

# King Abdullah Financial District - KAFD

## Duct Cleaning & Duct Sealing

C A S E S T U D Y





## How it Works?



### Prep of the ductwork

Protect vital equipment and create pressure inside the ductwork



### Connect the Aeroseal Equipment

Attach to the ductwork and run a pretest



### Seal the Ductwork

Inject sealant from the inside the ductwork, sealing only where needed.



### Certify the Results

Verify final duct leakage and pack up equipment





### Building:

King Abdullah Financial District (KAFD) – Parcel 1.16

### Contractors:

Saudi Bin Ladin Group –SBG

### Consultant:

Omraniya & HOK

### Goal:

Maximize HVAC system efficiency, ensure precise airflow as per design specifications, and significantly improve indoor air quality (IAQ) – all while minimizing the environmental footprint and reducing CO<sub>2</sub> emissions.

### Before Aeroseal arabia:

Up to 40% or more of leakage

### After Aeroseal arabia:

Below or around 6% of leakage

### Results:

Eliminated duct leakage in a 113,667 CFM system including all HVAC, exhaust and smoke extract systems.

## Optimizing HVAC Performance for Energy & CO<sub>2</sub> Reduction

Soaring **385 meters** above Riyadh, the Tower is a defining landmark in the **King Abdullah Financial District (KAFD)**. Formerly known as **CMA Tower**, this **80-story crystalline skyscraper**, designed by **Omraniya and HOK**, represents Saudi Arabia's push toward **global financial leadership, innovation, and sustainability**.

With **LEED Gold certification** anticipated, the project required a **state-of-the-art HVAC system** to ensure **optimal indoor air quality (IAQ), energy efficiency, and environmental responsibility**. However, initial inspections revealed **significant duct leakage**, impacting airflow, cooling performance, and sustainability targets.

To resolve these challenges, **Aeroseal Arabia** implemented a **comprehensive HVAC solution**, combining **robotic duct cleaning using dry ice** and **Aeroseal duct sealing** to enhance performance, cut energy waste, reduce carbon footprint In Alignment with **Saudi Arabia's Vision 2030 sustainability goals**.



"As the MEP Sr. Director at Saudi Binladin Group during the PIF Tower construction, we faced significant challenges in rectifying duct leakages, especially in concealed and inaccessible areas where traditional sealing methods failed. Bringing in Aeroseal was a game changer—leakage dropped well within SMACNA limits without the need for demolition or rework. I now consider Aeroseal a critical tool for complex projects and intend to use it across future developments."

**Eng. Fayez Sulaiman –**  
**SBG Sr. MEP Director**



### To Tip:

385 m / 1,263 ft

### Occupied:

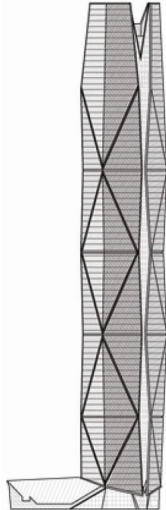
352.5 m / 1,156 ft

### Above Ground:

72 floors

### Below Ground:

4 floors



*"The Tower required a precise, high-performance HVAC solution to address significant air leakage while maintaining superior indoor air quality. By integrating Robotic Duct Cleaning & Dry Ice technology with Aeroseal duct sealing, we ensured the system was thoroughly cleaned and sealed with maximum efficiency. This approach drastically reduced duct leakage, enhancing energy savings, airflow distribution, and environmental sustainability. The success of this project reflects the impact of advanced, non-invasive HVAC technologies in supporting Saudi Arabia's green building initiatives and long-term sustainability goals."*

**Fadi Shora –**  
**Aeroseal arabia Managing Director Testimonial**



Robotic Duct Cleaning Process

## Optimizing HVAC Performance with Aeroseal Arabia's Sealing Technology

A premier commercial high-rise in Riyadh, Saudi Arabia, was experiencing HVAC inefficiencies, including air leakage, failure to meet the design flow rate, and poor indoor air quality (IAQ). A Test & Balance (TAB) inspection confirmed that these issues were negatively impacting energy efficiency and occupant comfort, posing a risk for higher operational costs and non-compliance with Saudi Arabia's sustainability standards.

To resolve these challenges, Aeroseal arabia provided turn key solutions followed by Aeroseal HVAC sealing: first, a duct cleaning process to remove contaminants and improve IAQ, followed by Aeroseal duct sealing to eliminate leaks and optimize airflow efficiency. The results were instantaneous, marking a significant advancement in sustainable building operations within Saudi Arabia, driven by high-performing HVAC systems that meet or exceed relevant codes and standards.

## The Challenge: Restoring HVAC System Efficiency

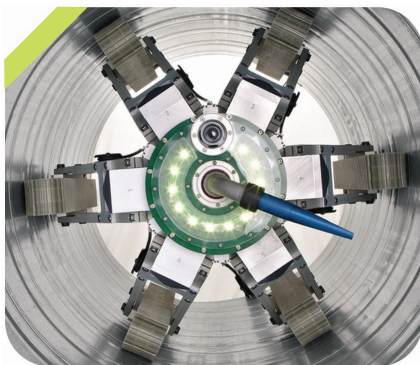
The HVAC system was not functioning as intended, which resulted in irregular airflow and ineffective cooling distribution. Uncontrolled air leakage resulted in significant energy waste, which raised expenses and degraded system efficiency. Concerns regarding occupant health and environmental sustainability were also raised by low IAQ.

Given the tower's prominence as a key commercial property in Riyadh, ensuring optimal HVAC efficiency was essential not only for energy conservation but also for maintaining compliance with Saudi Arabia's Vision 2030 sustainability initiatives.





Pre-seal Certificate



Robot actively navigating inside the ductwork

## Leakage Test – Pre-Seal

Before implementing corrective measures, **Aeroseal Arabia** conducted a **pre-seal leakage test** to assess duct performance. The findings revealed **up to 40% leakage**, contributing to **uncontrolled energy loss** and reduced HVAC system effectiveness.

Without proper sealing, the project risked **higher operational expenses, poor indoor comfort, and inefficiencies in air circulation**, reinforcing the need for a **targeted solution**.

## Robotic Duct Cleaning Using Dry Ice

To optimize the duct sealing process, **Aeroseal Arabia** first carried out **robotic duct cleaning** using **Dry Ice technology**. Since the building was still under construction, removing **construction-related dust, debris, and airborne contaminants** was essential for achieving maximum sealing efficiency.

The **dry ice cleaning method** provided **chemical-free, residue-free purification**, while the **system** ensured thorough cleaning without damaging duct surfaces. This proactive approach significantly enhanced **IAQ** before sealing.

## Duct Sealing

Following the duct cleaning, **Aeroseal Arabia** applied its **advanced sealing technology** to **eliminate air leaks** across the system. The process involved:





Team monitoring live duct sealing progress on screen

1. Identifying and sealing leaks **without invasive repairs**
2. Restoring **airflow integrity** for optimal HVAC performance
3. Ensuring compliance with **Saudi Arabia's green building initiatives**


This step ensured **long-term energy savings and improved IAQ**, positioning the Tower as a **benchmark for sustainable commercial properties**.

### Leakage Test – Post-Seal

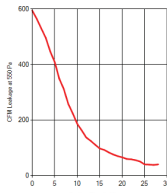
After sealing, a post-seal leakage test validated the effectiveness of the intervention. The results showed leakage reduction from 40% or more to just 6%, confirming:


1. **Improved system efficiency**
2. **Optimized cooling performance**
3. **Minimized air leakage-related energy waste**

Supporting documentation—including **Pre-Seal & Post-Seal certificates, updated TAB reports, and IAQ measurements**—reinforced the success of the project.



**Certificate of Completion**

<b>Duct Sealing Performed For:</b> PIF - Tower King Abdullah Financial District KAFD King Fahd Road, 11564 Asatalla Area Riyadh, Riyadh 13241	<b>Aeroseal Sealing Profile</b> 
<b>Aeroseal Technician:</b> ALWALEED NASIR <b>Aeroseal Case ID:</b> 3060 <b>Date of Seal:</b> 2/20/2020	<b>Model:</b> Duct Type: <b>Supply</b> <b>System Description:</b> PIF-AHU-23-7-8 <b>Seal Description:</b> SUPPLY <b>Hardware:</b> EuroSeal
<b>Sealing Results</b> SMACNA Level: <b>15</b> Initial CFM: <b>595.1</b> Final CFM: <b>40.3</b> Target CFM: <b>68.8</b> Operating Pressure: <b>550 Pa</b> Surface Area: <b>250</b> Duct Leakage Reduction: <b>93.2%</b>	<b>Duct Sealing Performed By:</b> Advanced World Technology Services (AWTS) Jeddah, Al-Sharafa Al-Madinah Al-Munawwarah Road



Post-seal Certificate

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*As Project Manager at Evolution, I was impressed by the speed and efficiency of Aeroseal's sealing process. The verification of leakage, testing & balancing confirmed the outstanding results. The successful sealing exceeded our expectations and left us fully satisfied with the outcome.*

**Yazan Rahhal**  
- Project Manager, Evolution





### Results: Immediate Energy and Airflow Optimization

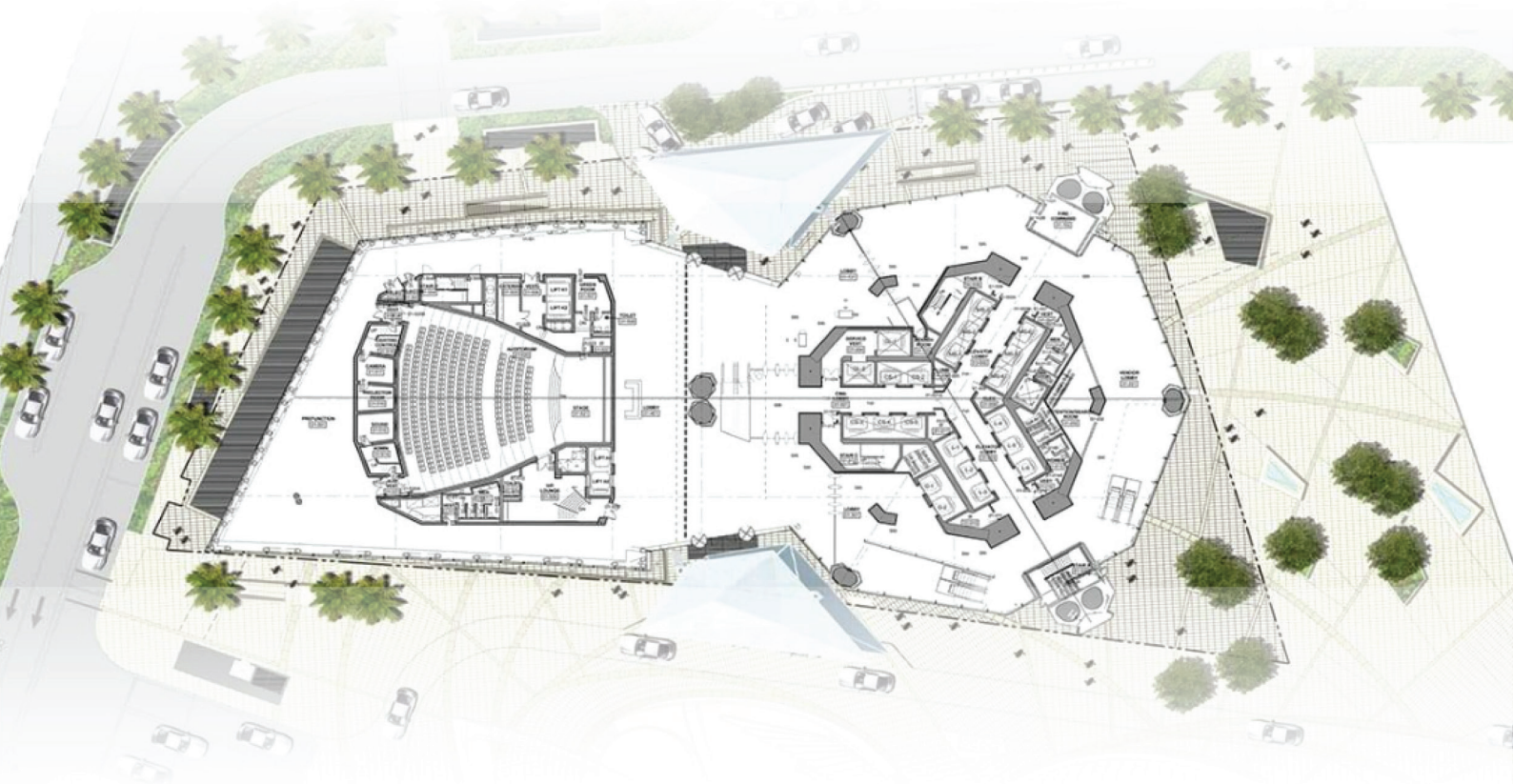
Following Aeroseal Arabia's intervention, the project experienced **instant improvements**:

1. **Restored airflow efficiency**, achieving design flow rate
2. **Enhanced IAQ**, ensuring healthier indoor environments
3. **Energy optimization**, reducing operational costs and waste

Additionally, **sealing 113,667 CFM of duct leakage** at **parcel 1.16 in KAFD** resulted in an estimated **142,000 kWh of energy savings annually**. This translates to a reduction of **over 75 metric tons of CO<sub>2</sub> emissions per year**—roughly equivalent to:

1. **Removing 16 cars from the road**
2. **Planting over 1,200 trees**

These estimates highlight the significant environmental impact of the project, contributing to **Saudi Arabia's sustainability initiatives** and reinforcing the importance of **net-zero building technologies** in commercial developments.







### Advancing Sustainable HVAC Solutions in Saudi Arabia

Aeroseal Arabia's duct cleaning and sealing solutions successfully optimized parcel's 1.16 HVAC performance, ensuring better airflow, improved IAQ, and substantial energy savings. By reducing air leakage and operational inefficiencies, the project set a new standard for sustainable building operations in Saudi Arabia's commercial sector.

As Saudi Arabia continues to push for net-zero objectives and LEED-certified developments, Aeroseal Arabia remains a trusted leader in energy-efficient HVAC technologies. For commercial properties looking to enhance sustainability and efficiency, Aeroseal Arabia offers proven expertise tailored to the Kingdom's evolving environmental goals.