News Release

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Taikisha Ltd.

Taikisha Develops AIREL, a Displacement Ventilation Diffuser That Achieves Both Comfort and Energy Savings

Taikisha Ltd. (Head Office: Shinjuku-ku, Tokyo, Japan; Representative Director: Masashi Osada; hereinafter referred to as "Taikisha") has developed "AIREL," a diffuser which utilizes a displacement ventilation system that creates temperature stratification based on air density differences to achieve both comfort and energy savings.

AIREL takes advantage of a unique structure that draws in warm air from the upper part of a space and mixes it with cold air supplied to the space before discharging it, reducing both drafts*1 and the required airflow rate. This reduces the power required to supply air and helps reduce energy consumption.

*1 Uncomfortably cold air currents that can cause discomfort when they come into contact with the human body.

Product Image

■Background of Development

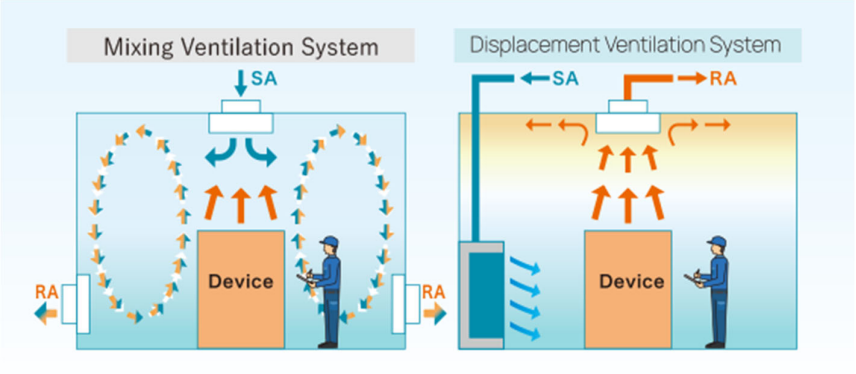
With the growing demand for carbon neutrality, there is an increasing need for air conditioning systems that provide greater energy savings than conventional systems while ensuring comfort and indoor air quality for workers active indoors. Furthermore, it is necessary to maintain stable indoor environments even as the amount of heat generated increases alongside the higher performance of devices and equipment installed in these indoor spaces.

In recent years, displacement ventilation (stratified air conditioning) systems, which supply fresh air efficiently to areas where people and production facilities are located and exhaust

warm, contaminated air from the ceiling, have garnered attention as air conditioning systems that can meet these needs. However, displacement ventilation systems have been found to cause uneven room temperatures and drafts in some cases, posing challenges for implementation in actual buildings.
Given these needs and challenges, Taikisha began developing the diffuser that would enable a displacement ventilation system in a more practical manner, utilizing the air conditioning control technology it has developed over the years.

■What is a Displacement Ventilation System?

There are two types of indoor air-conditioning systems: mixing ventilation systems, which mix air to make conditions uniform throughout a space, and displacement ventilation systems, which utilize airflow to exhaust contaminated air from the ceiling.



Comparison of mixing and displacement ventilation systems
SA: Supply Air (air supplied to the space) RA: Return Air (air returned from the space)

- Mixing ventilation system: Used for general air conditioning, this system mixes the fresh air supplied to the space with the air in the space to make the temperature and level of air contamination uniform throughout the space.

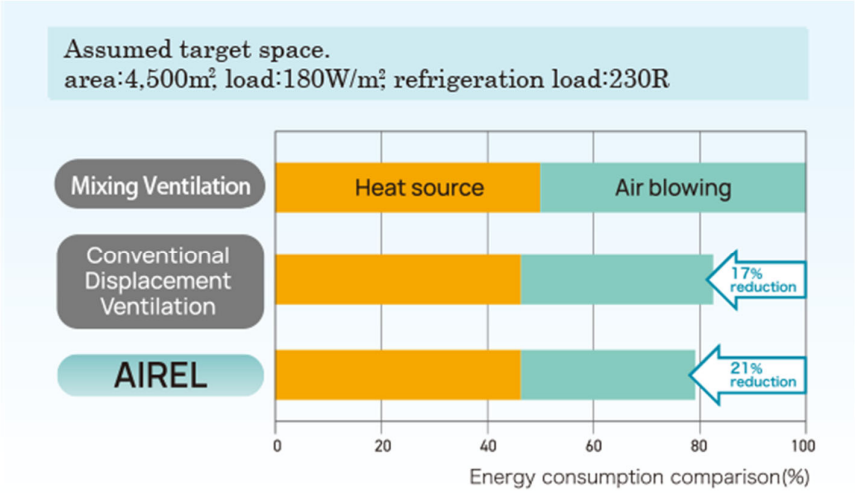
- Displacement ventilation system: This air conditioning system supplies fresh air at low velocity from near the floor and uses the upward airflow generated by the heat emitted from people and equipment to exhaust contaminated air that accumulates in the upper part of the space from near the ceiling. Compared to mixing ventilation systems, displacement ventilation systems have the advantage of efficiently air-conditioning mainly spaces where people spend their time, thereby reducing energy consumption.

■AIREL Features

- Suppresses drafts by increasing supply air temperature
  AIREL features a proprietary design that draws in warm air accumulated near the ceiling within the diffuser, mixes it with the cool air supplied from the air-conditioning unit, and then delivers the blended air into the room. This adjusts the supply air temperature to a

comfortable level and helps reduce the sensation of cold air in the occupied zone. In addition, because comfort can be maintained even when the unit's supply air temperature is set lower, the required airflow can be reduced—contributing to energy savings.

- Achieves energy savings through reduced fan power in the air-conditioning systems
  AIREL draws in up to 40% of the warm air accumulated near the ceiling within the diffuser, mixes it with the cool air supplied from the air-conditioning unit, and delivers it into the room as air at a comfortable temperature.
  This enables the supply airflow rate from the air-conditioning unit to be reduced even further than with conventional displacement ventilation systems, helping to lower fan (air transport) power and improve energy efficiency. Simulation results indicate that AIREL can reduce energy consumption by approximately 20% compared with mixing ventilation systems, and by a further approximately 5% compared with conventional displacement ventilation systems.



Comparison with conventional ventilation systems

- Reduces operating costs
  AIREL can efficiently air-condition only areas where people and production equipment are present, thereby reducing operating costs compared to conventional air-conditioning systems.

- Delivers an airflow pattern that spreads evenly forward and to the left and right
  AIREL uses semi-cylindrical ducts and radial nozzles to provide even airflow forward and to the left and right. This allows the supplied air to get behind equipment and devices.

■Envisioned Specifications

Product Name	AIREL
Dimensions	900 mm (W) x 450 mm (D) x 2,300 mm (H)
Weight	200kg
Airflow Rate	3,000m^3/h
Air Velocity	1.0 m/s or less at a distance of 0.5 m from the air outlet
Airflow Noise	60 dB or less (overall value)

* This product is currently under development, and specifications, design, release date, and mass production availability are subject to change in the future.

■Future Developments

Details regarding commercialization, mass production, and release date will be announced once they are finalized.
At present, we envision applications in gymnasiums, atriums, and high-heat-generating production facilities. In the future, we also aim to apply the system in cleanrooms. In addition, we plan to expand into manufacturing sectors such as semiconductors, electronic components, and secondary batteries.

AIREL demo unit will be exhibited at the Taikisha booth at SEMICON Southeast Asia 2026 to be held in Kuala Lumpur, Malaysia from Tuesday, May 5 to Thursday, May 7, 2026. We look forward to meeting you there.

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