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= CASE STUDY =

RIYADH HILTON MAINTAINS TIGHT SCHEDULE AND PASSES INSPECTION WITH THE HELP OF AEROSEAL DUCT SEALING

Project Achieves 95% Reduction in Duct Leakage

When it opens to the public in 2018, the Hilton Riyadh in Saudi Arabia will be one of the top 10 Hilton Hotel properties in the world. Construction began on the massive luxury hotel and residence project back in 2012. The two-building complex has 866 guest rooms as well as four restaurants, including a roof garden cafeteria, a business center, health club with an indoor swimming pool and a 1,750 seat ballroom. The total built up area for the complex is 220,000 M2.

In Brief

Building: Hilton Riyadh Hotel and Residences
Location: Riyadh, Saudi Arabia
Aeroseal Contractor: Advanced World Trading (AWT)
General Contractor: Al Latifia
Goal: Meet Ventilation Codes and Reduce Energy Costs
Before Aeroseal: 33,089 CFM of leakage (total)
After Aeroseal: 1279 CFM of leakage (total)
Results: Reduced leakage by more than 95%, which resulted in annual energy savings of SAR 215,000.

A “soft launch” of the property was scheduled for Summer 2018. However, a leakage problem was lurking in some of the exhaust shafts of the 20-story and 12-story buildings that would likely spell a delay.

In July 2017, general contractor Al Latifia turned the project over to its commissioning consultant (UCS) and an air balancer (Team Arabia) to begin commissioning of the ventilation system and fresh air makeup in the guest rooms.

This was done in order to meet the required ventilation codes to complete the project and hand it off to the Hilton for occupancy.

Figure 1: Artist's rendering of the Hiton Riyadh complex.

Exhaust leakage levels determined that duct sealing was needed, with limited access available. An Internet search revealed a new technology called Aeroseal that seals ductwork from the inside out.

The commissioning team was doubtful of the new technology, however. "A solution that only clings to and fills the holes without coating the inside of the ductwork. How can this be possible?" said Muthafar Emeish, commissioning team leader for UCS. After several calls and consultations with Aeroseal's U.S. Senior Vice President Neal Walsh, the team was introduced to the local Saudi Arabian Aeroseal service provider, Advanced World Trading (AWT). The next step was to propose the idea of using Aeroseal duct sealing to Shakir Hamdi, MEP project Director for the general contractor Al Latifia.

Figure 2: Hotel HVAC Ducting Layout.

Hamdi was skeptical as well to use this technology. "I discussed the idea of using Aeroseal with my client, Omrania, the designer and architect firm on the project," said Hamdi. As expected, Irshad Zahid, mechanical engineer for Omrania had the same concerns about whether the technology could be effective.

“When Al Latifia brought the idea to me, I had never heard of Aeroseal,” said Zahid. “But our other options were extremely limited,” he remarked. “The shafts were fully enclosed in masonry. Although there were access panels, it would have been extremely tedious work to get inside and try to seal all the joints by hand.” Zahid continued, “Manpower costs are relatively low here, but in this case, time was the most valuable commodity. We had a specific timeline to meet and would have had to call in a very large crew to even attempt manual sealing.”

Figure 3: The sealant doesn’t coat the duct interior but accumulates only in and around the leaks.

Using Aeroseal technology to seal the ductwork would offer a number of significant advantages over traditional duct sealing methods. Applied as an aerosol mist, the sealant is blown into the interior of ductwork that has been temporarily segmented into specific sections. Rather than coating the entire inside walls of the ducts, the sealant particles remain suspended in air until they are drawn to the various leaks. The particles then stick to the edge of the leak and then to other particles until the entire hole is completely filled from the inside.

The Aeroseal duct sealing technology has been used widely in commercial buildings throughout the United States for the past two decades. However, due to the doubts and questions surrounding the first time use of the new technology in Saudi Arabia, everyone involved thought it best to first perform a pilot project to prove that the technology would work as expected.

Figure 4: AWT technician discusses the Aeroseal process with UCS engineer Muthafar Emeish.

AWT, an indoor air quality specialist, mobilized its project team and set to work on sealing one single section of riser at the hotel. The results of the pilot sealing project were impressive. “I saw it work with my own eyes,” said Fadi Osiali, senior mechanical engineer from Team Arabia. “I punched several holes in the ductwork and saw them filled,” echoed Emeish from UCS.

With the results fully measured and verified, the go ahead was given for AWT to seal the rest of hotel’s 70 risers, which ranged in length from 60 to 180 meters to minimize and improve any exhaust duct leakage. At the same time, a thorough duct inspection was conducted using unique robots, and AWT recommended that cleaning and polishing of some of the ductwork also be performed.

Figure 5: Aeroseal duct sealing machine.

A large team of project leaders, technicians and assistants was assembled using resources from both AWT and Al Latifia. Sealing began in early March 2018. Two separate Aeroseal machines were in operation around the clock until completion of the project eight weeks later. Team Arabia and UCS completed all the final verifications on all 70 risers successfully.

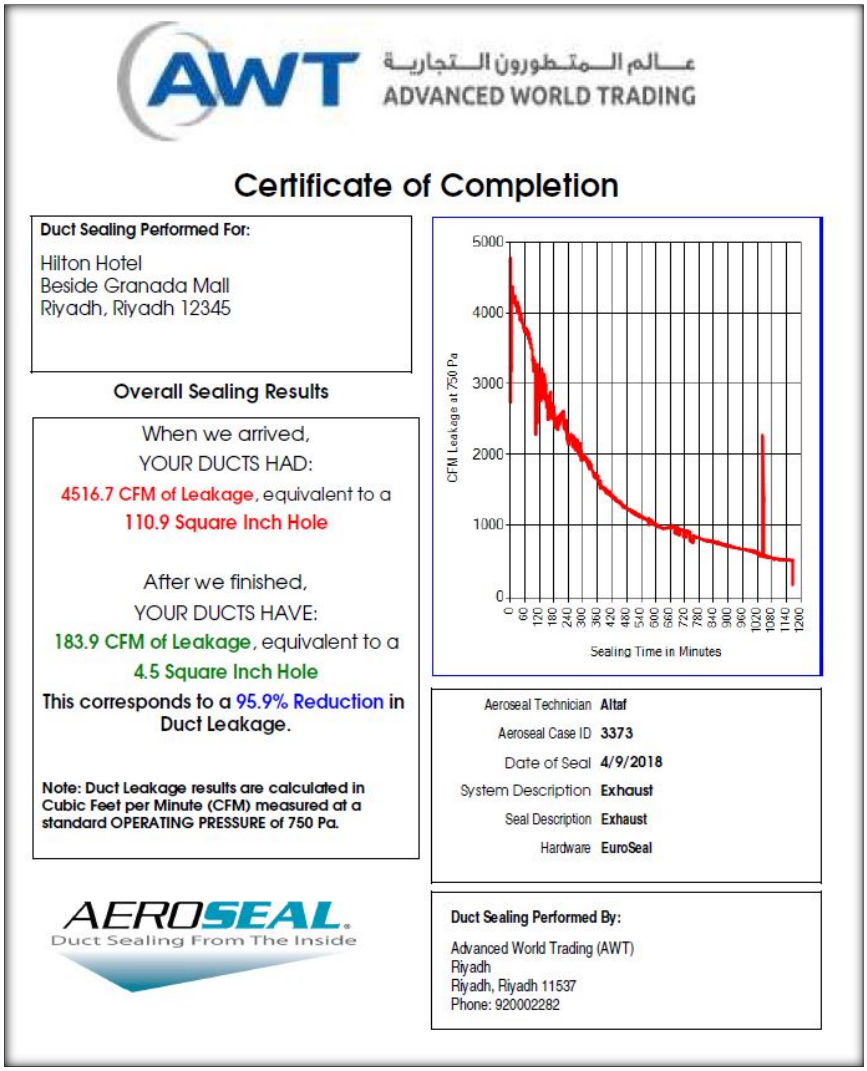

Figure 6: One of many Aeroseal Certificates of Completion, demonstrating 95% + reduction in leakage.

At long last, the massive project could be handed over to the Hilton. Tarek Khalifa, Riyadh Hilton's assistant chief mechanical engineer, has a unique perspective on the successful project. "I started out working with Al Latifia during the construction phase and was one of the first to witness the duct leakage problem," remarked Khalifa. "The hotel's HVAC systems were producing the designed cfm – but the air was not being delivered. Now, thanks to Aeroseal, the systems are performing as designed." Khalifa also happily reported, "The pre-opening Hilton team will take over in the presence of the contractors on July 1, to begin preparations for the Grand Opening planned for October 2018."

The Results and Kudos

"The entire Aeroseal team was very proactive and always pushing to solve the problem in a timely manner. We already have another project (hospital) on which we are planning to use Aeroseal in the future."

Shakir Hamdi – MEP Project Director
Al Latifia – General Contractor

"I found the Aeroseal process to be very effective! It eliminated more than 90% of the leakage, which is quite a good percentage. Many times, leakage is pushed under the carpet, especially when it comes to exhaust. But Aeroseal was able to meet and exceed our very strict test standards."

Irshad Zahid – Mechanical Engineer
Omrania – Designer/Architect for Hilton Project

"Everyone was surprised at results that were achieved with Aeroseal. The expedited process was a big advantage. It is a very effective technology, and we are happy to have found it. We will definitely consider it for future projects."

Muthafar Emeish – Commissioning Team Leader
UCS Universal Consultancy Services

"The difference in airflow before and after Aeroseal was staggering. The final results demonstrated really good readings and flow. We can definitely see and feel the improvement. We were skeptical in the beginning, but now we know Aeroseal will work."

Fadi Osiali – Senior Mechanical Engineer
Team Arabia – Test and Balance Contractor

"Aeroseal proved to be a very innovative solution for our problem. I was very happy with the immediate reduction in leakage. I have already had many inquiries about the Aeroseal process and AWT. We were pleased with their work and are hoping to use them for ongoing exhaust cleaning and maintenance at the hotel."

Tarek Khalifa – Assistant Chief Mechanical Engineer
Hilton Hotel – Maintenance Department

Aeroseal – The Technology

- Developed at Lawrence Berkeley National Laboratory in 1994.
- Research for aeroseal technology was partially funded by the U.S. Department of Energy.
- Aeroseal is the only duct sealant technology that is applied from the inside of the duct system. It is delivered as a non-toxic aerosol mist that seeks out and plugs leaks.
- Aeroseal has proven to be 95% effective at sealing air duct leaks.

For more information on this sealing project or about Aeroseal in general, contact Aeroseal at (937) 428-9300. You can also visit the Aeroseal website at www.aeroseal.com.

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