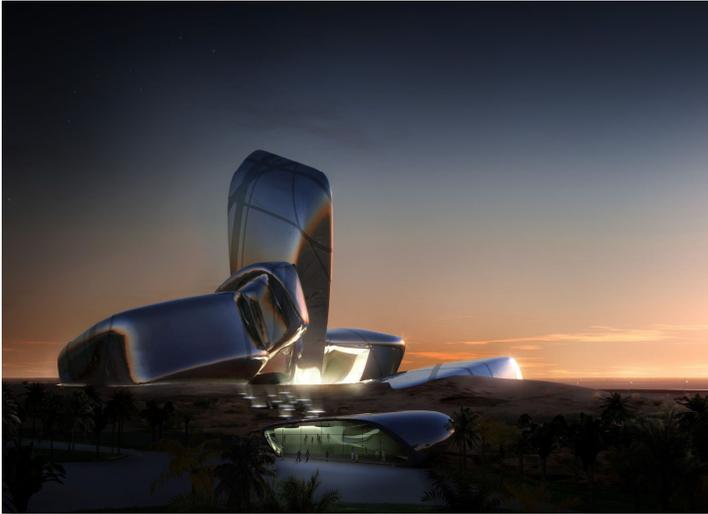


Celebrating Human Potential in the Civic Building Market: Proper Building Pressurization Fosters Knowledge Economy, *King Abdulaziz Center for World Culture*



The King Abdulaziz Center for World Culture (Ithra) in Dhahran, Saudi Arabia is a state-of-the-art facility commissioned by Saudi Aramco, the world's largest integrated oil and gas company. Aramco invested heavily in creating the 1,076,391 square foot futuristic facility to uphold their five-pillar mission of Art, Culture, Knowledge, Creativity and Community.

Situated on a seam between the Arabian Desert and the marine climate of the Persian Gulf, Ithra's location presented several challenges from exposure to both blistering desert heat and wilting humidity. Special care had to be taken when selecting the construction materials to ensure Ithra would stand up to the harsh environmental conditions and minimize energy consumption to deliver a project to Saudi Aramco that would achieve LEED Gold status.

Ithra houses various facilities requiring special ventilation such as a document archive, history museum, and library. The archive and library needed air conditioning and humidity controls conducive to preserving paper, while the museum had different requirements for the artwork and exhibits housed within. Maintaining proper airflow within the buildings also contributes to the overall wellbeing of the occupants, which is especially important

for an environment meant to foster learning and innovation.

Aramco was presented with a Paragon product package that provided a solution for Ithra's unique infrastructure; 176 Paragon Airflow Measurement Systems were installed in the fresh air, supply, and exhaust ducts of the HVAC system to control the pressure within the various buildings, using volumetric tracking/offset of the fresh air and exhaust airflow rates. This ensures a positive pressure is maintained to prevent unconditioned air from entering through the building envelope that could lead to humidity problems. Permanent monitoring allows those responsible for building maintenance to be notified immediately and automatically by the building management system when pressurization problems begin to develop in a specific location—before serious moisture problems develop. This type of early warning system has proven capable of saving millions of dollars in prevented damage to the building, its contents, and in mitigating potential unhealthy indoor air quality and associated health impacts to occupants.

Paragon's Airflow Measurement Systems installed in the fresh air intakes also monitor the amount of ventilation air the HVAC system delivers to the buildings to ensure that an acceptable level of indoor air quality is maintained and to meet the LEED Rating System Indoor Environmental Quality Prerequisite for Minimum Indoor Air Quality Performance. The use of Paragon's highly accu-

SOLUTIONS IMPLEMENTED

FE-1500

Airflow Measurement Station

MTEQ

Airflow Signal Processor



rate Airflow Measurement Systems ensures that energy is not wasted on cooling and dehumidifying ventilation air that could result from inaccurate measurement leading to overventilation with negative energy and cost consequences.

Additionally, the use of Paragon’s highly accurate Airflow Measurement Systems ensured that the buildings are not over pressurized. Overly pressurized buildings can waste a lot of energy if an excessive amount of conditioned air is exfiltrated, cause building security issues by not allowing exterior doors to close properly, and exert excessive force on building seals leading to premature sealant failures.

Paragon’s Airflow Measurement Systems were also an integral part of Ithra’s Mashrabiya architecture facade, which is a traditional feature of Islamic architecture that encourages the flow of air and serves to cool interior spaces. The resulting facade solution was comprised of two main elements – an insulated weather-tight envelope that is wrapped by a feature shade veil. The thin, reflective stainless-steel tubes that make up the feature veil shield the facade from the Saudi sun, while a ventilated air cavity purges any heat that builds up on these elements. Paragon’s Airflow Measurement Systems were installed in the HVAC system to ensure the ventilated air cavity maintains the correct ventilation rate and pressure. Paragon’s Airflow sensors are constructed of 6063-T5 anodized aluminum which does not rust and is resistant to other types of corrosion and deterioration. The durability of aluminum

makes it an ideal material for use in extreme heat and humidity.

Ithra, the Arabic word for ‘enrichment’, was built as a corporate social responsibility initiative for national and international development and since completion it has been a beacon of enlightenment and a hub for innovators, inventors, and knowledge-seeking locals. It has served to showcase the Kingdom’s rich culture both locally and internationally. Ithra’s massive use of sustainable building materials granted it a LEED Gold certification the year it opened. It was also named TIME Magazine’s “100 Greatest Places in the World to Visit” and won the World Innovation Summit for Education (WISE) award. Ithra also won the highest American Concrete Institute (ACI) “Excellence” award for its impressive structure.

Paragon is a leader in commercial and industrial airflow pressure measurement with over 35 years of experience in engineering and manufacturing. We are known for our product reliability and performance. Our quality is trusted by thousands of customers in the education, commercial, and healthcare market segments. We engineer high-quality solutions for client applications to keep buildings running efficiently while protecting occupant safety, reducing risk, and improving facility performance.

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