Zamil Air Conditioners

Cooline AIR CONDITIONERS from Zamil

Process Cooling Chiller Systems

ASP Series

10 to 1000 tons (35 to 3500 kW)

FOR

- Emergency Safety Shower and Eye Wash Facilities
- Concrete Batching Plants
- Plastic Industries
- Food and Beverage Industries
- Machines and Oil Cooling...

Higher Quality of Indoor Living

Our product line ...

Company Business

Zamil Air Conditioners was founded in 1974 as one of the first air conditioning business to be established in Saudi Arabia and today is a leading international manufacturer of air conditioning systems and is No. 1 in the Middle East.

Zamil Air conditioners manufactures both consumer and central air conditioners and has sales operations in over 55 countries in the Middle East, Europe, Africa and Asia.

The company's operations are structured into four Strategic Business Units (SBUs) supporting five in-house product and service brands as well as a number of international brands under the OEM sales.

The five in-house brands are Classic, Cooline, CoolCare, ClimaTech and Geoclima.

The four SBUs are:

1. Consumer Business Unit supporting Classic, Cooline, GE and OEM brands for consumers.
2. Unitary & Applied Business Unit supporting Classic, Cooline, GE and OEM brands for commercial and indus trial customers.
3. Zamil CoolCare providing engineering & project management services, HVAC maintenance, retrofit services and parts.
4. Geoclima srl is an independent business supporting other SBUs for their requirement of Chillers & Double skin AHU's.

The first three SBUs - Consumer Products, Unitary & Applied Products and CoolCare Service direct their business operations from the corporate headquarters at Dammam, Saudi Arabia.

Geoclima has its engineering & production departments located at Monfalcone, Italy and has a design center in Austria.

All the four SBUs, while operating independently, supplement each other's activities in a way that makes synergy work at its best and achieve the corporate goals of maximizing customer satisfaction.

Factories and Productions

Zamil Air Conditioners has two manufacturing plants in Dammam, Saudi Arabia and has one specialty production facility in Italy operated by Geoclima.

The company can produce up to 550,000 Room Air Conditioners, 300,000 Mini-Split systems and 50,000 Central Air Conditioning systems per year.

Quality & Product Certificates

The Quality systems and policies at Zamil Air Conditioners comply with the required ISO 9001:2000 certification.

Zamil Air Conditioners is the first company in Saudi Arabia to receive the SASO (Saudi Arabia's Standard Organization) Certificate for Room Air Conditioners. ZAC's products are also certified with:

1. CE (Council of European Community)
2. UL (Underwriters Laboratory)
3. Eurovent
4. ASME
5. ETL

Other awards include the prestigious Engineering Excellence Award of General Electric and the inaugural Prince Mohammed bin Fahd Al Saud Award for Factory Safety.

Our Products

In addition to the consumer products such as the Room Air Conditioners (RAC) and the Mini Splits, Zamil Air Conditioners manufacturers a host of residential, commercial and industrial air conditioners. This broad range extends from the Concealed Units up to 5 tons, the Ducted Splits up to 30 tons, the Packaged Units up to 90 tons, the Single and Double Skin Air Handling Units up to 70,630 CFM, Water Chillers for air conditioning applications up to 660 tons and process cooling chiller packages up to 1000 tons cooling capacity.

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CONTINUING RESEARCH RESULTS IN STEADY IMPROVEMENTS.
THEREFORE, THESE SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

MODEL DECODING & PRODUCT INFORMATION

MODEL DESIGNATION DETAILS

1, 2 & 3 BASIC (SERIES)	4, 5 & 6 UNIT SIZE (TONS)	7 COMPRESSOR & REFRIGERANT	8 ELECTRICAL SUPPLY (V-Ph-Hz)	9 CONDENSER SIDE	10 & 11 OTHER FEATURES, OPTIONS & ACCESSORIES
ASP PROCESS COOLING CHILLER PACKAGES	**010** **TO** **1000**	**A :** RECIPROCATING (R-22) **B :** SCREW (R-134a) **C :** SCROLL (R-407c) **D :** SCROLL (R-22)	**H :** 280/230-3-60 **M :** 380-3-60 (4 WIRE) **F :** 460-3-60 **L :** 380/415-3-50 (4 WIRE)	**A :** AIR COOLED **W :** WATER COOLED*	SEE NOTE BELOW

*Water Cooled Condenser option is available with screw Compressors (R-134a) only.

NOTES:

Factory selected digits (From AA to ZZ) describing all other features, Options & Accessories or combinations there of such as pumping system, Tanks, Secondary Heat Exchanger, Main Disconnect Switch, Compressor Enclosure, Water Flow Switch, Spring Isolator etc.

GENERAL

INTRODUCTION

Process Cooling Chillers, unlike cooling for comfort air conditioning purposes, provide cooling or extract heat mainly from a fluid required for a process, maintain temperature during a process or cool an equipment or its components.

Zamil has tailor made solutions for these process cooling needs, virtually for any process, Zamil can come up with the right process chiller system.

Process Cooling Chillers are often compared to equivalent tonnage of standard HVAC type chillers in an increasing number of applications. Customers seek to understand why a higher cost process design chiller is preferred over a lower cost HVAC chiller.

Cooling Processes differ from HVAC duty in the significant fact that operational efficiency and production profits are directly tied to process chiller performance and reliability. Therefore there are fundamental design differences…

- Any application where downtime is more costly than losing the AC system.
- Processes requires consistent flow, temperature and pressure.
- Year round 100% duty in ambient conditions from 50°F - 125°F.
- Anomalous operating parameters and fluid qualities.
- On-board tank(s), pump(s), controls etc.
- Integrated supervisory controls with auto-changeover, remote monitoring etc.
- Multiple circuits and technologies for large turndown ratio.

Traditional HVAC chillers are not designed for the rigors of process duty where year-round performance over a wider range of conditions, reliability, redundancy and flexibility should be a priority. Process chillers typically operate longer, experience extreme cyclic loads and must produce exact temperature, pressure and flow rates to critical production processes. A short loss of production is usually much higher than the initial equipment cost difference.

Process applications like plastics, chemical, medical, data-centers, food processing, concrete batching plants, emergency personnel drenching facilities often require duty that HVAC chillers cannot provide.

ZAMIL - A UNIQUE PROCESS COOLING RESOURCE:

We earned our stripes in large chilled water plants around the kingdom, designing, implementing and servicing some of the largest, efficient and economical chiller plant installations in the kingdom. Our process cooling products were borne out of these successes. From the ground-up, Zamil process cooling equipment is designed for the rigors of process cooling with more demanding thermal and mechanical performance, more sophisticated control systems and higher expectations for reliability, flexibility and lower operating costs.

Zamil enjoys a unique set of in-house capabilities that provide our customers with a fully capable and accountable process cooling resource:

- Complete Engineering
- Refrigeration/Chiller Systems
- Tanks/Pumping Systems
- Piping Design and Assembly
- Sheet Metal Working
- Control System Design
- Installation, Start-Up, Testing & Commissioning.
- Service and maintenance.

SUCCESSFUL PROJECTS START WITH RELATIONSHIPS:

Process cooling infrastructure is a coordination of several discipline and success drivers from site structure, current and future business goals and the economic costs of the equipment and its operation. Zamil understands the importance of the smooth and complete communication flow, scope of work planning, documentation and the professional dialogs that avoids surprises. Our experience in project work and the management and coordination of work efforts across disciplines is a key differentiator that equals higher overall value and reduced project risk for our customers.

IDENTIFY & MEET MUTUAL GOALS:

The success of our customers is our ultimate goal, providing cost effectiveness, robust designs to assure maximum up-time, professional installation and easy, low cost operation. We listen and study to understand base line requirements, wish lists and constraints and can provide a complete package of products and services including refrigeration, mechanical, electrical and controls.

By employing the highest quality component selection, assembled and tested by highly skilled technicians and supported by advanced microprocessor control systems, system redundancy, automated switch over schemes and our new web-based diagnostic and alerting system, there is simply no need for second-best-no better choice than Zamil. And when you do need us on site, our in-house and trained field service staff stands ready. Our dedication is to long term success is sustained by the caliber of people we employ, the resources we provide for product development, advanced controls and the realization of "Customer first" attitudes. With this strength and attitude, ZAMIL is equipped to respond to virtually any process cooling need.

A Large Zamil made process cooling station coupled to three no's 230TR Zamil chillers, serving the waste water treatment plant - Saudi Aramco Project.

ASP series Chillers - General Specifications

A. Structure & Cabinet:

- Compact unit design and excellent serviceability.
- Made of heavy gauge (G-90) galvanized steel. Steel sheet panels are zinc coated and galvanized by hot dip process of lock-forming quality conforming to ASTM A 653 commercial weight G-90 followed by air dry paint or baked on electrostatic polyester dry powder coat.

B. Refrigeration:

- Designed to conform to **ARI standard 550/590** water chilling packages using the vapor compression cycle.
- Designed to conform to **ANSI/ASHRAE 15-1994** Safety code for Mechanical Refrigeration.
- Independent refrigerant circuit for each compressor.
- Refrigerant utilized : R-22, R-134a or R-407c.
- Refrigerant specialities include:
  - Expansion Valve
  - Filter Drier (replaceable core type)
  - Sight Glass
  - Liquid Line Solenoid Valve

C. Compressor:

- High Energy Efficiency Ratio (EER) screw, reciprocating and scroll types are available.

D. Evaporator:

- Compact design Shell and Tube type water coolers with enhanced inner grooved copper tubes bundled into a "U" shape and expanded into a steel tubular sheets which offer efficient water flow as well as heat transfer design resulting in optimal unit performance. Standard and ASME stamped versions available. For smaller capacities, the brazed plate or co-axial tube types are employed.

E. Condenser:

- Both Air Cooled and Water Cooled types are available.
  - **Air Cooled condenser:**
  - Condenser coils are corrugated fin and tube type, constructed of seamless copper tubes, mechanically bonded to aluminum fins for maximum heat transfer efficiency. **As an option, copper fins or acrylic coated aluminum fins or other coated coils may be provided.**
  - Low noise condenser fans, direct drive at 1000 RPM with rolled form venturi design to eliminate short circuiting of airflow.
  - All fans are die cast aluminum propeller type with aerodynamic design, top discharge, provided with protective grille mounted on top panel within the unit casing.
  - All condenser fan motors are totally enclosed air over type (TEAO) with class "F" winding insulation and ball bearings.
  - Inherent thermal protection of the automatic reset type and specially designed for outdoor application is included.
  - **Water Cooled Condenser:**
  - Every refrigeration circuit has a separate water cooled condenser. The condenser is a shell and tube type with a rigid external structure made of steel and copper tubes and baffles in the inside to provide the best performance and response to load fluctuation. Standard and ASME stamped versions are available.

F. Pumps:
Centrifugal end suction or double suction design, cast iron or stainless steel made suitable for the selected duty and desired flow rate & lead.

G. Tanks:
Buffer tank, expansion tank, multi-purpose tank, chemical dosing pot, chosen (if required) to meet the specific chiller design for the process duty in concern.

H. Secondary Heat Exchange:
Shell and tube or plate type, liquid to liquid heat transfer, chosen (if required) to meet the specific chiller design for the process duty in concern.

I. Piping & Fittings:
Refrigerant piping is rigid copper with insulated suction line. Water piping is carbon steel or stainless steel with valves & fittings made of cast iron, brass or bronze.

J. Electrical, Controls & Safeties:
- Single point power connection to minimize job site installation cost and time.
- Completely wired control panel with the advanced microprocessor controller provides all the necessary operating and safety controls.
- The control panel design is equivalent to NEMA 4 (IP55) with hinged door for easy access ensuring dust and weatherproof construction. Internal power and control wiring is neatly routed, adequately anchored and all wires are identified with cable markers as per NEC standards applicable to HVAC industry. The electrical controls used in the control panel are UL approved which are reliable in operation at high ambient conditions for a long period.
- The microprocessor controller works on the state of art microprocessor technology. This controller monitors analog and digital inputs to achieve precise control & safety functions of the unit.
- Supervisory Controls and Remote Monitoring System: A Supervisory controller as required shall be provided. Further, the micro controller is complete with all hardware and software necessary to remotely monitor and control the unit.
- **COMPRESSOR IN-BUILT PROTECTION DEVICE:** Protects the compressor by monitoring:
- Motor winding temperature in case of overload.
- Discharge gas temperature in case of overheating.
- Phase reversal for direction of rotation.
- **STARTERS:** The starter is operated by the control circuit and provides power to the compressor motors and pumps. These devices are rated to handle safely both RLA and LRA of motors.
- **CRANKCASE HEATERS:** Each compressor has immersion type crankcase heater. The compressor crankcase heater is always on when the compressors are de-energized. This protects the system against refrigerant migration, oil dilution and potential compressor failure.
- **HIGH PRESSURE SWITCH:** This switch provides an additional safety protection in the case of excessive refrigerant discharge pressure.
- **UNDER VOLTAGE AND PHASE PROTECTION:** Protects against low incoming voltage as well as single phasing, phase reversal and phase imbalance by de-energizing the control circuit. It is an automatic reset device, but it can be set up for manual reset.
- **COMPRESSOR AND PUMP CIRCUIT BREAKERS:** Protects against branch circuit fault. When tripped (manually or automatically), the breaker opens the power supply to the compressor and control circuit through auxiliary contacts.

APPLICATIONS

1. Chillers for the EMERGENCY SAFETY SHOWER & EYEWASH FACILITIES

In today's industries, many safety precautions and types of emergency equipment must be used to protect and ensure the health of employees. Although regulations and standards, personal protective equipment, and safety training are used, accidents still happen. Accidents involving hazardous chemicals can be especially severe. A chemical exposure accident may cause injuries to eyes, face and other parts of a human body. Eye injuries are always serious, and require immediate treatment. The emergency safety shower and/or eyewash station is a necessary first aid response to minimize the effects of a chemical exposure accident.

These emergency safety shower and eyewash equipment and the associated water cooling, storage and distribution system falls under the umbrella of Industrial Building Services Engineering.

The Building Officials & Code Administrators (BOCA) "National Plumbing Code" (1990, Article 12) includes emergency safety showers and eyewash stations as Plumbing Fixtures and states that "Emergency Showers and Eyewash Stations shall be provided with a supply of cold water as required by the manufacturer" (Section P-1210.1).

Saudi Arabia being a moderately industrialized nation and by far one of the major oil producing countries has ample applications of emergency eyewashes and showers and hence there is a substantial requirement of Water Cooling Plants serving these facilities.

Work areas and operations that may require emergency showers and eyewash stations include:

- Laboratories
- Hazardous substances preparation, storage and handling areas
- Paint spraying and paint stripping operations areas
- Off loading and dispensing areas for aviation fuel and naval fuel storage facilities
- Battery charging areas and workshops
- Cleaning and/or degreasing baths
- High dust areas

The American National Standards Institute (ANSI) has published a standard covering emergency shower and eyewash equipment.

This standard, ANSI Z358.1 - 2004 "American National Standard for Emergency Eyewash and Shower Equipment" is intended to serve as a guideline for the proper design, performance, installation, use and maintenance of emergency equipment.

In accordance with this standard, the major requirements of a Water Cooling System serving an emergency safety shower and eyewash facility are:

Water temperature requirement: In the range of 20°C - 30°C.

Water quality: Shall be uncontaminated, safe and suitable for flushing / drinking purposes.

Supply water flow rate: This parameter is variable and depends on the System Design i.e., Number of safety showers, Number of eyewash stations, ancillary consumption requirements for drinking etc. This supply water flow rate determines the required cooling system capacity.

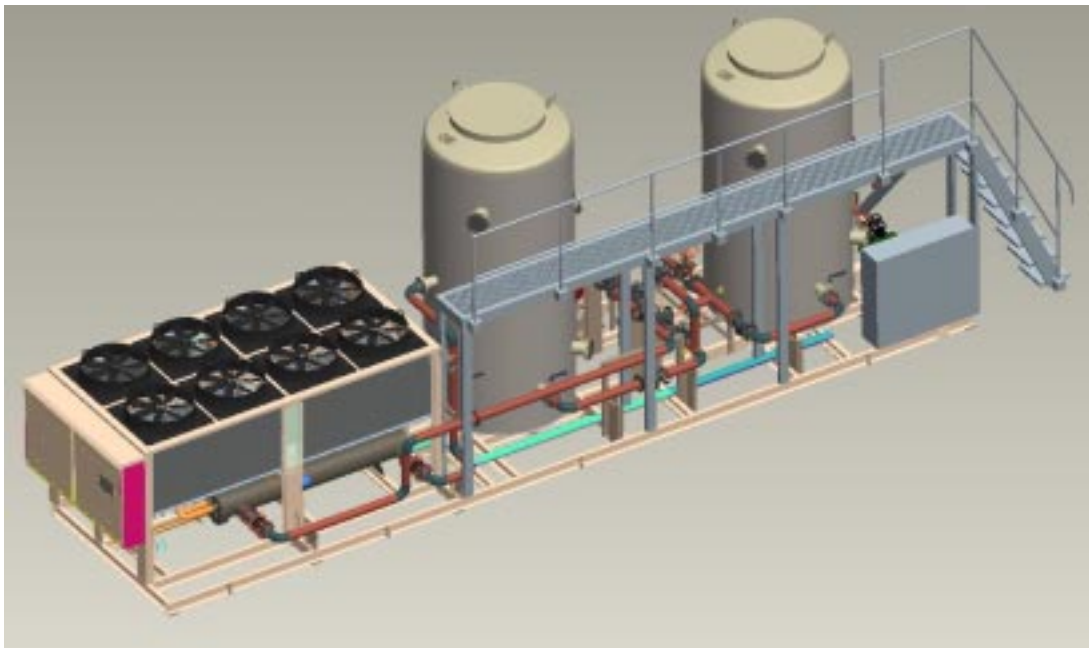
The above requirements cannot be met by a standard chiller (which is utilized for HVAC applications) both in terms of water temperature and quality because the standard chillers are specifically designed for comfort air conditioning applications and therefore chill and deliver water in the temperature range of 4°C - 10°C. Further, there is a potential risk of water contamination at the evaporator / cooler in case of any refrigerant leakage which can pose a serious hazard if the water is utilized for flushing / drinking purposes. Due to these reasons a custom built "Water Cooling System" is essentially required and Zamil has tailor made solutions for these applications.

2. Chillers for Concrete batching plants

Supplying temperature controlled concrete for large construction projects is a must all over the world. The development of the strength in concrete is accompanied by evolution of heat as the cement cures and hardens (heat of hydration). In small structures this phenomenon is not of importance, but very significant in mass concrete projects. The heat of hydration raises the temperature during the curing process by up to 25°C causing an increase of volume. After curing the concrete cools down again reducing its volume and thus naturally causing cracks. Therefore the initial pouring temperature should be lowered so much that the maximum temperature during the curing process does not exceed a certain temperature determined by the consultants.

Even though the required pouring temperatures of the concrete vary from site to site and from country to country (from +4°C to max. 15°C) there is always a requirement for a sophisticated water chilling system.

As the initial and the running costs for such a chilling system are quite high it is essential for the contractors to have an optimized system installed and Zamil has tailor made solutions for this application.



3. Chillers for the Plastics Industry

The making of plastic requires a huge amount of heat and the transfer of that heat from the plastic and the plastic process equipment. When heat is added to the plastic resin so it can be easily formed and removed from the formed part, finding the most efficient way to transfer the heat will maximize productivity. During the process of making plastic, a process chiller cools the hot plastic that is injected, blown, extruded or stamped. With the right planning, design, installation and proper maintenance, our process chillers offer the plastic processor years of reliable service.

In the plastics industry, where future expansion is inevitable but unpredictable, it important to choose a cooling system that can be expanded quickly and without interrupting the process.

Secondly, the size of the chiller has to precisely meet the required output of the processes. For example, a ton of capacity is defined as the capability to extract or reject 12,000 BTUs per hour. A 5 ton chiller, therefore, can reject 60,000 BTUs per hour. If you have an injection molding process that is producing 120 lbs of HDPE per hour, a 4 ton chiller should be **selected for the job. Production rates recommendation for the various plastics products per ton of cooling capacity are provided below:**

30 lbs/hour - HDPE
35 lbs/hour - LDPE
35 lbs/hour - Acrylic
40 lbs/hour - Nylon
40 lbs/hour - Urethane
45 lbs/hour - PET
50 lbs/hour - ABS
70 lbs/hour - PVC

4. Chillers for the Food & Beverage Industry

One of the more popular applications of the modern industrial chiller is in the food and beverage industry which uses a chilling system to remove the heat gained from the process during mixing, cooking or after pasteurizing the product. Our chillers are used in the process of producing beverages like juices and pasteurization of milk in dairy applications.

5. Chillers for Machine and/or Oil cooling

Process oil used in hydraulics, cutting, lubrication, broaching, honing, quenching, drilling, grinding etc... aids as a cooling media. In other worlds, the heat is dispersed during the process when carried away by the circulating oil. Now this oil needs to be maintained at a certain temperature range to retain its physical and chemical properties, hence cooling is required.

Our chillers can be utilized for cooling of machines and process oil or their components in a variety of applications mentioned below:

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- Wire cut/ Spark erosion EDM
- Laser cutting/ Marking machine
- X-ray diffraction spectrometer
- Medical equipment
- Machine tools
- Induction hardening machine
- High frequency welding machines
- Hydraulic press
- Pressure die casting
- Furnaces
- Power generators
- Computer room servers
- Injection moulding machine
- Plasma spray/Coating machine
- Chemical solutions for de-scaling of pipelines

6. Other Applications

Our process cooling chillers can be utilized for a variety of other applications including laboratories, immersion cooling, printing, quenching, swimming pools, sewage treatment plants etc.

PROCESS CHILLER SELECTION QUESTIONNAIRE

E-mail or fax back to fbitar@zamilac.com or 8473333 ext/240

Zamil can produce chillers to meet virtually any process cooling application from 10 to hundreds of tons. Systems can be engineered to deliver chilled water or liquid down to 40°F with returning temperatures upto 115°F and can include internal or external tanks, pumps and supervisory plant controls. The more we know about your application, the better we can understand your cooling requirements and propose optimal solutions accordingly.

Your Name:	**Project Name:**
Company:	**Phone/E-mail:**

Your Process - Briefly explain the process which the Chiller shall be serving.	
Cooling Load - Provide the cooling load, if known. If you do not know, it can be calculated from known temperatures and flow rate. If your process has a variable load, please specify.	
Liquid to be chilled - Is it soft/potable water, raw/hard water or if the liquid has ethylene or propylene glycol, please provide the percentage.	
Temperature Required at your Process - This is the exiting temperature of the liquid leaving the chiller package.	
Temperature Returning from your Process - This is the temperature of the liquid entering the chiller package.	
Flow Rate of the Process Liquid. If you do not know this, it may be calculated from the entering and exiting temperatures together with the cooling load.	
Flow Rate Constancy - Rather than a continual steady flow, processes may vary or stop process flows during normal operation. If flow rate is variable, please specify.	
Type of Chiller Circuit – Once through or Closed loop. Closed loop means the liquid flows to the process and is returned back (recirculated) to the chiller package.	
Pressure Required at the Process –Typical is 20 to 50 PSI.	
Installation Location – Specify design ambient temperature and Specify if dirty or corrosive environment.	
Type of Compressor & refrigerant - Scroll, recip. and screw compressors are available. Scroll are common for lower capacities. Screw compressors are typical for higher capacity needs. R-22, R-134a and R-407c are available. Please specify your choice.	
Type of condenser - Both Air cooled and water cooled versions are available. Please specify your requirement.	
Electrical Service Available - Common voltages are 230, 380 and 460 volts at 60 hertz and 380/415 volts at 50 hertz.	
Type of Package - Self contained packages including chiller, tank(s), pump(s), controls etc. shall be offered. Please specify any reservations.	
Physical Restrictions - Specify any maximum length, width, height or weight.	
Other Notes - Anything else we should know. Special materials, temperature stability, required connection sizes, remote monitoring, etc.	

Zamil
Air Conditioners

Zamil Air Conditioners (ZAC), a sector business of Zamil Industrial, is the largest supplier of air conditioners in the Middle East. It manufactures and markets a whole range of air conditioners from Room Air Conditioners to Packaged Units to large capacity Chillers for residential, commercial and industrial applications.

Zamil Air Conditioners was founded in 1974 as one of the first air conditioning business to be established in Saudi Arabia and today is a leading international manufacturer of air conditioning systems and is No. 1 in the Middle East.

With its head office and prime manufacturing plants in Dammam, Saudi Arabia and a production facility in Italy, Zamil Air Conditioners produces over 900,000 air conditioners per annum. It supplies air conditioning products to over 55 countries across the world - the major markets being GCC, Middle East, North Africa, Europe and Asia.

Zamil Air Conditioners is an ISO 9001:2000 certified company. It is the first Middle-Eastern company to have received the prestigious ARI (Air Conditioning and Refrigeration Institute, USA) and Eurovent certifications for many of its products. With its state-of-the-art testing facility - Ikhtebar, a third party air conditioners testing facility built by Intertek Testing Services (ITS), Certified by Electrical Testing Laboratories (ETL) and accredited by the Saudi Accreditation Committee (SASO) for compliances with the international testing standards, Zamil Air Conditioners is the only manufacturer in the region capable of guaranteeing product performance in compliance with local, regional and international specifications and standards for operating performance, cooling capacity, energy efficiency, airflow, noise level and durability.

Over the past few years, Zamil Air Conditioners has embarked upon an ambitious growth path. Besides expanding its product lines through the two acquisitions made by Zamil Industrial in Europe - Clima Tech and Geoclima. Zamil Air Conditioners has been vigorously moving into newer markets, seeking strategic alliances and investing heavily in Research & Development.

For more information, please visit our website **www.zamilac.com**

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PL-AP-ASP-10-2M-E