

**MATERIAL AND EQUIPMENT STANDARD****FOR****ROOM AIR CONDITIONERS****(WINDOW AND THRU-THE-WALL TYPE)****ORIGINAL EDITION****OCT. 1996**

This standard specification is reviewed and updated by the relevant technical committee on Dec. 2001(1) and Sep. 2005(2) and Oct. 2014(3). The approved modifications are included in the present issue of IPS.

**FOREWORD**

The Iranian Petroleum Standards (IPS) reflect the views of the Iranian Ministry of Petroleum and are intended for use in the oil and gas production facilities, oil refineries, chemical and petrochemical plants, gas handling and processing installations and other such facilities.

IPS is based on internationally acceptable standards and includes selections from the items stipulated in the referenced standards. They are also supplemented by additional requirements and/or modifications based on the experience acquired by the Iranian Petroleum Industry and the local market availability. The options which are not specified in the text of the standards are itemized in data sheet/s, so that, the user can select his appropriate preferences therein

The IPS standards are therefore expected to be sufficiently flexible so that the users can adapt these standards to their requirements. However, they may not cover every requirement of each project. For such cases, an addendum to IPS Standard shall be prepared by the user which elaborates the particular requirements of the user. This addendum together with the relevant IPS shall form the job specification for the specific project or work.

The IPS is reviewed and up-dated approximately every five years. Each standards are subject to amendment or withdrawal, if required, thus the latest edition of IPS shall be applicable

The users of IPS are therefore requested to send their views and comments, including any addendum prepared for particular cases to the following address. These comments and recommendations will be reviewed by the relevant technical committee and in case of approval will be incorporated in the next revision of the standard.

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**GENERAL DEFINITIONS:**

Throughout this Standard the following definitions shall apply.

**COMPANY:**

Refers to one of the related and/or affiliated companies of the Iranian Ministry of Petroleum such as National Iranian Oil Company, National Iranian Gas Company, National Petrochemical Company and National Iranian Oil Refinery And Distribution Company.

**PURCHASER:**

Means the "Company" where this standard is a part of direct purchaser order by the "Company", and the "Contractor" where this Standard is a part of contract documents.

**VENDOR AND SUPPLIER:**

Refers to firm or person who will supply and/or fabricate the equipment or material.

**CONTRACTOR:**

Refers to the persons, firm or company whose tender has been accepted by the company.

**EXECUTOR:**

Executor is the party which carries out all or part of construction and/or commissioning for the project.

**INSPECTOR:**

The Inspector referred to in this Standard is a person/persons or a body appointed in writing by the company for the inspection of fabrication and installation work.

**SHALL:**

Is used where a provision is mandatory.

**SHOULD:**

Is used where a provision is advisory only.

**WILL:**

Is normally used in connection with the action by the "Company" rather than by a contractor, supplier or vendor.

**MAY:**

Is used where a provision is completely discretionary.

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**0. INTRODUCTION**

For the purpose of this Standard, a room air conditioner is a factory-made encased assembly designed as a unit primarily to provide free delivery of conditioned air to an enclosed space, room, or zone. This equipment is intended for installation in a window, through a wall, or as a console located in or adjacent to the room, zone, or space to be conditioned. These units employ hermetic refrigerant motor-compressors with factory-charged refrigeration systems and include means for circulating air. They shall also have provision for heating and ventilation. A console or in-wall type room air conditioner may additionally serve a single adjacent room.

The terms "air conditioner" and "unit" are used interchangeably and refer to all room air conditioners or any part there of covered by this Standard unless specifically noted otherwise.

This Standard does not cover the following:

- Packaged terminal air conditioners and equipment intended for connection to duct system
- Split system direct expansion water or air cooled air conditioners
- Mobile portable and console type package air conditionings units

**1. SCOPE**

The general specification of this Standard covers the basic and minimum requirements for the design, materials fabrication, testing, inspection, painting, packing and shipment of self-contained window and thru-the-wall type air-cooled room air conditioners.

These requirements cover commercially available room air conditioners with rated cooling capacity from 2.637 to approx. 7KW (9000 to approx. 24000 Btu/h), designed to operate on power rating not more than 400 volts AC supply and intended for installation in accordance with the National Electrical Code, NFPA No 70 both for standard and high efficiency compressors.

For ease of evaluation this standard is divided into the following parts:

**Part I:** Material Specification for Room Air Conditioners

**Part II:** General Administrative and Procedural Requirements

**Part III:** Data Sheet

**Note 1:**

**This standard specification is reviewed and updated by the relevant technical committee on Dec. 2001. The approved modifications by T.C. were sent to IPS users as amendment No. 1 by circular No. 153 on Dec. 2001. These modifications are included in the present issue of IPS.**

**Note 2:**

**This standard specification is reviewed and updated by the relevant technical committee on Sep. 2005. The approved modifications by T.C. were sent to IPS users as amendment No. 2 by circular No. 266 on Sep. 2005. These modifications are included in the present issue of IPS.**

**Note 3:**

**This standard specification is reviewed and updated by the relevant technical committee on Oct. 2014. The approved modifications by T.C. were sent to IPS users as amendment No. 3 by circular No. 431 on Oct. 2014. These modifications are included in the present issue of IPS.**

**2. REFERENCES**

Throughout this Standard the following dated and undated standards/codes are referred to. These referenced documents shall, to the extent specified herein, form a part of this standard. For dated references, the edition cited applies. The applicability of changes in dated references that occur after the cited date shall be mutually agreed upon by the company and the vendor. For undated references, the latest edition of the referenced documents (including any supplements and amendments) applies.

**AHAM (ASSOCIATION OF HOME APPLIANCE MANUFACTURERS)**

AHAM RAC-1-2008 "Room Air Conditioners"

**ASHRAE (AMERICAN SOCIETY OF HEATING REFRIGERATING AND AIR CONDITIONING ENGINEERS, INC.)**

ANSI/ASHRAE 15 (Packaged W/34) "Safety Standard for Refrigeration Systems and Designation and Safety Classification of Refrigerants"

ANSI/ASHRAE 16 "Method of Testing for Rating Room Air Conditioners and Packaged Terminal Air Conditioners"

ANSI/ASHRAE 28 "Method of Testing Flow Capacity of Refrigerant Capillary Tubes"

**UL (UNDERWRITER'S LABORATORIES, INC.)**

UL 484 "Standard for Safety, Room Air Conditioners"

**BSI (BRITISH STANDARDS INSTITUTION)**

BS EN 14511-Part 3 "Air Conditioners, Liquid Chilling Packages and Heat Pumps with Eclectically Driven Compressors for Space Heating and Cooling - Part 3: Test Methods"

BS 4580 "Specification for Number Designation of Organic Refrigerants"

**NEMA (NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION)**

ANSI/NEMA FB 11 "Plugs, Receptacles, and Connectors of the Pin and Sleeve Type for Hazardous Locations"

**NFPA (NATIONAL FIRE PROTECTION ASSOCIATION)**

NFPA 70 "National Electrical Code"

NFPA 497 "Recommended Practice for the Classification of Flammable liquids Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas"

**IPS (IRANIAN PETROLEUM STANDARDS)**

[IPS-E-AR-120](#) "Engineering Standard for Building Air Conditioning Systems"

[IPS-E-GN-100](#) "Engineering Standard for Units"

### **3. DEFINITIONS AND TERMINOLOGY**

#### **3.1 Accessory**

An optional electrical device or other component intended for installation in or connection to a room air conditioner for the purpose of modifying or supplementing the functions of the room air conditioner. It may be factory installed or intended for installation by the user or service personnel.

#### **3.2 Barrier**

A partition for the insulation or isolation of electrical circuits or for isolation of electrical arcs or for isolation of moving parts or hot surfaces.

#### **3.3 Console-Type Room Air Conditioner**

An assembly designed for installation in or adjacent to the room, zone, or space to be conditioned. It may provide free air delivery or air distribution by means of collars, sleeves, or the like, having a single air inlet and single air discharge opening. Air-cooled units may be provided with collars or sleeves extending through a wall, floor, or roof for condenser air inlet and discharge.

### 3.4 Enclosure

That part of a room air conditioner which by itself or in conjunction with barriers:

- 1) Renders inaccessible all or any parts of the unit that may otherwise present risk of electric shock,
- 2) Reduces the risk of contact with parts which may cause injury to persons, and/or
- 3) Prevents propagation of flame initiated by electrical disturbances occurring within the unit.

### 3.5 Energy Efficiency Ratio (EER)

The EER designation compares the air conditioner's energy output with the electricity it requires for power. The EER figure is computed by dividing BTU/h by the required wattage. Higher the EER number the more efficient the unit and less costly to operate. EER is determined in accordance with Section 9.2.2.2 of this standard.

### 3.6 In-Wall or Thru-The-Wall Type Room Air Conditioner

An assembly designed for installation in and extending through a prepared wall opening

### 3.7 Modular Construction

A type of design used with in-wall and console room air conditioners which permits individual sections of the unit, such as the enclosure, cooling system, heater-blower assembly, and the like, to be shipped separately from the factory as needed at the point of installation.

### 3.8 Window-Type Room Air Conditioner

An assembly provided with mounting hardware designed for installation in a window.

## 4. UNITS

This Standard is based on International System of Units (SI), as per [IPS-E-GN-100](#) except where otherwise specified.

## 5. CONFLICTING REQUIREMENTS

In the case of conflict between documents relating to the inquiry or order, the following priority of documents shall apply:

- **First priority:** Purchase order (including attachments) and variations thereon.
- **Second priority:** Data requisition sheets and drawings.
- **Third priority:** This standard specification.

All conflicting requirements shall be referred to the company in writing. The Company will issue confirmation documents if needed for clarifications.



## PART I

## MATERIAL SPECIFICATION FOR ROOM AIR CONDITIONERS

## 6. MATERIAL SPECIFICATIONS FOR ROOM AIR CONDITIONERS

## 6.1 Classification

The following classifications shall apply to the room air conditioner mentioned in this Standard:

- a) Room air conditioners for cooling purposes only.
- b) Room air conditioners as heat pump including reverse cycle arrangement for heating (with or without electric resistance back-up heating).
- c) Room air conditioner including electric resistance elements for heating.
- d) Explosion-proof room air conditioners for hazardous areas both for cooling and/or cooling with electric heaters for heating.

**Note:**

**Supply voltage shall be per rating specified in the data sheet and the use of any kind of transformers shall not be acceptable.**

## 6.2 Mounting Methods

6.2.1 To adapt to building codes the following mounting methods shall be available for window or thru-the-wall installation as mentioned in the data sheet.

- a) **Inside Flush Mounting:** Interior face of conditioner is approximately flush with inside wall.
- b) **Balance Mounting:** Unit is approximately half inside and half outside the window.
- c) **Outside Flush Mounting:** Outer face of unit is flush or slightly beyond outside wall.
- d) **Special Mounting:** Includes casement windows, narrow double hung windows horizontal sliding windows, office windows with swinging units (or swinging windows) to permit window washing, and transoms over doorways.
- e) **Through-the-wall Mounts or Sleeves:** Used for installing window-type chassis, complete units, or consoles in walls of apartment buildings, hotels, motels, and residences.
- f) **Integral Chassis Mount:** With the outer cabinet fastened permanently to the chassis, where the electrical components can be serviced without removing the unit from the installation.
- g) **Slide-Out Chassis:** Allowing the outer cabinet to remain in place while the chassis is easily removed for service. It shall be available for window or thru-the-wall type units.

**6.2.2** The mounting method for explosion-proof units shall be designed for window or thru-the-wall installation to operate reliably in all kinds of hostile and severe environments.

**Notes:**

- 1) Window air conditioners may be available with expandable panel.**
- 2) Chassis shall be either fixed or removable type.**

### **6.3 General Specification**

**6.3.1** The general specification in this Standard shall cover the requirements of all kinds of air conditioners as classified in Clause 6.1. The specification for the explosion-proof types shall be based on description as specified in Clause 7 of this Standard.

**6.3.2** The standard components of the products shall comply with the requirements of that component in accordance with its recognized rating and other limitation of use conforming to Appendix A of UL 484 and/or ANSI/ASHRAE 16 or authoritative international bodies.

**6.3.3** The room air conditioners shall be suitable for operation with pure 50 Hz frequency without the necessity of deration factor. Units with 60 Hz shall be rejected outright.

**6.3.4** The refrigerant gas shall be based on safety requirements of ANSI/ASHRAE 15 (Packaged W/34).

**Note:**

**For load calculations the capacity ratings of the units shall be based on [IPS-E-AR-120](#) and/or AHAM cooling load guide ,square feet method, Bands A, B or C operating at required frequency and voltage and depending on room location and window exposure.**

### **6.4 Material Specification**

The room air conditioners shall be constructed compact with low profile per manufacturer's design suitable for quiet operation consisting the minimum requirements of the following components:

**a) Compressor:** It shall be hermetically sealed rotary or reciprocating compressors (rotary preferred), vertical or horizontal design (vertical preferred), protected against dust and moisture and mounted on vibration isolators. The compressors shall be permanently lubricated refrigerant cooled, fitted with suitable thermal overload device against breakdown and short-circuits. The compressor shall be available in single or dual voltage as specified, with allowance for up to 10% voltage fluctuation. The location of compressor shall be towards the outside wall. (The compressor manufacturers shall furnish when required, complete performance curves at various evaporating and condensing temperatures).

**b) Evaporator and condenser coil:** It shall be staggered design either tube-and-plate-fin variety or tube-and-spine-fin variety, featuring internally grooved copper tubing and mechanically bonded louvred aluminum fins. It shall be provided with generous surface area for maximum heat transfer and low moisture content. All coils shall be factory leak tested at least three times to ensure durability.

**c) Evaporator fan:** Single inlet forward curved centrifugal blower for supply air constructed of aluminum with provisions to promote smooth and quiet operation eliminating fan noise and vibration. The fan shall be located in an insulated air chamber.

**d) Condenser fan:** An axial or radial flow multi-blade "slinger ring" fan designed in one-piece polymeric-type plastic or metal to effectively cool the condenser coil even in high heat and humidity area.

**e) Fan motor:** The fan motor shall be totally enclosed permanently lubricated multi-speed split capacitor motor designed to operate together with a run capacitor.

**f) Cabinet:** Weather-resistant lightweight cabinet (with or without sleeve) coated either with polymeric or polycarbonate or zinc-clad steel type allowing for enhanced styling and eliminating corrosion. The cabinet shall be thermally insulated with odor-free fire-proof insulation material.

**g) Front panel:** It shall be plain or accordion style of walnut decorative or wood grain type or baked enamel finish, with adjustable air deflection through vertical or horizontal louvres for control of air flow in any required direction.

**h) Filters:** The filters shall be removable either for slide-out or pop-up, permanent washable and/or vacuum clean type, front mounted for easy access. The filters shall be foam or fiberglass type.

**i) Base pan:** Or baseplate shall be rugged one piece corrosion resistant epoxy-coated steel with steel outer case to resist the abuse of the elements and vibration. In slide-out chassis the base pan shall allow easy removal on window or thru-the-wall mount units. Necessary arrangement for condensate drain shall be made.

**j) Controls:** All controls shall be thumb touch or rotary type, hidden from view to provide a clean and contemporary appearance. The minimum requirements of the following components shall be inclusive, as specified in the data sheet.

- Three or two-speed fan control consisting of "Hi-Med-Low" and "Off" switch with "Fan Only" setting.
- Temperature control setting for choosing comfort level through adjustable built-in thermostat.
- Vent control (air-in, air-out) with settings for exhausting stale air and bringing in fresh air in simultaneous requirement.
- Necessary control provisions for heating by heat pump units or electric resistance heaters shall be made.

**k) Capillary tube:** Or restrictor tube shall be suitably sized for liquid line expansion device. The method of testing flow capacity refrigerant capillary tubes shall comply to ANSI/ASHRAE standard 28.

**l) Plug type:** The receptacles shall preferably be ANSI/ASHRAE FB 11 provided with either tandem or parallel arrangement.

**m) Installation kit:** All room air conditioners shall be furnished with suitable and simple to use installation kit.

## 6.5 Material Selection

Special advantages of the comparable units, for which preference shall be given (when specified) during selection of units, shall be as follows:

- a) Energy saver switch to allow fan run continuously or be set to cycle off when temperature is satisfied or the fan runs only when the compressor is on.
- b) Operation mode indicator light showing when the unit is running.
- c) Built-in easily-grip handles for easy handling of installation.
- d) Filter monitor provided with indicator signal as an alarm, for cleaning filter, when required.
- e) Supplemental electric resistance heater on heat pumps
- f) Air fragrance dispenser for freshening stale air (without cooling it), lasting up to minimum 200 hours.
- g) Time delay safety circuit to delay restart of the compressor when the unit is turned off.
- h) Drain kit for condensate disposal.
- i) Build-in sound reduction with one piece moulded sound partition as effective thermal insulation and sound isolators to prevent metal to metal contact.
- j) Interchangeability of window unit with thru-the-wall unit without any modification requirements on units.
- k) Remote control electronic panel displaying operating mode, fan speed, temperature and start and stop times. Audible signal shall sound to indicate commands have been accepted.

## 7. MATERIAL SPECIFICATIONS FOR EXPLOSION-PROOF ROOM AIR CONDITIONERS

### 7.1 General

The units shall be of slide-out chassis type, suitable for window or thru-the-wall installations. It shall be suitable for cooling and heating hazardous locations such as offshore living quarters and production platform, hazardous material storage, industrial control buildings and in analyzer shelters, where specific volatile liquids or flammable gases are handled or used within enclosed containers or systems conforming to NFPA 497.

### 7.2 Material Specification

**7.2.1** The compressor shall be high capacity with internal hermetically sealed overload and solid-state switch to prevent arcing.

**7.2.2** The unit shall be engineered for design requirements of NEC Article 500, Class 1, Groups B, C, D and/or Class II Groups E, F and G in Divisions 1 and 2.

**7.2.3** The blower shall be direct driven with stainless steel shaft to resist corrosion. The fan motor shall be totally enclosed with hermetically sealed overload and an electronic switch to prevent arcing. The fan blades of the condenser fan shall be spark-proof. The run capacitor shall be capable to withstand voltage overloads above 440 V.

**7.2.4** The heating system shall be by all electric means. The electric heaters shall be rated to NEC identification No. T2A, that is for use in areas where the ignition temperature of the hazardous material is at or above 280°C (536°F). The all electric components including the accessories to electric heaters shall be listed or recognized by UL, FM, CSA or authoritative international bodies. The wirings shall be fully enclosed in rigid conduit.

**7.2.5** An insulated solid state printed circuit board shall be provided with transient voltage suppressors to protect controls against transient voltage spikes.

**7.2.6** The front panel control shall have an adjustable built-in thermostat for temperature setting and adjustable air flow deflector of rigid construction for direction of air discharge. A dust-proof on-off switch and anti-corrosive plated contacts shall be provided with the thermostat. Contacts shall be in non-incentive circuits.

**7.2.7** Hot gas by-pass shall be provided for low ambient control to allow operation without freeze-up at outdoor temperatures as low as 5°C (41°F).

**7.2.8** As an option, the manufacturer shall have available full corrosion protection package and/or heavy duty cover housing in type 316 stainless steel material.

## **8. SAFETY CODES AND PROVISIONS**

**8.1** The National Electrical Code, and NFPA Standard covering room air conditioners shall meet the requirements of UL 484 and NFPA 497.

**8.2** The room air conditioners shall be equipped either with electronic relay or time delay fuses to protect the system against adverse voltage fluctuations.

**8.3** Safety Standard for Refrigeration Systems and Designation and Safety Classification of Refrigerants ANSI/ASHRAE 15 (Packaged W/34) or BS 4580 shall be referenced and applied wherever deemed essential.

### **Note:**

**Safety provisions as addressed by relevant codes of OSHA, NFPA, ISO, AHAM and relevant international bodies, wherever applicable, shall be applied to this Standard.**

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**PART II**  
**GENERAL ADMINISTRATIVE AND PROCEDURAL REQUIREMENTS**

**9. GENERAL REQUIREMENTS****9.1 Marking**

Each room air-conditioner shall have a nameplate firmly attached, in a location accessible for reading. The nameplate shall be marked in a permanent and legible manner with at least the following information:

- a) Manufacturer's name or trademark and fabrication date;
- b) Distinctive type or model designation and serial number;
- c) Rated voltage(s) phase and frequency;
- d) Rating and class of insulation (for compressor and fan);
- e) Purchase order and factory order number, an additional non-removable plate reserved for the purchaser shall be screwed to the unit engraved as follows:

**NIOC No. -----**

- f) Climate application types;
- g) Current input rating;
- h) Power input rating;
- i) Net total room-cooling and heating capacity;
- j) Refrigerant designation.

**9.2 Inspection/Quality Control and Quality Records****9.2.1 Inspection/quality control and test**

**9.2.1.1** The purchaser's inspector, or his authorized representative shall have free access to the manufacturing plant engaged in the manufacture of the equipment, to carry out necessary inspection at any stage of work.

**9.2.1.2** Approval by the purchaser's inspector or assigned representative shall not relieve the vendor of his commitments under the terms of this specification or any associated order.

**9.2.1.3** The supplier shall make available technical data, test facilities and samples that the purchaser's representative may require for verification in conjunction with pertinent equipment.

**9.2.1.4** The equipment shall be replaced if measurement, data and inspection reveal any discrepancies between quoted figures resulting in purchase order and those measured actually.

**9.2.1.5** Test certificates and test reports shall refer to the serial number of the equipment tested and bear the purchaser's name, order number and manufacturer's name and seal.

**9.2.1.6** The supplier shall maintain appropriate inspection and test records to substantiate conformance with specified requirements.

**9.2.2 Performance test**

**9.2.2.1** For performance of room air conditioners, results of tests as specified by AHAM Standard RAC-1-2008 shall be furnished to the company.

**9.2.2.2** The efficiency test of the room air conditioners shall be calculated by either of the following two forms:

1. Energy efficiency ratio (EER-generally for cooling)

$$\frac{\text{capacity in Btu / h}}{\text{input in watts}} \quad \text{or} \quad \left( \frac{\text{capacity in watts}}{\text{input in watts}} \right)$$

2. Coefficient of performance (COP-generally for heating)

$$\frac{\text{capacity in Btu / h}}{\text{input in watts} \times 3.413} \quad \text{or} \quad \left( \frac{\text{capacity in watts}}{\text{input in watts}} \right)$$

**9.2.2.3** Recorded data for cooling capacity tests shall be performed per Table 2 of ANSI/ASHRAE standard 16.

**9.3 Packing and Shipment**

**9.3.1 Damage prevention**

All resilient mounted components such as motors compressors, etc., to be secured by wedges of suitable clamps before packing, to prevent excessive movement and consequential damage during transit.

**9.3.2 Unit protection**

The units shall be suitably placed for export and protected against all damages or defects which may occur during handling, sea shipment to the port and rough road haulage to site and extended tropical open air storage, generally as per purchaser's general conditions of purchase.

**9.4 Vendor's Documentation/Literature**

**9.4.1 At quotation stage**

Suppliers shall provide the following in the numbers requested at the time of quotation:

- a) Descriptive drawings and literature shall be in accordance with the AHAM test conditions A & B, or in accordance with BS EN 14511 Part 2, the former preferred.

**AHAM RAC 1 TEST CONDITION "A"**

outside:	50°C	(122°F)	D.B.
	29.5°C	(85°F)	W.B.
inside:	26.7°C	(80°F)	D.B.
	19.5°C	(67°F)	W.B.

**AHAM RAC 1 TEST CONDITION "B"**

outside:	35°C	(95°F)	D.B.
	29.5°C	(85°F)	W.B.
inside:	26.7°C	(80°F)	D.B.
	19.5°C	(67°F)	W.B.

**BS EN 14511 APPLICATION RATING CONDITIONS**

outside:	46°C	(115°F)	D.B.
	24°C	(75°F)	W.B.
inside:	29°C	(85°F)	D.B.
	19.5°C	(67°F)	W.B.

**BS EN 14511 STANDARD RATING CONDITIONS**

outside:	35°C	(95°F)	D.B.
	24°C	(75°F)	W.B.
inside:	26.7°C	(80°F)	D.B.
	19.5°C	(67°F)	W.B.

**b)** The following datas shall be provided for each air conditioners:

- guaranteed net cooling and heating capacity (W)
- net humidifying capacity (Litres/hr)
- airflow-evaporator (each speed) (m<sup>3</sup>/min.)
- airflow-condenser (m<sup>3</sup>/min.)
- power developed (kW)
- power consumption (W)
- power factor (%)
- full load current (Amps)
- max. start current (Amps)
- overall dimension, unpacked and packed (mm)
- weight unpacked and packed (Kg)

**9.4.2 At ordering stage**

Suppliers shall provide the following in quantities and at times as detailed on the order.

- a)** List of recommended spares for three year's continuous operation.
- b)** Details of mounting kit required for installation.
- c)** Illustrated comprehensive spare parts manual with blow-up (explosive view) layout and part numbers suitable for warehouse stocking.
- d)** Illustrated installation and operating instructions.
- e)** Maintenance manuals.
- f)** Test certificates per specified conditions.



**Note:**

**All proprietary items shall be clearly identified.**

**9.5 Warranties**

The warranty period of the air conditioner shall begin from the date of shipment and the protection period shall extend the minimum requirements of the following:

**9.5.1 Full one-year warranty**

Supply of parts, repair and replacements of any section of air conditioners which may fail due to manufacturing malfunction.

**9.5.2 Five-year warranty**

During the second through the fifth year, the supply of parts, repair and replacement of any section in the sealed refrigerating system (including the compressor assembly, condenser, evaporator or cooling coils and the interconnecting tubings) which may fail due to manufacturing defects.

**9.5.3 Three-year warranty**

The explosion-proof air conditioners shall cover similar requirements of Clause 9.5.2 but for full three years.

**9.5.4** The above warranties shall be honored and executed either by the manufacturer, its assigned representative or its authorized dealer in Iran.

**9.6 Guarantees**

**9.6.1** All equipment and component parts shall be guaranteed by vendor against defective material design and workmanship when operated under normal condition for 12 months after being placed in specified service but not exceeding 18 months after date of shipment. If any mal-performance or defects occur during the guarantee period, vendor shall make available repaired, altered or replacement parts free of any charges whatsoever, direct on the purchaser's job site.

Vendor shall make available free of charge qualified representative as it deems necessary to supervise the removal, repair and replacement of the defective parts in such a manner that the guarantee be maintained. Guarantee period for repaired or replaced parts shall be 12 months after start up of repaired equipment but not more than 18 months after the repaired parts and or equipment are shipped.

**9.6.2** If defects are found and vendor is not in position to take necessary action and perform the repairs, within the time required by purchaser and agreed upon according to purchaser requirements, purchaser shall have such modification and repairs made and the relevant expense will be charged to vendor.

**9.6.3** It is understood that in this instance vendor shall not be relieved of his guarantee contract obligations. Furthermore vendor shall guarantee the provision of spare parts for a minimum period of 10 year from the date of dispatch of the materials and/or equipment.

**9.7 After Sale Technical Services****9.7.1 Commissioning**

**9.7.1.1** The supplier shall quote if required for the services of competent engineer(s) and or technician(s) to assist in installation, commissioning and test-run of the equipment at site on a per diem basis.

**9.7.1.2** The quoted rates shall be irrespective of duration and frequency and the supplier shall guarantee the services of the engineer(s) and technician(s) on the specified date within a minimum of four weeks advance notice by the purchaser.

**9.8 Spare Parts**

**9.8.1** The spare parts shall comply with specification and tests of the original equipment and shall be fully interchangeable with the original parts without requiring modification at site.

**9.8.2** Spare parts shall be preserved to prevent deterioration during shipment and storage in tropical climate.

**9.9 Coordination Responsibility with Others**

**9.9.1** In case the equipment ordered should be mounted on, aligned, connected, adjusted, or tested with the equipment of other manufacturer(s), the supplier shall coordinate with the participating manufacturer(s) and obtain all dimensional and technical information allowing for any interconnecting equipment and tests that may be required.

**9.9.2** The supplier shall be responsible for correct and timely communication with the participating manufacturer(s) and for any delay and/or cost claims arising from such communications.

**9.9.3** Copies of all correspondence, including those with sub-vendors, shall be furnished to the purchaser.

**9.10 Languages**

All correspondence, submittals, layouts, documents, certificates including testing procedures and edited specifications shall be submitted in English and/or Persian language.

**PART III  
DATA SHEETS**

**10. DATA SHEETS**

**10.1 Site Conditions**

- a) Operating Conditions:** The equipment must be suitable for operation in a tropical climate under arduous and dusty condition with a maximum dry bulb temperature of 50°C (122°F) and wet bulb temperature of 27°C (80°F) to 29.5°C (85°F), and a maximum sun temperature of 82°C (180°F).
- b) Power Supply to Equipment:** 380 Volt, 3 phase, 50 Hz. (±10%) or 220 Volt, single phase, 50 Hz. (±5% to ±10%)
- c) Electric Motors:** Electrical motor shall be rated as necessary for operation in a 50°C ambient temperature. Class F or IP54 insulation should preferably be used.

**10.2 Room Air Conditioner Data Sheet**

**a) General**

Customer .....Location .....

Order No. ....Customer .....Factory.....

Manufacturer .....Model No..... Serial No.....

Qty. .... Refrigerant.....

Noise Criteria .....dB .....Scale.....

Unit Type .....Fabrication Date .....

Unit Mount ..... Window ..... Thru-the-wall .....

Chassis ..... Slide-out..... Fixed... ..

Explosion-Proof .....NEC Group.....NEC Division.....

**b) Performance Data**

**- Cooling:**

Capacity W (Btu/h)..... EER,.....

Air delivery m<sup>3</sup>/h (cfm)..... Air throw m(ft).....

Dehumidification, L/hr ..... Pints/hr .....

Fan-speed..... 3-speed ..... others

Air flow deflector .... 4-way ..... others

**- Reverse Cycle (Heating):**

Capacity kW (Btu/h) ..... COP,.....

Fan speed ..... 2-speed ..... others

**- Electric Heating:**

Heater capacity, watts ..... Amps.....  
Type ..... Elements .....Strip

**c) General Description**

Compressor .....Type ..... Hp..... RPM  
Fan type ..... Evaporator ..... Condenser  
Fan Motor RPM .....Evaporator ..... Condenser  
Coil type .....Evaporator .....Condenser  
Fin type ..... Aluminum ..... Copper  
Air change ..... Ventilation .....Exhaust  
Room Air Outlet ..... Top .....Front .....Side  
Motor Insulation ..... Compressor .....FAN  
Salient Features .....  
.....

**d) Electrical**

Elect. Characteristics .....V ..... ph.....Hz  
Plug type (Receptacle) .....Parallel .....Tandem  
Fuse Size, Amps ..... Power Cord length, m(ft) .....  
Absorbed power.....Compressor ..... Fan

**e) Dimensions & Shipping**

Chassis size, mm (in) .....H ..... W..... Depth  
Cabinet Dimension mm (in) .....H.....W.....Depth (W/front)  
Weight, kg (lbs) ..... Net ..... Shipping

**Notes:**

- 1) Items not filled shall be completed by the manufacturer.
- 2) The customer shall provide where required, data on maximum wall thickness for thru-the-wall units, and minimum width and height of window opening for the sliding and casement mount units.