services Pte Ltd**

WITNESS:

_____
By: [insert name and designation]
SATS Airport Services Pte Ltd

FINAL ACCEPTANCE CERTIFICATE

1. In accordance with Clause 9.8 of the Agreement by and between [CONTRACTOR] ("Contractor") and SATS Airport Services Pte Ltd ("Company") dated **[●],** 20[__] ("Agreement"), the undersigned Contractor hereby certifies as follows:

   1.1 All punch-list items have been fully and successfully completed in accordance with the terms and conditions set out in the Agreement and the Company's requirements;

   1.2 The Works have been fully and successfully completed in accordance with the terms and conditions of the Agreement and the Company's requirements; and

   1.3 The Contractor has transferred to the Company, the Specifications, the Documentation and all documents, records, as-built drawings, and test reports required to be delivered to the Company pursuant to the express or implied terms and conditions of the Agreement.

2. This Final Acceptance Certificate of the System and the Works shall only be valid and effective after the Company's final written acceptance of the System and the Works and does not release the Contractor from all obligations, undertakings, warranties, guarantees and liabilities arising from or connected with or provided for in the Agreement which will survive until their entire satisfaction.

3. The applicable milestone payment referred to in **[●]** of the Agreement shall be due and payable to the Contractor only after the Company's final written acceptance of the System and the Works.

4. Final written acceptance of the System and the Works shall occur when the Company's duly authorised representative signs this Final Acceptance Certificate.

5. Capitalized terms used herein which are not defined shall have the meaning ascribed to such terms in the Agreement

IN WITNESS WHEREOF, the Contractor has caused this Final Acceptance Certificate to be duly executed and delivered this **[insert date]**

[CONTRACTOR]

_____
By: [insert name and designation]
For and on behalf of [insert full name of Contractor]

Accepted by the Company on [insert date]

_____
By: [insert name and designation]

For and on behalf of **SATS Security Services Pte Ltd**

WITNESS:

_____
By: [insert name and designation]
SATS Security Services Pte Ltd