MATERIAL AND EQUIPMENT STANDARD

FOR

PACKAGED AIR CONDITIONERS

ORIGINAL EDITON

MAR. ۱۹۹۳

This standard specification is reviewed and updated by the relevant technical committee on June ۱۹۹۸(۱) and June ۲۰۰۳(۲). The approved modifications are included in the present issue of IPS.

CONTENTS : PAGE No.

۱. SCOPE

This Standard Specification covers the basic and minimum requirements for the design, materials, fabrication, testing, inspection, painting, packing and shipment of packaged air conditioning units.

Field erected central air conditioning units are not covered by this Standard.

Note ۱:

This standard specification is reviewed and updated by the relevant technical committee on June ۱۹۹۸. The approved modifications by T.C. were sent to IPS users as amendment No. ۱ by circular No ۶۸ on June ۱۹۹۸. These modifications are included in the present issue of IPS.

Note ۲:

This standard specification is reviewed and updated by the relevant technical committee on June ۲۰۰۳. The approved modifications by T.C. were sent to IPS users as amendment No. ۲ by circular No ۲۱۱ on June ۲۰۰۳. These modifications are included in the present issue of IPS.

۲. REFERENCES

Throughout this Standard the following standards and codes are referred to. The edition of these standards and codes that are in effect at the time of publication of this Standard shall. to the extent specified herein, form a part of this Standard. The applicability of changes in standards and codes that occur after the date of this Standard shall be mutually agreed upon by the Company and the Vendor.

ANSI/AHAM **(AMERICAN NATIONAL STANDARDS INSTITUTE/AMERICAN HOME APPLIANCES MANUFACTURERS)**

RAC-۱	"Room Air Conditioners -۱۹۸۲"

ANSI/UL **(AMERICAN NATIONAL STANDARDS INSTITUTE/UNDERWRITERS LABORATORIES)**

UL ٤٦٥	"Standard for Central Cooling Air Conditioners"
UL ٤٨٤	"Standard for Room Air Conditioners"

IEC/ANSI **(INTERNATIONAL ELECTRONIQUE COMMISSION/AMERICAN NATIONAL STANDARDS INSTITUTE)**

IEC ۳۷۸	"Safety Requirements for the Electrical Equipment Room Air Conditioners"

ASHRAE **(AMERICAN SOCIETY OF HEATING, REFREGRERATION AND AIR-CONDITIONING ENGINEERS)**

٥٨-۱۹۸٦	"Method of Testing for Rating Room Air Conditioners and Packaged Terminal Air Conditioners Heating Capacity"
٥٨ ASHRAM-۱۹۹٥	“Method of Testing for Rating Seasonal Efficiency of Unitary Air Conditioners and Chat Pumps”

۱٦-۱۹۸۳	"Method of Testing for Rating Room Air Conditioners and Packaged Terminal Air Conditioners"
۳۷-۷۸	"Method of Testing for Rating Unitary Air Conditioning and Heat Pump Equipment"
۱۱٦-۱۹۸۳	"Methods of Testing for Seasonal Efficiency of Unitary Air Conditioners and Heat Pumps"
	"Equipment-۱۹۸۳"

ARI (AMERICAN REFRIGERATION INSTITUTE)

۲۱۰/۲٤۰ (۱۹۹٤)	"Unitary Air Conditioning and Air Source Heat Pump Equipment"
۲۷۰	"Sound Rating of Outdoor Unitary Equipment"
۲۷٥ (۱۹۹۷)	"Application of Sound Rating Levels of Outdoor Unitary Equipment"
۳٦۰ (۲۰۰۰)	"Commercial and Industrial Unitary Air Conditioning and Heat Pump Equipment"
۳۱۰	"Standard for Packaged Terminal Air Conditioners and Heat Pumps"
۳۲۰ (۱۹۹۸)	"Water Source Heat Pumps"
۳٤۰ (۲۰۰۰)	"Commercial and Industrial Unitary Air Conditioning and Heat Pump Equipment"

ANSI/ARI

۳۱۰	"Packaged Terminal Air Conditioners"

IPS (IRANIAN PETROLEUM STANDARDS)

IPS-E-TP-۱۰۰	"Engineering Standard for Paints"

۳. DEFINITIONS AND TERMINOLOGY

The terms used in this Standard are defined as follows:

Air-conditioning unit

A piece of equipment designed as a specific air treating combination, consisting of a means for ventilation, air circulation, air cleaning and heat transfer, with a control mean for maintaining temperature and humidity within prescribed limits.

Capacity, refrigerating

The ability of a refrigerating system or part thereof, to remove heat, expressed as a rate of heat removal. It is usually measured in tons or kW.

Charge

The amount of refrigerants in a system.

Coil

Cooling or heating element made of pipe or tube that may or may not be finned, formed into helical or serpentine shape.

Compressor, hermetic

A refrigerant compressor consisting of a compressor and a motor, both of which are contained in the same sealed housing, with no external shaft or shaft seal, the motor operating in the refrigerant atmosphere.

Compressor, semi-hermetic (accessible-hermetic)

A hermetic Compressor whose housing is sealed by one or more gasketed joints and is provided with means of access for servicing internal parts in the field.

Condenser

A heat transfer device which receives high pressure vapor at temperatures above that of the cooling mediums such as air or water, to which the condenser passes latent heat from the refrigerant, causing the refrigerant vapor to liquefy.

Defrosting

Removal of accumulated ice from the cooling unit.

Dehumidify

To remove water vapor from the atmosphere. To remove water or liquid from stored goods.

Direct expansion (DX)

A system in which the evaporator is located in the material or space refrigerated or in the air circulating passages communicating with such space.

Drier (dehydrator)

A device used to remove moisture from the refrigerant.

Expansion valve, thermostatic

A device to regulate the flow of refrigerant into an evaporator so as to maintain an evaporation temperature in a definite relationship to the temperature of a thermostatic bulb.

Humidifier

A device used to add moisture to the air.

Liquid receiver

That part of the condensing unit that stores the liquid refrigerant.

Load

Amount of heat per unit time imposed on a refrigeration system by the required rate of heat removal as per specification in data sheet.

Refrigerant

The medium of heat transfer in a refrigerating system which picks up heat by evaporating at a low temperature and gives up heat by condensing at a higher temperature.

Refrigeration oil

A stable fluid which is compatible with system components, will form a friction reducing film between rubbing surfaces, seal critical clearances and has low temperature properties suitable for the application.

Ton of refrigeration

Useful refrigerating effect equal to ۳۵۱۷W (۱۲۰۰۰ Btu/h).

٤. UNITS

International system of units (SI) in accordance with IPS-E-GN-۱۰۰ shall be used.

٥. 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 and variations thereto.
- Second priority : data sheets and drawings.
- Third priority : this Standard Specification.

٦. CLASSIFICATIONS

The following classifications apply to the packaged air conditioners:

a) Unit employing compressor, indoor air coil (with boiler) and outdoor coil (with fan) in a single package assembly

b) Unit employing compressor and indoor coil (with blower) in one assembly and remote outdoor condenser coil (with fan) in another assembly

c) Unitary heat pumps for

Note: For a), b) and c) see attachments A and B.

٧. General Service Conditions

The equipment (including auxiliaries) covered by this Standard shall be suitable for the specified operating conditions and shall be designed and constructed for at least ۲۵۰۰۰ hours of uninterrupted continuous service.

٧,١ Cabinet

٧,١,١ The cabinet shall be constructed of heavy gage galvanized and finished steel, baked enamel with synthetic resin paint, with suitable air circulation and discharge grilles for different unit types. The service panels shall be easily removable for service access to the electrical components, evaporator, condenser, compressor and fans. There shall be provision for draining base pan through a drain connection.

٧,١,٢ Cabinets shall be completely storm and weatherproofed suitable for outdoor installations.

٧,١,٣ Cabinets shall be thermally and acoustically insulated with odor free fireproof insulating materials.

٧,١,٤ The cabinet's base shall be heavy gaged zinc coated steel and all internal dividers shall be galvanized steel.

٧,٢ Compressor

٧,٢,١ Compressor type

The compressor shall be a multi-cylinder, hermetic or serviceable, semi-hermetic reciprocating type.

٧,٢,٢ Compressor mounting

The compressor shall be mounted on vibration free isolators.

٧,٢,٣ Compressor motor protection

Compressor motor shall be protected against overload, breakdown and short cycling.

٧,٢,٤ Crank case heater

The compressor shall be equipped with a ٢٢٠ Volt crank case heater (wherever required).

٧,٢.٥ Compressor protection

The compressor shall be equipped with electrical or pressure actuated unloader and oil sight glass (wherever applicable).

٧,٢,٦ Compressor motor

Start up current not more than ٤ times the full load steady current and problem free operation within A ±١٠٪ rated voltage fluctuation range. The insulation class and protection shall be as specified in data sheet.

٧,٢,٧ Built in transformer

Should the voltage rating of the equipment be other than as specified in data sheet, a transformer though not preferred, must be built into the equipment and not supplied as a separate item.

٧,٣ Evaporator

٧,٣,١ Evaporator coil shall be fabricated with oxygen free seamless copper tubes with mechanically

bonded aluminum fins (serviceable).

٧,٣,٢ Evaporator coil shall be cleaned, dehydrated and tested for leakage at the factory.

٧,٣,٣ To prevent freeze up on evaporator a suitable defrost package shall be provided (where applicable).

٧,٤ Indoor Coils (for Heat Pumps)

٧,٤,١ The indoor coil shall be multi-pass tube or similar with highly efficient aluminum fins mechanically bonded to seamless oxygen free copper tubes.

٧,٤,٢ Clause (٧,٤,٢) applies to indoor coils.

٧,٥ Evaporator Fan

٧,٥,١ Fan type

Evaporator fan shall be forward curved multi blade centrifugal type (squirrel cage).

٧,٥,٢ Fan design

The fan shall be capable of handling large volumes of air at low speed and quietly, through top or horizontal discharge airflow, on vertical or horizontal unit configuration.

٧,٥,٣ Drive mechanism

Fan shall be statically and dynamically balanced, direct drive or properly guarded adjustable V-BELT drive by totally enclosed resilient mounted motor. The fan shaft and motor bearings shall be sealed type for life lubricated.

٧,٥,٤ Fan motor

For effective environmental control the manufacturer shall furnish preferably three speed fan motor i.e. LO-MED-HI. speeds.

٧,٥,٥ Permissible voltage fluctuation for fan motors shall be ±١٠٪ of rated voltage. Mechanical protection and insulation class as specified in data sheet.

٧,٦ Condenser (Air Cooled)

٧,٦,١ The condenser shall be multi pass cross finned or similar type with aluminum fins mechanically bonded to the seamless oxygen free inner grooved copper tubes.

٧,٦,٢ The coil shall be cleaned dehydrated and tested for leakage at the factory.

٧,٦,٣ Where specified, copper fins, instead of aluminum fins, shall be provided.

٧,٧ Condenser (Water Cooled)

٧,٧,١ The condenser shall be shell and tube type with removable steel heads.

٧,٧,٢ The waterside of the condenser shall be cleaned and hydrostatically tested with water, the

minimum hydrostatic test pressure shall be ١,٥ times the design pressure.

٧,٧,٣ Exchange surfaces of condensers shall allow for a ٠,٠٠٠١ m^2h°C/Kcal fouling factor.

٧,٧,٤ The refrigerant side of the condenser shall be cleaned, dehydrated and tested for leaks.

٧,٨ Water Side Heat Exchanger (for Heat Pumps)

All clauses of section ٧,٨ are also applicable to this section.

٧,٨,١ Double tube heat exchangers are also an acceptable option.

٧,٨,٢ The auxiliary heating source shall be supplied by other manufacturers.

٧,٩ Air Cooled Condenser Fan & Motor

٧,٩,١ The fans shall be propeller type dynamically and statically balanced, directly driven for horizontal or up flow air discharge. Fan shaft shall be corrosion protected.

٧,٩,٢ The fan motor shall be totally enclosed, fan cooled with mechanical protection and insulation class as specified in data sheet and lifetime lubricated ball bearings. All motors shall be resiliently mounted with built in overload protection and problem free operation within ±١٠٪ rated voltage fluctuation range.

٧,١٠ Refrigerants

One of the two types of refrigerants shall be used in packaged air conditioners.

a) A-ozone friendly refrigerant shall be used

b) Mono chloro-difluoromethane, called F٢٢ or R٢٢.

٧,١١ Refrigeration Circuit

٧,١١,١ Refrigeration circuit for room & unitary air conditioners shall include necessary solenoid valve, expansion valve, filter drier, moisture indicator, sight glass and gage ports.

٧,١١,٢ Refrigeration circuit for heat pumps shall include reversing valve, filter drier, moisture indicator, sight glass and gage ports on suction and discharge of compressor.

٧,١٢ Electric Heater

Multi stage electric resistance heater shall be provided as unit or duct mount for control of cooling (for latent load) and supply of warm dehumidified air when needed.

٧,١٣ Humidifier

Shall be wall, duct unit or space mounted provided with electronic controls for ±٥٪ indoor "R.H." conditions, type of humidifiers shall be either steam jet, steam grid, pan type electric with float valve or evaporative humidifier or electrode humidifier complete with humidstat, to maintain selected humidity.

٧,١٤ Air Filters

Depending on the job specification, either of the two types of filters shall be provided:

a) Washable.

b) Disposable.

۷,۱٤,۱ Washable filters

Shall be viscous impingement panel type, synthetic resin bonded fibre, mounted in a rigid withdrawable frame with initial resistance of ۲۵ Pa or less at ۲,۵ m/s face velocity and maximum final resistance of ۱۳۰ pa and have an average arrestance of ۸۰٪ and dust spot efficiency of ۵ to ۱۵٪ conforming to ASHRAE Standard ۵۲-۷٦.

۷,۱٤,۲ Disposable filters

Shall be of the following types.

۷,۱٤,۲,۱ Low efficiency filters

Filter media shall be pleated fibreglass, ۲۵-۵۰ mm thick, with average arrestance and efficiency similar to washable type.

۷,۱٤,۲,۲ Medium efficiency filters

Filters shall be ۲۵-۵۰ mm thick, with efficiency of ۲۵ to ۳۰٪ when tested under ASHRAE test standard ۵۲-۷٦, with arrestance of ۹۰ to ۹۲٪ by the same standard. Initial resistance at ۲,۵ m/s face velocity shall not exceed ۱۳۰ pa for ۲۵ mm thickness and ٦۲ pa for ۵۰ mm thickness.

۷,۱٤,۲,۳ High efficiency filter

a) Filters shall be ۳۰ cm thick, throw away type with efficiency of ۹۰ to ۹۵٪ when tested under the ASHRAE test standard ۵۲-۷٦ and shall have an arrestance of greater than ۹۵٪ under this Standard.

b) Filter media shall be high-density microfine glass fibers laminated to nonwoven synthetic backing.

c) Media support grid shall be welded wire grid bonded to the filter media.

d) Enclosing frame shall be galvanized steel with the filter pack bonded to the frame to prevent air leaks.

e) High efficiency filters shall be provided with medium efficiency prefilters to prolong the life of the main filter. Prefilter shall have approximately ۳۰٪ efficiency.

f) Filter housing shall be provided to match the filters and to provide for sealing the filters in place to prevent air bypass.

g) Side access housings shall be provided with locking gasketed doors on both sides and shall have extruded aluminum rails to hold the main filters and the prefilters.

h) Static pressure loss through the high efficiency filters shall not exceed ۱٦۱ Pa at a face velocity of ۲,۵ m/s. Final resistance of a dirty filter shall be as high as ۳۷۲ Pa.

۷,۱۵ Controls

۷,۱۵,۱ Control panel shall be electric or solid state type to be unit mount, complete with, but not limited to, switches for cooling, heating and fan operation, indicator lights, ventilation control knob, manual and automatic sequencing, compressor protection such as temperature, over current, short cycle and head pressure protection, internal labeled wiring connection and other safety components required per NEC code, factory wired, assembled and tested in a weather proof, NEMA rated enclosure. Unit shall be capable for remote control field wiring. The panel shall be equipped with

electronic relay to protect the system against adverse voltage fluctuations.

۷,۱۵,۲ Defrost controls where applicable, defrosting shall be initiated and controlled with the combination of an electronic time counter and a thermistor thermostat.

۷,۱۵,۳ Where applicable, the freeze preventive operation circuit for the field supplied water pump (water supplied by others) shall be provided in the unit and controlled with a thermistor thermostat.

۷,۱۵,٤ The temperature of refrigeration oil in the compressor shall be controlled with a crankcase heater thermostat.

۷,۱۵,٥ For heat pumps the changes of operation from heating operation to cooling operation and vice versa shall be performed by the activation of a four way valve.

۷,۱٦ Site Conditions

۷,۱٦,۱ Wherever applicable, the manufacturer shall apply necessary correction and deration factors to meet site conditions.

۷,۱٦,۲ Manufacturer shall be advised, at the time of delivery of hazardous locations (class I & II) and special site conditions wherever supply of copper fins (in lieu of aluminum fins), supply of storm and weatherproof control panel, supply of corrosion resistant products, supply of explosion proof encapsulated motors shall be considered.

۷,۱٦,۳ The manufacturer shall clearly specify the accessories required for field erection duly supported by pertinent drawings.

۷,۱٦,٤ Manufacturer shall be advised of any exceptions, additions and deviations required on the specification per job demand.

۸. INSPECTION AND TESTS

۸,۱ Inspection

The purchaser or his nominee shall have free access to the manufacturing plant engaged in the construction of the equipment, to carry out the necessary inspections at any stage of fabrication. Such inspections in no way shall relieve the supplier of his responsibilities.

۸,۲ Reject Causes

The equipment will be rejected if measurements and inspection reveal any discrepancies between quoted figures resulting in purchase order and those measured actually.

۸,۳ Tests

The unit and its components shall be actually tested under load and environmental (as specified in data sheet) conditions and as required by the relevant standards, all dimensional,operational and limit checks shall be carried out and verified.

The following tests shall be carried out:

a) All mechanical equipment and instrumentation shall be factory tested and test certificates supplied with the units.

b) After installation performance tests shall be carried out on each installation to verify the heating, cooling and air change requirements. Should the performance and noise level not meet the requirements of this standard, the supplier shall at no extra cost replace or rectify the installation or parts thereof to meet all clauses of this specification and to the satisfaction of the purchaser appointed supervisory engineer.

The test procedure as proposed by the supplier should be agreed and approved by the purchaser before tests are carried out. Purchaser may require witnessed tests to be carried out in the presence of its nominated representive who should beinformed at least ٤ weeks in advance of the date of the tests and confirmed ١٠ days before the test. All the test equipment, labor, consumables and other expenses shall be provided by the supplier at no extra cost to the purchaser.

Test certificates should refer to the serial number of the equipment tested and must bear the purchaser's name and manufacturer's name seal. The certificate should be approved by the purchaser before shipment instructions are given.

٩. LABELING AND PAINTING

٩,١ Labeling

All units on order shall be suitably labeled with engraved stainless or non corrosive alloy name plate, showing datas as called for in the relevant standards and order including the followings:

- Manufacturer's name.
- Type, size and serial number.
- Power supply characteristics.
- Input/output characteristics.
- Rating and class of insulation.
- Purchase order number and date tag number.
- Area classification.

The nameplate shall be fixed in an easily visible and non removable part of the frame.

A second plate ٢٠ x ٧٠ mm reserved for purchaser shall be screwed to the unit engraved as following:

For example:

+ N.I.O.C. No..... +

٩.٢ Painting

The equipment shall be painted with two layers of antirust undercoat and one final layer of paint suitable for the specified environment. The color of final layer shall be:

As per manufacturer standards

AS per IPS-E-TP-١٠٠:١٣٦٩(٠)

All unpainted surfaces (inside or outside) shall be adequately protected with suitable antirust compound, easily removable by hydrocarbon solvents or galvanized finish.

١٠. VENDOR'S DATA

١٠,١ Drawings and Data

The supplier shall provide the purchaser the drawings and data in English, at no extra cost to the purchaser.

١٠,٢ Documentation

٤ sets of the following documentations shall be furnished with quotation:

a) Comprehensive catalogs, technical data, outline drawings, derating curves, proposed

test procedure, service facilities, etc. of the equipment offered and its various components.

b) Preliminary connection and wiring diagrams, dimensional and cross sectional drawings.

c) Declaration of confirmation with the set standard and/or clear indication of deviations from the standards and specifications with copies of non-specified standards adhered to by manufacturer.

d) Recommended spare parts for ٣ years of operation.

e) Price list of spare parts.

f) Reference list showing the successful continuous operation for at least three years and the location of the equipment offered, in major oil or pipe line company installations.

١٠,٣ Order

Immediately following the placing of order (not later than ٥٠ days) ٥ sets of the followings shall be submitted:

a) Piping, wiring and dimensional outline drawings and foundation plans, specially giving size, location and rates (such as flow, pressure, voltages, power consumption, etc.) of various connections to the outside equipment and recommended installation details.

b) Proposed tests procedure for purchaser's approval.

c) Reproducibles (١ set only) of above mentioned drawings after approval, duly certified by the supplier. No dimensional changes will be allowed after approval.

d) Maintenance and operation instructions.

١١. PURCHASER'S DATA

The purchaser's comments or approval shall be given within ٦ weeks of the receipt of the relevant documents.

١١,١ Data Sheet

The purchaser's data sheet (see Attachment C) shall be completed as far as possible and shall be part of purchaser's inquiry specification.

١٢. INSURANCE

١٢,١ Supplier shall be advised of any insurance facilities & rates in cases where the safety of the units to be shipped or boarded deemed essential.

١٣. PACKING AND SHIPMENT

١٣,١ The units shall be suitably packed 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.

١٤. GUARANTEE

١٤,١ All equipment and component parts shall be guaranteed by vendor against defective material, design and workmanship when operated under normal condition for ١٢ months after being placed in

specified service but not exceeding ۱۸ months after date of shipment. If any malperformance or defect occurs during the guarantee period, vendor shall make available repaired, altered or replacement parts free of charge, direct on the purchasers job site. Vendor shall make available free of charge qualified representatives as deemed necessary to supervise the removal, repair and replacement of the defective parts in such a manner that the guarantee be maintained.

The guarantee period for repaired or replaced parts shall be ۱۲ months after start up of repaired equipment but not more than ۱۸ months after the repaired parts and or equipment are shipped.

The guarantee period for the remaining equipment whose operation is dependent upon the proper performance of the repaired part shall be extended by the number of days of fraction thereof that the equipment been inoperative because of defects. Field labor charges for work during the guarantee period shall be subject to negotiation between purchaser and vendor.

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 every time according to purchaser requirements, purchaser shall have such modification and repairs made and the relevant expense will be charged to vendor. 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 ۸ years from the late date of dispatch of the materials and/or equipment.

ATTACHMENTS

ATTACHMENT A
CLASSIFICATION OF UNITARY AIR CONDITIONERS

Table A-۱ shows the types of unitary air-conditioning equipment available. The following variations apply to some, but not all, types and sizes of unitary equipment:

TABLE A-۱ - CLASSIFICATION OF UNITARY AIR CONDITIONERS

TYPES OF UNITARY AIR CONDITIONERS			
SYSTEM DESIGNATION	ARI TYPE	HEAT REJECTION	ARRANGEMENT
SINGLE PACKAGE	SP-A SP-E SP-W RCH-A	AIR EVAP COND WATER AIR	FAN, COMP EVAP, COND
REFRIGERATION CHASSIS	RCH-E RCH-W SPY-A	EVAP COND WATER AIR	COMP EVAP, COND FAN
YEAR ROUND SINGLE PACKAGE	SPY-E SPY-W RC-A	EVAP COND WATER AIR	HEAT, COMP EVAP, COND FAN
REMOTE CONDENSER YEAR ROUND	RC-E RC-W RCY-A	EVAP COND WATER AIR	EVAP, COND COMP FAN
REMOTE CONDENSER	RCY-E RCY-W RCU-A-C	EVAP COND WATER AIR	EVAP, COND HEAT COMP HEA-۱
CONDENSING UNIT COIL ALONE	RCU-E-C RCU-W-C RCU-A-CB	EVAP COND WATER AIR	EVAP, COND COMP
CONDENSING UNIT COIL AND BLOWER YEAR ROUND	RCU-E-CB RCU-W-CB RCUY-A-CB	EVAP COND WATER AIR	FAN, COND EVAP, COMP FAN
CONDENSING UNIT COIL AND BLOWER	RCUY-E-CB RCUY-W-CB	EVAP COND WATER	EVAP, COND HEAT, COMP

ATTACHMENT A (continued)

CLASSIFICATION OF UNITARY AIR CONDITIONERS

Arrangement

Major unit components for various types of unitary systems are arranged as indicated in Table A-۱.

Heat rejection

Condensers may be air-cooled, evaporative cooled, or water-cooled and are designated by the letters A, E or W following the system designation in the ARI-type designation.

Unit exterior

Decorative for in space application, functional for equipment room and ducts, weatherproofed for outdoors.

Placement

Floor standing, wall mounted, ceiling suspended, roof mounted.

Fans or blowers

Indoor air equipment with fans may have airflow arranged for vertical upflow, downflow, horizontal, ۹۰ or ۱۸۰ deg.

turns, or multizone. Indoor coils without fans are intended for use with forced air furnaces or blower packages. Variable volume blower arrangements may be incorporated with any type of system.

Locations

Unitary equipment intended for indoor use may be placed in exposed locations with plenums or furred in ducts, concealed in closets, attics, crawl spaces, basements, garages, utility rooms or equipment rooms. Wall mounted equipment may be attached to or built into wall or transom. Outdoor equipment may be roof mounted or placed on the ground.

Heat

Unitary systems may incorporate gas fired, oil fired, electric, hot water or steam coil heating sections.

Ventilation air

Outdoor air dampers may be built into the equipment to provide outdoor air for cooling or ventilation.

Note:

Unitary air conditioners,unlike room air conditioners are usually designed with fan capability for duct work, although some units may be designed to discharge directly into the conditioned space.

ATTACHMENT B

TABLE B-۱- CLASSIFICATION OF UNITARY HEAT PUMPS

SYSTEM DESIGNATION	TYPES OF UNITARY HEAT PUMPS		
	ARI TYPE		ARRANGEMETN
	HEATING AND COOLING	HEATING ONLY	
SINGLE PACKAGE	HSP-A HSP-W	HOSP-A HOSP-W	FAN COMP INDOORCOIL OUTDOOR COIL COIL
REMOTE OUTDOOR COIL	HRC-A-CB	HORC-A-CB	FAN INDOORCOIL OUTDOOR COIL COIL COMP
REMOTE OUTDOOR COIL WITH NO INDOOR FAN	HRC-A-C	HORC-A-C	INDOOR OUTDOOR COIL COIL COMP
SPLIT SYSTEM	HRCU-A-CB HRCU-W-CB	HORCU-A-CB HORCU-W-CB	FAN COMP INDOOR OUTDOOR COIL COIL
SPLIT SYSTEM NO INDOOR FAN	HRCU-A-C	HORCU-A-C	COMP INDOOR OUTDOOR COIL COIL

(to be continued)

ATTACHMENT B (continued)

CLASSIFICATION OF UNITARY HEAT PUMPS

Table ۱ shows the variety of types of unitary heat pump equipment. The following variations apply to some as indicated, but not necessarily to all, types and sizes of unitary heat pumps:

Arrangement

Major unit components for the various types of heat pump systems are arranged as indicated in Table-۱.

Heat sink/source

Outdoor coils may be air-cooled or water-cooled as designated by A or W following the system designation in the ARI type designation. The same coils act as the heat sink in the cooling mode and as the heat source in the heating mode.

"Outdoor" coils of water source heat pumps are not necessarily placed outdoors.

Placement Floor standing, wall mounted, ceiling suspended, roof mounted.

Unit exterior

Decorative for in space application, functional for equipment room and ducts, weatherproofed for outdoors.

Indoor air

Equipment with fans may have airflow arranged for vertical upflow, downflow, horizontal, ۹۰ or ۱۸۰ deg. turns. Split systems with no indoor fan are intended for use with forced air furnaces or blower packages.

Locations

Unitary heat pumps intended for indoor use may be placed in exposed locations with plenums or furred in ducts, concealed in closets, attics, crawl spaces, basements, garages, utility rooms,or equipment rooms. Wall mounted equipment may be hung onto or built into a wall or transom.

Outdoor equipment may be roof mounted or placed on the ground.

Heat

Unitary heat pump system may incorporate electric, gas fired or oil fired heating sections to provide backup heating capability.

Ventilation air

Outdoor air dampers may be built into the equipment to provide outdoor air to cool or ventilate.

ATTACHMENT C

PURCHASER'S DATA SHEET

PACKAGED AIR CONDITIONER DATA SHEET No. ۱

ARI TYPE.....SERVICE.....			
INQUIRY No. .....MFR.....SIZE.....			
SERIAL No. .....WEIGHT.....Kg.			
COOLING CAPACITY.....Kw.....Btu/h.			
SENSIBLE COOLING CAPACITY.....Kw.....Btu/h.			
HEATING CAPACITY.....Kw.....Btu/h.			
AIR QUANTITY.....M^3/h.....CFM.			
FRESH AIR QUANTITY.....M^3/h.....CFM.			
EXTERNAL STATIC PRESSURE.....Pa.....in WG.			
INDOOR AIR TEMP.....°C(dB).....°C WB.			
SITE CONDITIONS			
AMBIENT CONDITIONS	ENVIRONMENT	WEATHER TYPE	
		DRY	HUMID
ALTITUDE.....M AVE. MAX. TEMP.....°C AVE. MIN. TEMP.....°C SUMMER MAX .....% REL. HUMIDITY WINTER MAX .....%	REL. CLEAN DUSTY CORROSIVE SALIFEROUS	HOT MODERATE COLD	HI MOD LOW
UNIT LOCATION			
INDOOR UNIT		OUTDOOR UNIT	
IN BASEMENT IN CLOSET SLAB MOUNTED CONDITIONED SPACE		UNDER STEEL SHELTER WITH SUN CANOPY GRADE LEVEL EXPOSED: ROOF TOP	
TYPE OF INSTALLATION		TYPE OF APPLICATION	
ATTENDED UNATTENDED		SERVICE DUTY CONTINUOUS INTERMITTENT STAND BY	

(to be continued)

ATTACHMENT C (continued)

PACKAGED AIR CONDITIONER DATA SHEET No. ٢

AIR FILTER TYPE								
WASHABLE DISPOSABLE LOW EFFICIENCY MED EFFICIENCY HIGH EFFICIENCY								
ELECTRICAL CHARACTERISTICS								
TYPE OF CONTROLS				DUST PROOF WEATHER PROOF FLAME OR EXPLOSION PROOF INCREASED SAFETY (DIV.I)				
ELECTRIC ELECTRONIC				FAN MOTOR				
COMPRESSOR MOTOR				MECHANICAL PROTECTION: IP..... INSULATION CLASS.....				
MECHANICAL PROTECTION: IP..... INSULATION CLASS.....				CONTROL				
POWER				CONTROL				
.....VOLTS ±١٠٪	.....Ph	٥٠ Hz		.....WIRES	.....VOLTS	±١٠%	١ Ph	٥٠ Hz
INTERVAL BETWEEN INSPECTIONS								
٢٤ HRS OPERATION		DAILY CHECK		WEEKLY	MONTHLY	OCCASIONALLY		
	No.	Date	By	Check	App.	Description		
REMARKS:								