

GARMATAAB®
RADIANT HEATING SYSTEM



Gyms and swimming pools



Shahid Khorrami tennis court | Tehran

IRAN MASH'AL Co was founded as executive of great projects of public & industrial buildings in 1982. This company with credit of 30 years of experience took action to import manufacturing technology of radiant heating devices with cooperation of AMBIRAD UK company under the registered name of "GARMATAAB". IRAN MASH'AL Co founded an equipped lab in the location of its factory and succeeded to .achieve different certificates including Iran's National Standard of product Supply heating of area of over 5 millions m2 in more than 4500 projects in different spaces using GARMATAAB heaters and also product export to various countries prove the commitment of company directors to maintain and enhance customer satisfaction



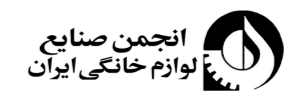
Iranian Syndicate
of Industrial
Companies



Member of
Association of Iranian
Industries Industry



ISO17025 lab
accreditation
certificate



Association of
Industries of Household
Appliances of Iran



**Only holder
of radiant heater
standard certificate
736816696**

First & only holder of standard certificate of gas-fired radiant heating systems issued by Iranian National Standard Organization

Standard of GARMATAAB product

Due to special importance of safety & performance of gas-fired devices, Iranian National standard Organization compiled "single burner gas-fired overhead radiant tube heaters for non-domestic use" standard with NO.12871-1 based on "BS EN 416-1:1999" reference in 2010

IRAN MASH'AL Co took action to found and equip Research Laboratory of Radiant Heating Systems by spending so much effort & cost for proving conformity assessment of its product based on mentioned standard



Test & Research Lab of
IRAN MASH'AL Co has been
implemented based on ISO17025
standard and succeeded to accredit
by National Accreditation center
of Iran NACI

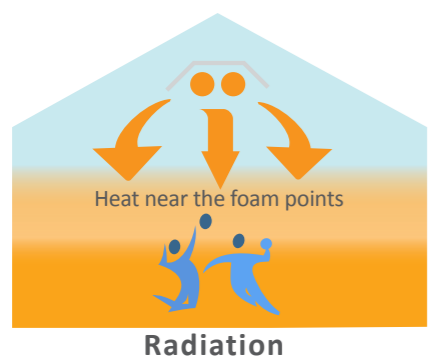
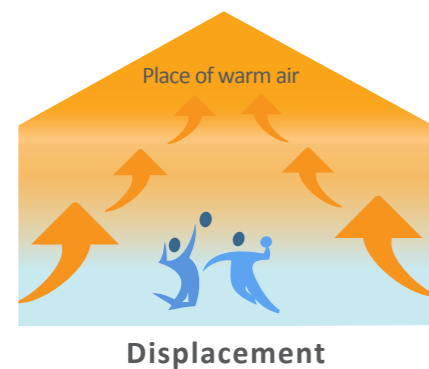


Conformity assessment of product based on "BS EN 416-1:1999" & under license
certificate issued by AMBIRAD Co



Certificate issued by standard
administration of Tehran
Province of IRAN as first & only
collaborative lab

**Please consider necessity of safety & performance standard certificate
in gas-fired devices**



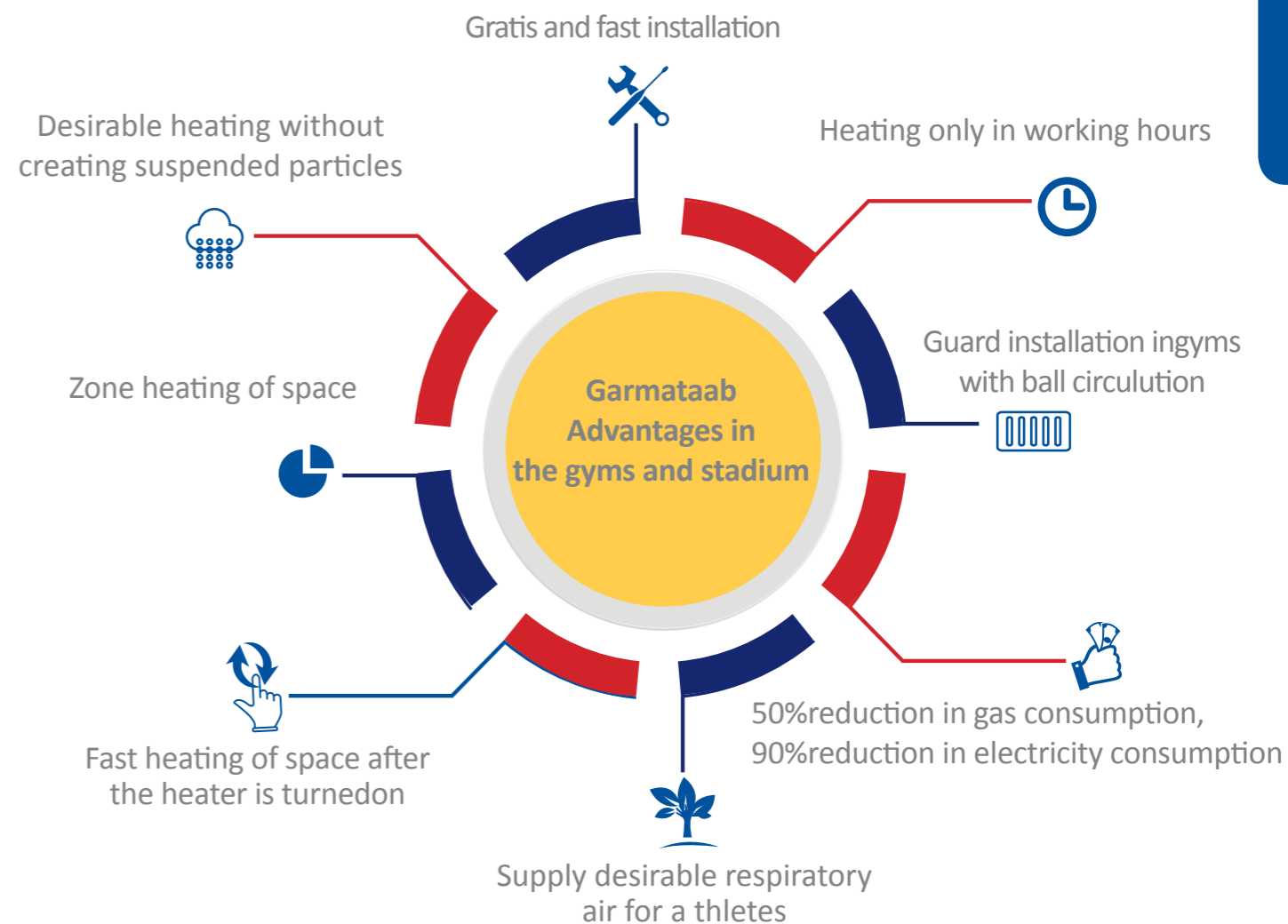
Comparison between convection & radiation heating

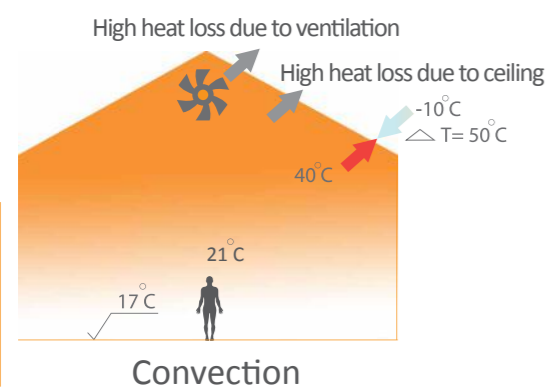
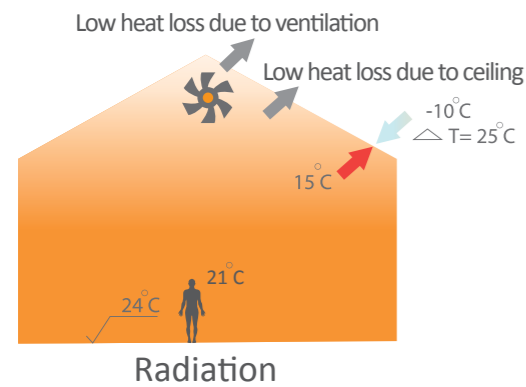
The non-permanent use of gyms makes it necessary to keep the heating system on active mode in non-working hours when using convective heat transfer methods such as central engine room. While using GARMATAAB heating system, a few minutes after turning on the device, desirable heating is provided on the floor of building.

In addition to direct heating of the floor, sport equipments & athlete's body, thermal comfort of athlete is provided at air temperature of 3 to 4°C lower than other heating methods. For example by using convective heating system such as unit heater, the athletes feel thermal comfort at temperature of 18°C in gym while GARMATAAB radiant heating system provides same feeling at temperature of 14°C for athletes. When athlete feels same desirable warmth in cooler air, it's natural to breathe more balanced air, exercise joyfully and receive more oxygen.

Air circulation in the space is low by using GARMATAAB devices, so it can significantly decrease suspended particles & dust of air and increase respiratory air quality of athletes.

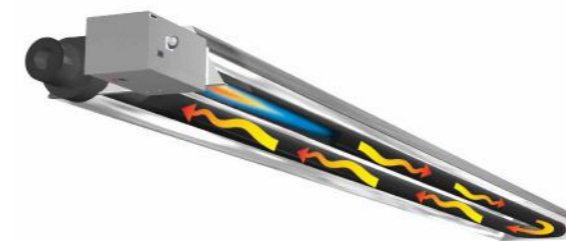
Zone heating is possible in gyms which have a special place for spectators. It's clear that spectators need more heat due to lack of physical mobility & athletes need lower temperature due to high physical mobility. This requirement is met in gyms with proper layout & installing more devices at top of spectator place.





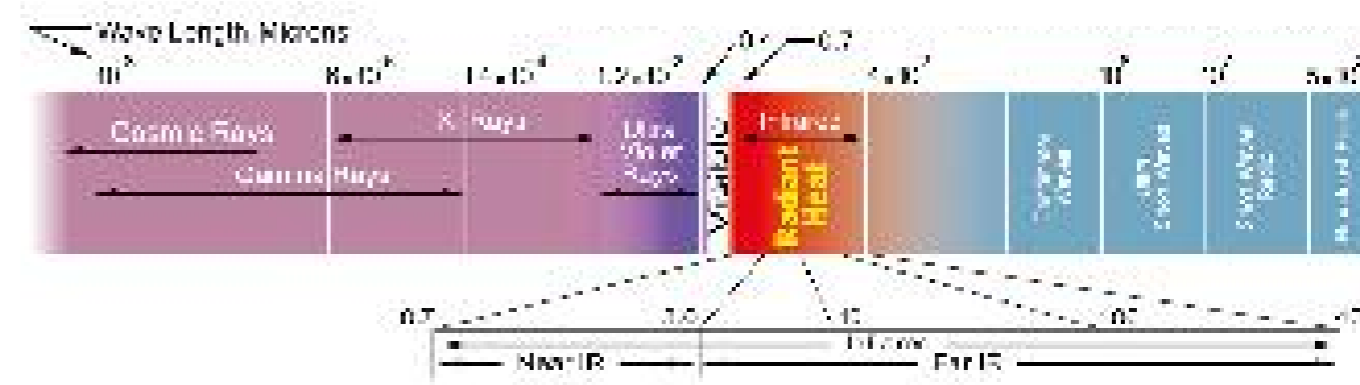
Why is GARMATAAB the best option?

Nowadays, supply heating by using methods like central heating equipped with steam, hot & warm water, burner & unit heater or space heaters is not suitable & economical in long-height spaces. In these methods, major amount of energy is transferred below ceiling of building due to low density of hot air. Despite high consumption of energy, only low amount of consumed energy heats the space. By inventing radiant heating system in past decades, high percentage of combustion energy is transferred to the surfaces in the mode of radiation without air interference. Great advantages of radiant heaters for supply heating of large spaces provide desirable, optimal & fast heating with uniform distribution of temperature in addition to decreasing initial investment & high energy saving of fuel & electricity



In this heater, natural gas burns by a specific burner with long flame in a tube with high radiation factor. The generated heat is transformed into infrared waves and is radiated to the specified places by trapezoidal reflector surfaces located above the device. In contact with surface, these waves are transformed into heat due to their properties and create very pleasant sensation in human like heat of the sun.

Electromagnetic spectrum



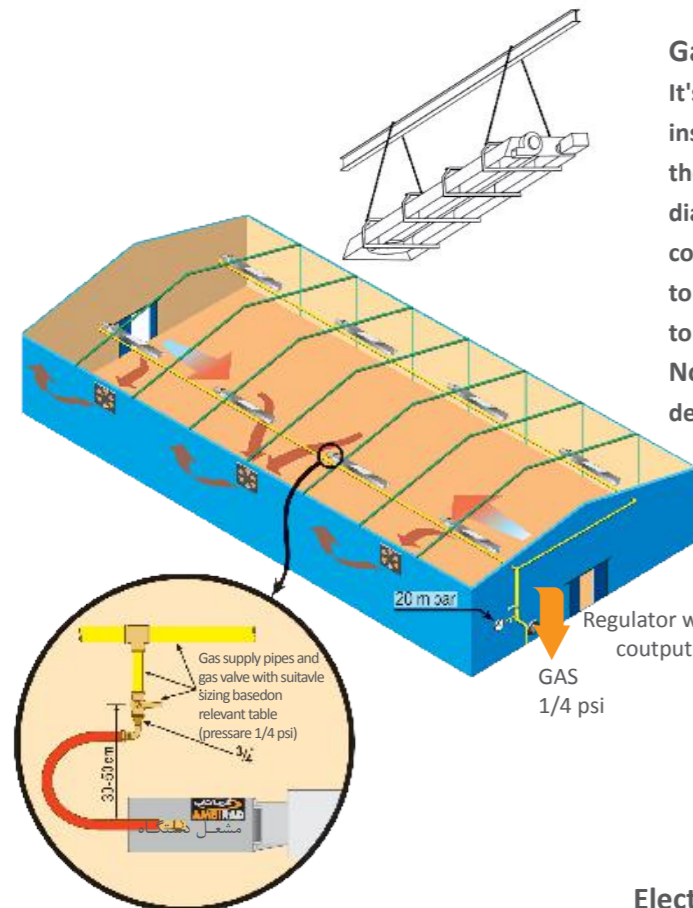
Comparison of heaters cost

	Central heating	GARMATAAB®	Saving percentage
Cost of design	100	0	100
Equipments	Boilers, burners, piping, heaters(unit heaters), pumps, valves, controllers, insulators, pipe ducts, electrical panels	Devices & gas piping	
	100	40 to 60	40 to 60
Cost of implementation	100	10	90
Maintenance	100	5	95
Consumed fuel	100	40 to 60	40 to 60
Consumed electricity	100	10	90
Consumed water	100	0	100



Alimoradian gym | Nahavand

Installation details guide



Gas piping

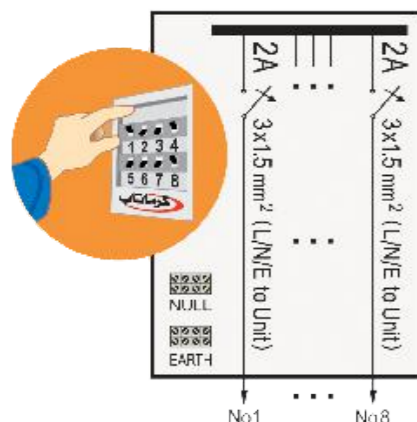
It's better to implement gas piping of GARMATAAB device after installation (based on technical specification table) by following the standards of national gas company in terms of size, pipe diameter & suitable capacity of regulator. Also, it's necessary to consider details of the following figure for connecting the device to piping system. It's recommended to install a pressure gauge (0 to 100 mbar) after regulator.

Notification: In case of using LPG, please notify to technical department of company before sending the devices.



Electrification

Electricity consumption of each device is about 40 to 100 Watts. In order to proper performance of devices, it's better to install a separate & independent electrical panel including null, Earth terminals & 2A miniature switches (based on the number of device on figure) in suitable place of the building. Also, cabling of each device is performed independently by 3*2.5 cable (phase, null, earth)



Ventilation of the space

Suitable ventilation of GARMATAAB radiant heating system is important in 2 aspects:

- Supply the required air of combustion
- Exhaust of combustion products

The amount of required air for perfect combustion of device is 11 to 13 times the amount of consumed natural gas.

Based on European credible standard (BS EN 13410), if natural ventilation is more than 10 cubic meters per hour per Kilowatt of device, the device can be applied without any chimney.

In spaces with insufficient ventilation or dense dust, it's necessary to supply the required air of combustion from outdoor air by a tube connected to the burner. Also, in these spaces, it's necessary to install a suitable chimney connected to the fan for exhaust of combustion products (the following figure)

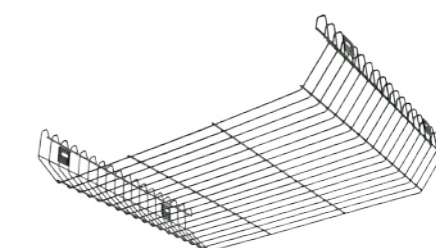


Technical specification of UT type of GARMATAAB

Model		22 UT	35 UT	40 UT	50 UT
Overall length (m)		5/24	5/89	6/10	7/62
Overall width (cm)		49	67	67	67
Weight (Kg)		63	95	97	144
Heat capacity	Kcal/hr	20,000	30,000	34,400	45,000
	KW	22	35	40	50
Max natural gas consumption (pressure 17.8 mbar) (m3/hr)		2/1	3/3	3/8	4/7
Min mounting heights (m)	Wall-mounted	3/6	4/3	4/3	5/7
	Ceil-mounted	3/0	3/6	3/6	5/0
Min clearance distances (cm)	Above device	50	50	50	50
	Beneath tubes	125	150	210	210
	To the sides of device	60	60	60	60
Electrical supply		40 to 100 Watts 220- volts-single phase			
External fuse (A)		2A			



- UT type of GARMATAAB
- With high power radiation
- For heating of long-height spaces



Galvanized reticulated guard
For beauty & protection of tube

Women's gym | Khorramdarreh



Misagh gym | Mashhad



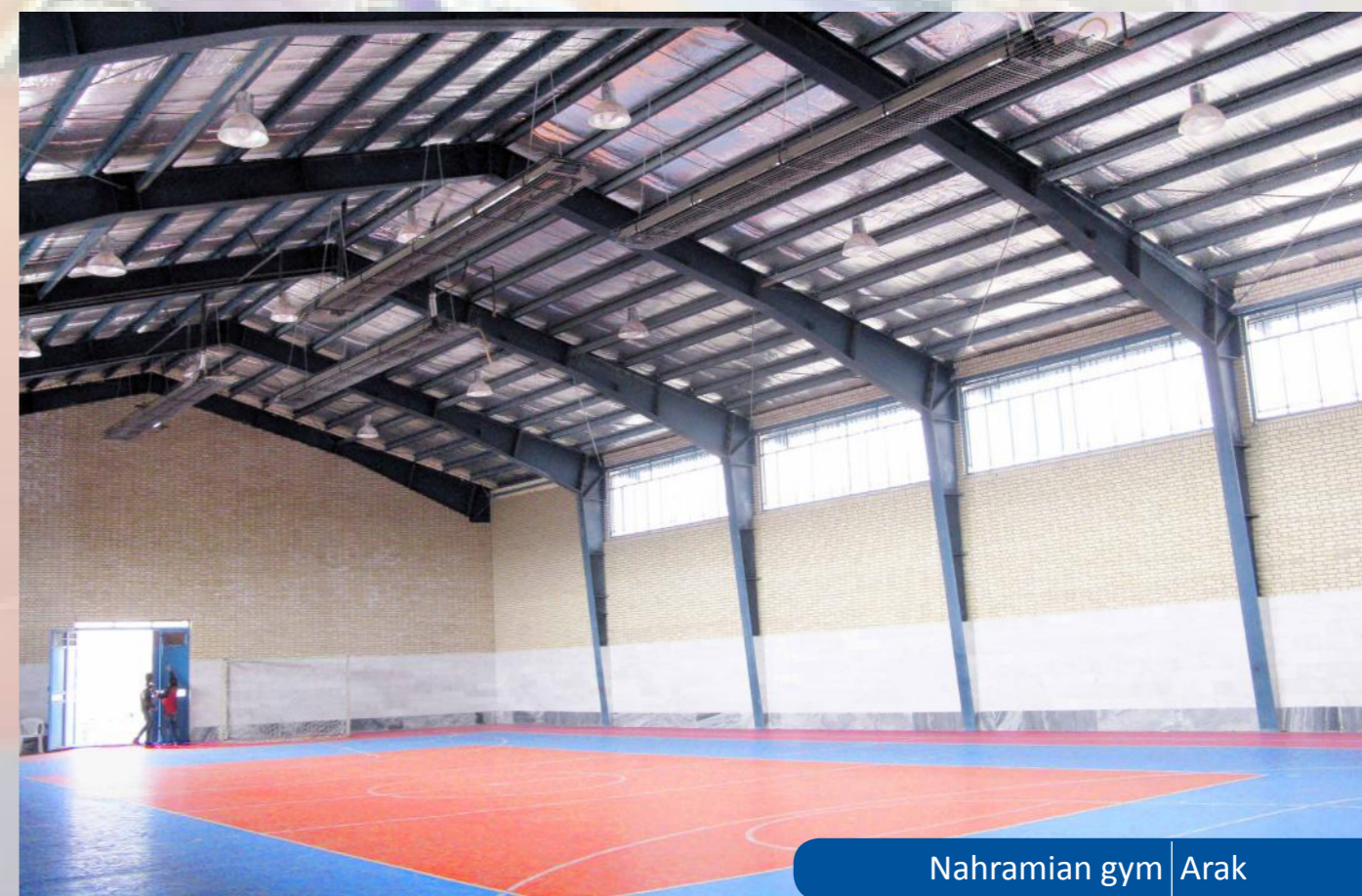
Astan Ghods gym | Mashhad



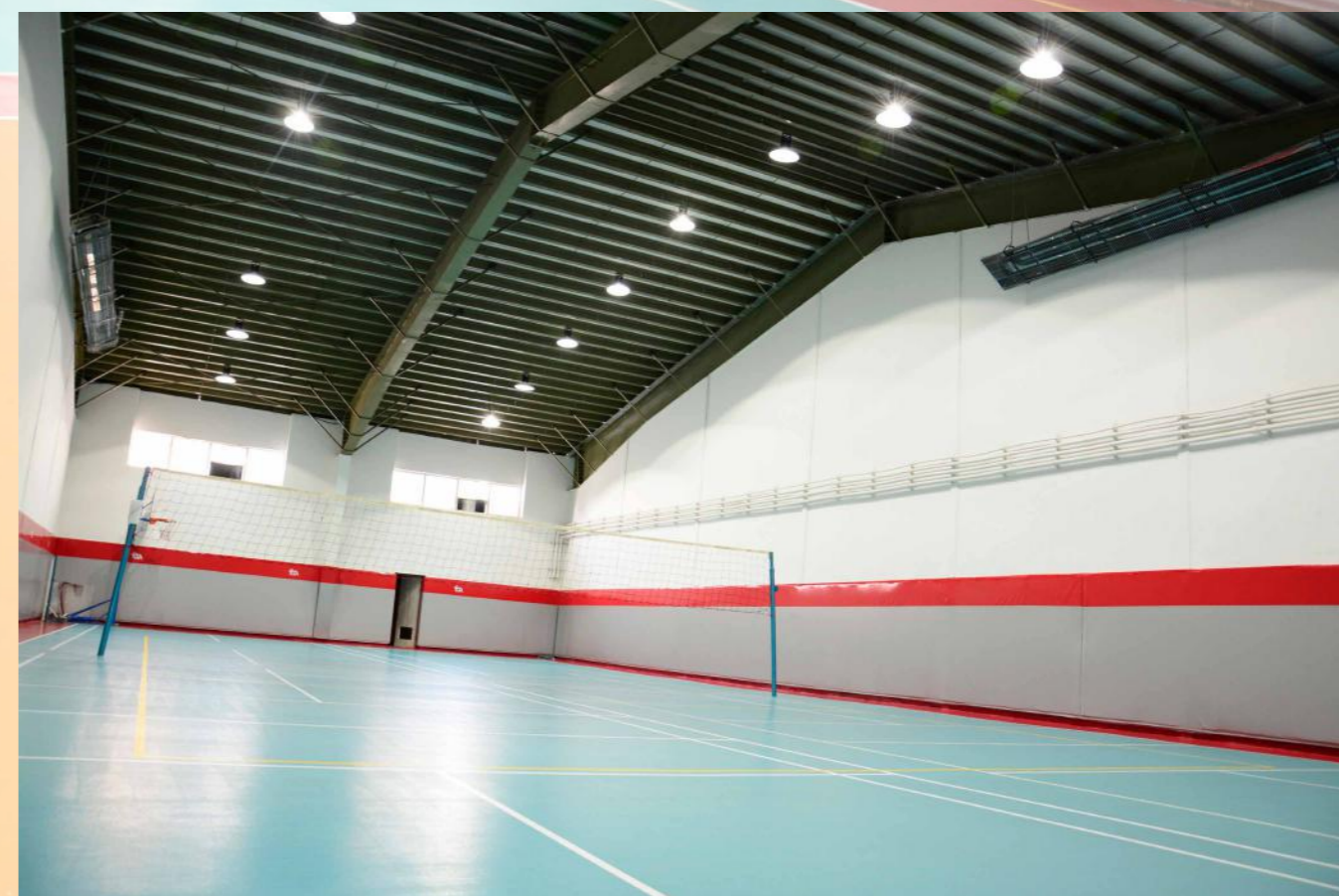
Janbazan gym | Karaj



Shahr-e-Babak gym | Kerman



Nahramian gym | Arak



Hall No.3 of Enghelab sport complex | Tehran





Pardisan-e-Noor swimming pool | Tehran



Shahed gym | Hamedan





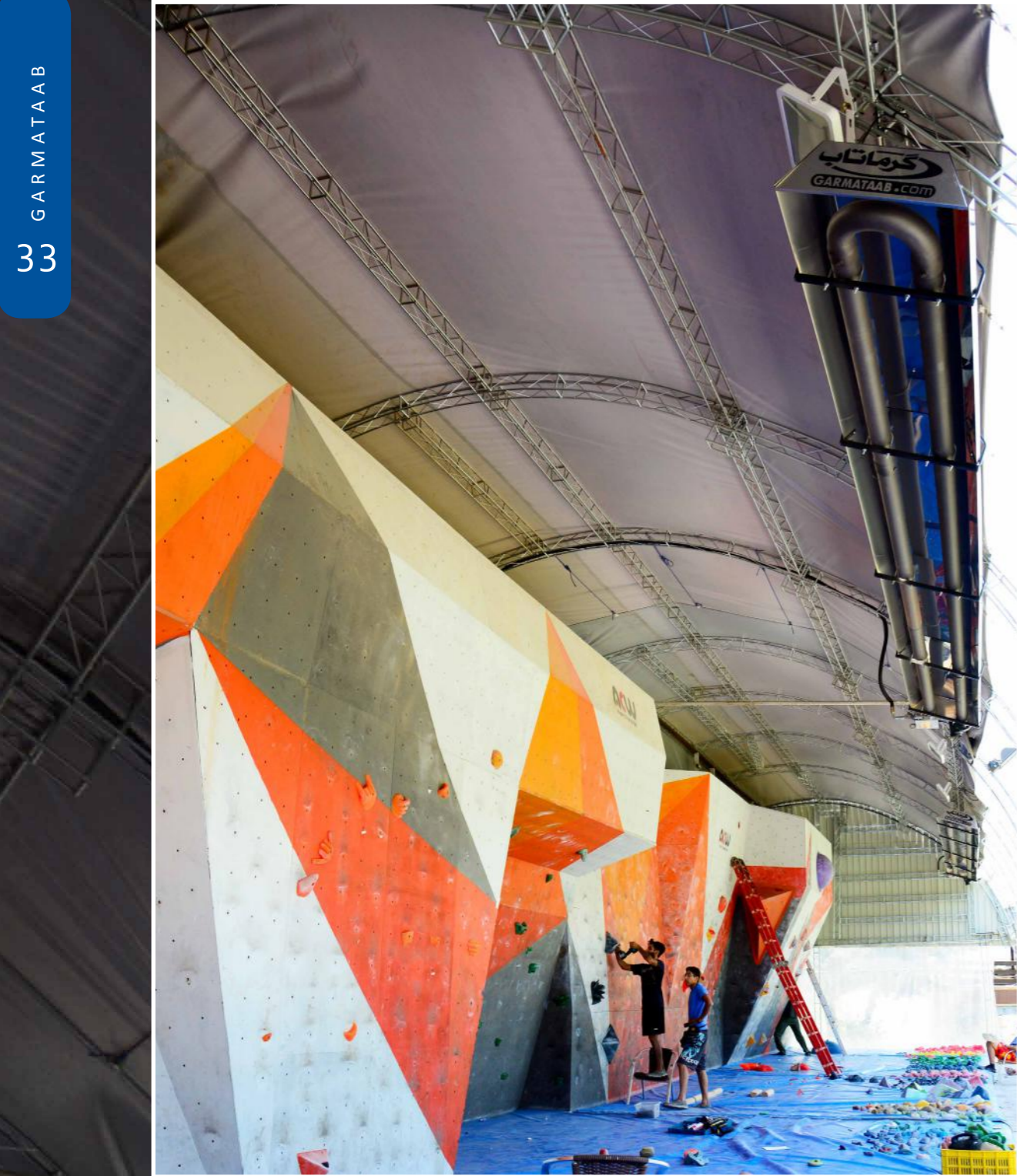
Tennis court of Esteghlal hotel | Tehran



Helal Ahmar gym | Tehran



Gol-e-Moghan gym | Ardebil



Rock climbing ground of Enghelab sport complex | Tehran





15 years customer service

3 years warranty

10 years warranty of radiant tubes

Gratis visit & installation

IRAN MASHAL

environment engineering co.

First manufacturer of radiant heater &
only holder of national standard certificate
based on ISIRI 12871-1 in IRAN under the
registered name of GARMATAAB

GARMATAAB®



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