

ANNEXURE J: DETAILED SPECIFICATION SCOPE OF WORK

1. BACKGROUND

Currently Broadband Infraco has established PoP (Point of Presence) sites across South Africa in all provinces.

The request is for service provider/s to install/upgrade, replace air conditioners and maintain as and when required. Broadband Infraco at most sites have 2 or 3 air conditioners which various types

Broadband Infraco require service provider/s for various types of air conditioners in all provinces which will include supply, install and maintain of the required air conditioners. The required types of air conditioners to be supply are as follows:

- Midwall Split unit
- Window wall unit
- Cassette types
- Floor standing; and
- Clip-on air conditioners.

It should be noted that multiple service providers may be appointed for the different type of air conditioners and different /provinces. Preference may be given to companies who have presence in multiple provinces as reflected in the Technical/functionality evaluation.

2. SCOPE OF WORK

The technical requirements of the air conditioners are specified in the following sections.

2.1. Technology

1. Air conditioners shall be designed to be of commercial type air conditioner.
2. Air conditioner should comply with the electrical requirement and interface as per table below i.e. 220V 50Hz single phase or 380V 50Hz three phase, with an EER of greater than 10.
3. Power factor in all cases should be better than 0.95.
4. New installations and or extension/upgrade of existing sites

Type	Capacity	Power interface	EER	Maximum running power (power rating in BTU divide by 10)
Midwall Split Units	24 000 BTU	Nominal 220V 50Hz single phase	≥10	2400W
Midwall Split unit *	32 000 BTU-36000 BTU	Nominal 380V 50Hz three phase/ Nominal 220V 50Hz single phase**	≥10	3600W
Clip-ons*	32 000 BTU-40 000 BTU	Nominal 220V 50Hz single phase	≥10	4000W
Midwall Split unit, cassette type, clip-ons and Floor standing (will differ depending on site conditions)	40 000 BTU-60 000 BTU	Nominal 380V 50Hz three phase	≥10	Depending on rating and should be between 3600W to 6000W

* Depending on the installation may determine the use of single phase or 3 phase air conditioner

Replacement on existing sites

Type	Capacity	Power interface	EER	Start-up and maximum running power
Midwall Split/Window mount Unit	12 000 BTU	Nominal 220V 50Hz single phase	≥10	1200W
Midwall Split/Window mount Unit	24 000 BTU	Nominal 220V 50Hz single phase	≥10	2400W

Ratings of 5% variance of above mentioned values may be considered

Table: Standard air conditioners sizes and electrical requirements

2.2. Features of air conditioners

The air conditioner should have the following features as standard on the supplied air conditioners:

1. The air conditioners should have a minimum air flow rate design as follows:
 - a. 12000 BTU air – Air flow of minimum 600 m³/h (Window wall units 450 m³/h)

- b. 24000 BTU air – Air flow of minimum 1200 m³/h (Window wall units 800 m³/h)
 - c. 36000 BTU air – Air flow of minimum 1600 m³/h
 - d. Clip-ons - Air flow of minimum 1800 m³/h
- 2. The air conditioners should have air flow direction control in the following directions
 - a. Horizontal (manual or auto); and
 - b. Vertical (auto).
- 3. Must have close control on temperature, humidity and operation with other air conditioners
- 4. The air conditioner should be able to auto restart. When there is electricity failure the system shuts off. After restoration of the power, unit will start in the same set conditions prior to the power failure.
- 5. The air conditioner should have an onboard memory so that after mains restoration after mains failure the condition of on / off condition, operating mode (cooling/heating), set temperature and fan speed must be remembered.
- 6. The air conditioner should have an Automatic rotation on a time basis as well as be able to be controlled by an EAS as per paragraph 5.4.
- 7. The air conditioner should have a manual override/forced operation in case when the user needs the air conditioner to be switched on.
- 8. The air conditioner should be able to go in a sleep mode when power is been cut and be switched on again when power has been restored to the specific air conditioner as been controlled by the on-site controller.
- 9. The air conditioners should be able to dehumidification and or remove moisture from the air inside the required room and or container.
- 10. The air conditioner should be able to operate in the following outside ambient temperature range
 - a. At least up to 45 but preferably 50 degrees Celsius.
 - b. 12000 BTU air conditioners - At least up to 43 degrees Celsius
- 11. Auto defrosting feature should be available on the air conditioner by for example reducing outdoor fan speed when such an incident occurred.

12. Easy access and filter removal should be possible to enhance routine maintenance.
13. Piping length between the indoor and outdoor unit should be able to operate with a distance of at least 10m.
14. Temperature control – Air conditioners should be able to regulate the temperature in a room to a user selectable set value between 18 and 30 degrees Celsius.
15. Wireless remote control or panel mounted control should be supplied with the air conditioner.
16. Environment friendly refrigerant should be used. i.e R410A.
17. The air conditioners should have the following operations: Cooling- and fan functions. The requested air conditioner doesn't require heating function.
18. Must have free cooling mode as optional item and will be deployed as and where required.
19. Air conditioner should be equipped of anti-corrosion finish or coating for the outdoor units.
20. Air conditioner should have an auto cleaning function.
21. The window wall units should include a slide-out chassis for easy wall mounting.

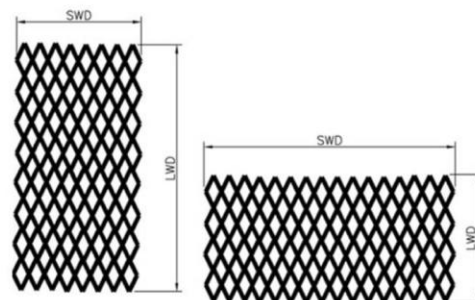
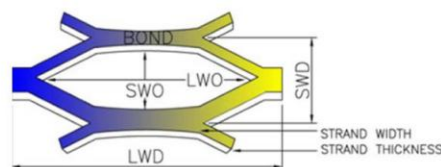
2.3. Dimensions

1. The typical maximum dimensions of the air conditioners units should be as follows (width x height x depth):
2. Midwall Split unit 12 000BTU: 900mm x 300mm x 210mm
3. Midwall Split unit 24 000BTU: 1110mm x 330mm x x 250mm
4. Midwall Split unit 32 000 - 48000 BTU: 1250mm x 400mm x 250mm
5. Window wall unit 12 000BTU: 600mm x 380mm x 720mm
6. Window wall unit 24 000BTU: 660mm x 428mm x 800mm
7. Clip-ons units: 1150mmx2200x850mm
8. Floor standing 60 000 BTU: ≤600mmx2000mmx600mm

Please note that all types and physical dimensions (indoor and outdoor) for the air conditioners should be confirmed with Broadband Infraco, prior ordering to take place. Air conditioners units may be installed in space constraints areas where specific dimensions may be required especially where replacement units and or expansions are required. In general air conditioners are installed in Broadband Infraco standard container design where up to three units are being installed

2.4. Vandal-proof cages

1. All new and or existing split unit air conditioners outdoor unit shall be fitted inside vandal cages (Existing sites may use existing vandal cages if condition is still acceptable and sizes adequate- else to be replaced with new vandal cages) to accommodate the newly proposed air conditioners.
2. Vandal cage which shall have sufficient space around the outdoor unit to allow air to pass over and out from the air conditioner un-obstructively with the following minimum requirements.
 - a. Galvanised expanded metal mesh – raised
 - b. LWD = 28mm, SWD=14mm, Width=4,5mm, Thickness = 2.5mm
 - c. Lockable with Mul-T-Lock G-Series
 - d. Sample prior manufacturing will be required.



2.5. EAS Controller

All air conditioners shall be able to be controlled by the EAS (SAM2) air conditioning control unit and shall be able to automatic start and switch-off after the appropriate signal from the EAS has been received (which is either when the temperature inside the container has reached a certain threshold value or when the mains power of the site has been interrupted and been restored). Currently Broadband Infracore has an extensive installed base of the SAM 2 controller.

2.6. Alarms/indicators

1. The air conditioner should have a self-diagnostic feature and be able to detect what is faulty with the air conditioners and indicate the required error code and or message accordingly.
2. Configurable alarm output signals to the EAS system will be an advantage.

2.7. Service intervals

1. The service intervals of the air conditioners shall be made available (in running hours and maximum months/years).
2. Part of the service interval schedule, the supplier shall indicate the service components and items to be serviced at various service intervals as well.
3. The supplier of the air conditioners should be able to do the required servicing and maintenance of the air conditioner at the required interval/s, the required service and maintenance components must be available, the same is applicable in case of breakdown.
4. The air conditioners require service at least twice in a year, this depends on the area of operation, the requirement of service might be more.
5. The supplier is required to provide a report after each service.

6. The scope of air conditioner maintenance includes but not limited to the following:

- Clean condenser coil
- Clean evaporator coil
- Clean drip tray and drainpipe
- Check operation of evaporator
- Check for operation of condenser fans
- Clean filters on evaporator (replace if necessary)
- Check all electrical connections, voltages, and currents.
- Check and record LP and HP pressures
- Clean condenser and evaporator coils.
- Test units cooling for correct operation
- Check the condition of Armaflex foam insulation
- Check for leaks on refrigerant lines and coils
- Adjust thermostat when necessary
- Check for harsh vibrations of the compressor and replace vibration material
- Check and ensure that the system is free of errors, if any, resolve the error.
- Check electrical connections
- Record compressor voltages and currents
- Check operation of the thermostat

2.8. Support

1. The air conditioner and spares must be locally available in South Africa and must be supported by any local company in all provinces.
2. The supplier of the equipment should also be prepared to do services on the air conditioner when the need arises in all provinces.

2.9. Warrantee

Warrantee of minimum 36 months is required for the air conditioner under normal operations. However the design life should be at least 5 years

2.10. Training

The supplier shall offer training to Infraco on request covering aspects like installation, maintenance and or fault finding.

2.11. Deliverables

The air conditioner must come with all relevant manuals, including required installation materials (excluding tubing and refrigerant), technical drawings and product specifications, supplied.

2.12. Maintenance

All maintenance items such as filters etc. must be easily accessible.

2.13. Installation and Delivery

1. The contractor shall delivery and install all air conditioners to site (except when advise otherwise).
2. All air conditioners must be fully configured on site after installation.
3. On existing sites, the current/existing air conditioners to be recovered and give it to the BBI regional personnel (or scrapped if air conditioner reached end of life) who will take it to their regional centre.
4. The proposed air conditioner brochure shall be supplied with the proposal from the supplier/contractor to allow BBI to confirm compliance to the BBI specification.
5. In case of split units, the indoor units shall be installed where possible with one in the front of the room and or container and one or two at the back.(Outdoor units not to be faced North). In all cases the position shall be confirmed with the BBI personal on site before work commence.
6. On existing sites - The new split unit air conditioners outdoor unit shall be fitted inside the current vandal cages (where possible) else to be replaced with new vandal cages to accommodate the newly proposed air conditioners. Vandal cage
7. The power feed from the new air conditioner shall be fed from the AC board with a suitable installed in the AC DB Board to the air conditioner.
8. The power cable shall be supplied and installed by the contractor.
9. The AC power feed shall be installed via the air control switch which will be supplied by BBI.

10. All work shall be compliant to NE-NT-SP0008 and NE-NT-SP0049.
11. The load should be split on the different phases to prevent any nuisance tripping. i.e. single phase air conditioners to be on separate phases.
12. All work shall be done according to SANS 10142-1.
13. A CoC shall be issued to BBI according to SANS 10142-1 after all work is completed (single point of disconnect is required for each air conditioner).
14. The supplier must issue the air con CoC after installation as per SARACCA requirements

Site survey, if required, can be arranged in all cases

2.14. Drawings

1. All suppliers must provide Broadband Infraco with a full set of the actual drawings and brochures.
Drawings and brochures must be supplied in both of the following formats:
2. Hard copy, A3 paper size
3. Electronic copy, in Portable Document Format (PDF) and / or compatible with Microsoft Visio Viewer.

2.15. Quality Assurance

1. The premises, facilities, procedures and Quality Assurance (QA) programmes of local manufacturers may be inspected and approved by Broadband Infraco prior to the commencement of local manufacture.
2. All equipment (and drawings) must be approved by Broadband Infraco before any final manufacturing and or delivery should take place.
3. A sample may be called for and inspected by Broadband Infraco during the tender evaluation process.