

Air Space- Enhancing Air Quality, Pathogen Control, and Cleanliness for Funeral Directors and Mortuaries

Executive Summary

This white paper highlights the comprehensive benefits of Air Space technology for the funeral director and mortuary industry. Air Space offers a solution that improves air quality, reduces airborne pathogens, controls mould and fungi build-up, enhances cleanliness, and ensures regulatory compliance.

Key Benefits of Air Space:

- Improved air quality
- Pathogen reduction
- Enhanced safety and hygiene
- Improved Staff Well Being and Customer Experience
- Mould and fungi control
- Regulatory compliance

Introduction

The funeral director and mortuary industry play a crucial role in providing respectful and dignified services to grieving families. However, the unique challenges faced in this sector, including hygiene concerns, mould issues, and time constraints, necessitate innovative solutions to ensure a safe and comfortable environment for all.

Challenges and Issues in the Funeral and Mortuary Sectors:

1. Mould and Fungi Build-up

Funeral homes and mortuaries often face challenges related to the accumulation of mould and fungi, leading to health risks and facility damage.

2. Virus and Bacterial Contamination

The industry exposes personnel to infectious diseases, demanding effective pathogen control measures.

3. Hygiene and Cleanliness

Maintaining high standards of hygiene and cleanliness is critical to avoid cross-contamination and maintain a positive reputation.

4. Odour Control

Strong and unpleasant odours are common and need to be managed to create a respectful atmosphere.

5. Time Constraints

Funeral directors and mortuary staff operate under time-sensitive conditions, requiring efficient operations without compromising safety and cleanliness.

The Air Space Solution

Overview of the Air Space Technology

Air Space technology is designed to comprehensively address the challenges faced by funeral directors and mortuaries. It offers a range of benefits, including:

- **Airborne Pathogen Reduction:** Continuous air disinfection minimizes the presence of airborne pathogens, ensuring a safer environment.
- **Mould and Fungi Control:** Air Space effectively eliminates mould and fungi from the air, preventing build-up and associated issues.
- **Enhanced Safety and Hygiene:** The technology improves overall hygiene and cleanliness, creating a more sanitary environment for staff and visitors.
- **Odor Control:** Air Space eliminates unpleasant odours, enhancing the comfort of grieving families and maintaining a respectful atmosphere.
- **Regulatory Compliance:** Air Space meets UK standards and requirements for air quality and pathogen control, ensuring regulatory compliance.

How Air Space Works

Air Space technology utilizes advanced air cleaning methods to achieve these benefits. It employs a continuous air disinfection process, real-time monitoring to ensure safety, and controlled plasma technology to combat airborne pathogens, mould, fungi, and odours effectively. At the heart of the technology is a complex chamber where air is mixed with gaseous plasma products to eradicate any air borne pathogens. The surrounding air is sucked from the environment into this chamber, mixed and combined and then passed through a series of complex scrubbers and filters before the cleaned and fresh air exits to the environment. Sensors ensure that any byproducts are completely removed. Gaseous plasma emerges as a formidable contender for microbial eradication and disinfection, boasting a multifaceted approach that distinguishes it from conventional sterilization methods. Unlike traditional techniques that primarily rely on heat, chemicals, or radiation, precisely controlled gaseous plasma at the heart of the Air Space family of products harnesses the power of charged particles and reactive species, acting on numerous fronts to neutralize a broad spectrum of microorganisms, including bacteria, fungi, viruses, and moulds. These potent elements act as a dynamic force against the most resistant microorganisms by disrupting their cellular functions and rendering them defenceless. By attacking pathogens at their core, controlled plasma effectively neutralizes even the most resilient drug-resistant strains such as MRSA. This focused assault not only eradicates harmful microbes but also significantly curtails the development of antimicrobial resistance.

1. Production of Reactive Species:

Gaseous plasma is a unique state of matter where electrons gain high energies through collisions with other particles, giving rise to an array of reactive species:

- **Ions:** Both positively charged cations and negatively charged anions are generated.
- **Electrons:** High-energy electrons initiate chemical reactions and directly damage cellular components.
- **Free Radicals:** Excited molecules release energy by emitting photons or react with other molecules, producing highly reactive free radicals like hydroxyl radicals ($\bullet\text{OH}$), atomic oxygen (O), and atomic nitrogen (N).

2. Chemical Reactions:

Within this dynamic environment, a cascade of chemical reactions ensues:

- **Ions Interaction:** Positively and negatively charged ions can disrupt microbial cell membranes by disturbing the electrical balance, leading to membrane leakage and cell death.
- **Electron Impact:** High-energy electrons break chemical bonds in microbial cell membranes, DNA, and proteins, causing structural damage and functional impairment.

- **Free Radical Attack:** Reactive species, particularly hydroxyl radicals, target microbial cells by damaging lipids through peroxidation, DNA by inducing mutations and strand breaks, and proteins via denaturation.

3. Cell Membrane Disruption:

The disruption of microbial cell membranes is a key facet of plasma's action:

- Reactive species, including ions and free radicals, destabilize microbial cell membranes through lipid peroxidation and oxidative stress, compromising membrane integrity.

4. DNA Damage:

Plasma-generated reactive species, especially hydroxyl radicals, induce extensive DNA damage:

- Base modifications, strand breaks, and cross-linking disrupt DNA replication and transcription.

5. Protein Denaturation:

Proteins within microorganisms undergo structural changes (denaturation) due to modifications by reactive species:

- This renders enzymes non-functional, disrupting vital cellular processes.

6. Cellular Stress Response:

- While microbial cells may attempt to activate stress response mechanisms, the overwhelming oxidative stress and physical harm often override these defences, resulting in cell death.

7. Biofilm Disruption:

Gaseous plasma's unique ability to generate reactive species is particularly effective in breaking down the extracellular polymeric substances (EPS) that comprise biofilms:

- This weakens the biofilm matrix, making it easier to remove or kill embedded microorganisms.

In summary, gaseous plasma's distinctive approach to microbial eradication, acting on numerous molecular and structural fronts, sets it apart from conventional sterilization methods. Its versatility in targeting a wide spectrum of microorganisms makes it a potent and promising tool for disinfection and sterilization across various applications. This multifaceted attack on microbiology has also shown to reduce the

Key Features

Air Space's key features make it an ideal solution for funeral directors and mortuaries, helping them address a wide range of challenges:

- Airborne pathogen reduction
- Continuous air disinfection
- Mould and fungi control
- Odor elimination
- Regulatory compliance assurance

Benefits for Funeral Directors and Mortuaries

Air Space technology offers a wide range of benefits that drive informed decisions to invest in a cleaner and safer environment. These benefits span across various critical areas and impact both operational efficiency and overall wellbeing. Here are the key benefits of Air Space technology:

1. Improved Air Quality

Enhanced Respiratory Health: Air Space's continuous air disinfection reduces airborne pathogens, allergens, and pollutants, leading to improved respiratory health among occupants. Fewer respiratory issues mean fewer sick days and reduced healthcare costs.

Comfortable Environment: Clean and fresh air creates a more pleasant and comfortable environment for everyone, fostering a sense of wellbeing and productivity. Improved air quality is particularly important in spaces where people spend extended periods.

2. Pathogen Reduction

Enhanced Safety: Air Space effectively reduces the presence of airborne viruses, bacteria, and fungi, minimizing the risk of disease transmission. This benefit is invaluable in healthcare facilities, offices, and public spaces where pathogen control is essential for public health and safety.

Lower Healthcare Costs: Fewer infections and illnesses among occupants translate to reduced healthcare costs for both individuals and organizations. This is especially significant in high-traffic areas such as schools and public transportation.

3. Cleanliness and Hygiene

Reduced Cleaning Costs: Air Space technology helps maintain a consistently hygienic environment, reducing the frequency and intensity of cleaning routines. This leads to cost savings on cleaning supplies, labour, and maintenance.

Enhanced Reputation: Cleaner and safer spaces positively impact the reputation of businesses and institutions. It can lead to higher customer satisfaction, increased patronage, and greater trust in healthcare facilities.

4. Odour Control

Improved Customer Experience: Effective odour control ensures a more pleasant experience for customers, guests, and visitors. In sectors such as hospitality and retail, this can lead to increased patronage and higher revenue.

Enhanced Staff Wellbeing and Workplace Morale: In workplaces, eliminating unpleasant odours contributes to higher employee morale and productivity. It creates a more comfortable and motivating atmosphere for staff.

5. Regulatory Compliance

Peace of Mind: Air Space's compliance with industry-specific regulations and standards ensures peace of mind for facility managers and owners. It reduces the risk of fines and legal issues related to air quality and hygiene violations.

6. Cost Savings

Reduced Healthcare Expenses: By minimizing the risk of illnesses and allergies caused by poor air quality, Air Space technology can lead to substantial reductions in healthcare expenses, including medical bills and medication costs.

Lower Cleaning and Maintenance Costs: The continuous air disinfection capabilities of Air Space technology reduce the need for extensive cleaning and maintenance, resulting in significant cost savings over time.

Increased Operational Efficiency: Cleaner and healthier environments lead to increased employee productivity and fewer disruptions due to illnesses, ultimately boosting operational efficiency.

7. Environmental Sustainability

Energy Efficiency: Air Space technology is designed with energy efficiency in mind, contributing to reduced energy consumption and lower utility bills. This environmentally responsible approach aligns with sustainability goals.

Less Chemical Usage: By reducing the need for harsh cleaning chemicals and disinfectants, Air Space promotes environmentally friendly practices and reduces the environmental impact of cleaning processes.

8. Remote Monitoring for Critical Parameters

Enhanced Operational Oversight: Air Space technology offers optional remote monitoring capabilities, allowing mortuaries and funeral directors to maintain continuous oversight of crucial environmental parameters. This includes monitoring temperature, humidity, and other critical factors that are essential for the preservation and respectful handling of deceased individuals.

Preservation Quality Assurance: The ability to remotely monitor temperature and humidity levels ensures that the preservation conditions within mortuary and funeral facilities remain consistent and within the desired range. This helps prevent issues such as premature decomposition and ensures the dignified treatment of the deceased.

Early Issue Detection: Remote monitoring provides real-time data, enabling prompt identification of any deviations from optimal conditions. This proactive approach allows for immediate corrective actions, minimizing the risk of unexpected challenges and preserving the integrity of the facility's operations.

Compliance and Reporting: Remote monitoring of critical parameters aids in regulatory compliance by providing a documented record of environmental conditions. This can be valuable for demonstrating adherence to industry-specific standards and requirements, contributing to a higher level of trust among stakeholders and regulatory authorities.

Peace of Mind: Mortuaries and funeral directors can have peace of mind knowing that they have access to real-time data and alerts regarding environmental conditions. This ensures that the highest standards of care and respect are maintained for the deceased while minimizing the risk of operational disruptions.

In summary, Air Space technology offers a holistic solution that not only enhances air quality and safety but also delivers cost savings, improved hygiene, and a positive impact on overall wellbeing. These benefits make Air Space a wise investment for a wide range of industries and applications, contributing to healthier, happier, and more efficient spaces. Incorporating optional remote monitoring capabilities into Air Space technology adds an extra layer of assurance and operational control, making it an even more valuable asset for the mortuary and funeral sector. These features contribute to the overall benefits of Air Space by ensuring the preservation and respectful handling of the deceased while facilitating compliance with industry-specific standards.

Case Studies

Case Study 1: Problem - Mould and Fungi Build-up

Air Space Solution:

A leading UK based independent funeral director struggling with mould issues installed Air Space technology in their embalming and preparation rooms. Over six months, mould build-up was significantly reduced, leading to improved air quality, lower maintenance costs, and enhanced safety.

Case Study 2: Problem - Virus and Bacterial Contamination

Air Space Solution:

A busy urban mortuary implemented Air Space units to mitigate disease transmission risks among staff and visitors. Over a year, reported cases of illness decreased significantly, improving staff safety and the facility's reputation.

Case Study 3: Problem - Hygiene and Cleanliness

Air Space Solution:

A chain of funeral homes installed Air Space units to maintain consistent hygiene standards across multiple locations. The technology's continuous air disinfection ensured a consistently hygienic environment, boosting staff morale and customer satisfaction.

Case Study 4: Problem - Odour Control

Air Space Solution:

An upscale funeral home enhanced the comfort of grieving families by eliminating unpleasant odours with Air Space technology. Positive feedback from families resulted in higher customer retention rates and an improved brand image.

Case Study 5: Improving Air Quality for Enhanced Staff Wellbeing

A large mortuary facility recognized the importance of staff wellbeing and sought to improve air quality within their premises. The facility needed to ensure a comfortable working environment for their personnel while maintaining regulatory compliance.

Air Space Solution:

Understanding the significance of air quality for staff wellbeing, the mortuary facility integrated Air Space technology into their air handling system. Air Space's comprehensive air purification capabilities ensured that not only did the facility meet stringent UK air quality regulations, but it also created a cleaner and healthier atmosphere for staff.

Over the course of several months, the impact of improved air quality on staff wellbeing was evident:

- **Enhanced Comfort:** Staff reported a noticeable improvement in the overall comfort of their workplace. The absence of unpleasant odours and the continuous reduction in airborne pathogens contributed to a more pleasant working environment.
- **Health Benefits:** With reduced exposure to airborne contaminants, staff experienced fewer respiratory issues and reported fewer sick days. The improved air quality directly contributed to their health and wellbeing.
- **Increased Productivity:** The combination of cleaner air and a more comfortable workspace resulted in increased productivity among staff. Tasks were completed more efficiently, and morale was higher.
- **Safety Assurance:** The mortuary facility's compliance with UK air quality regulations was confirmed through independent air quality tests, providing assurance to staff that their workplace was not only comfortable but also safe.

In summary, the integration of Air Space technology not only ensured regulatory compliance but also significantly improved staff wellbeing. The enhanced air quality created a more comfortable and productive environment, benefiting both the staff and the facility's operations.

Case Study 6: Overall Improvements

Air Space Solution:

A busy funeral director's office installed Air Space units to address multiple challenges. Over time, the technology improved air quality, reduced mould and fungi issues, enhanced cleanliness, and contributed to smoother operations during busy periods.

Case Study 7: Financial Savings through Mould and Fungi Reduction

Build-up of mould and fungi represents a significant time, financial and other resource issue within embalming and preparation rooms in particular. These challenges not only raised hygiene concerns but also incurred significant financial burdens on the facility.

The Air Space Solution:

Recognizing the need to address this issue comprehensively, the funeral home implemented Air Space technology to combat mould and fungi build-up in their premises. The continuous air disinfection capabilities of Air Space played a pivotal role in tackling this challenge.

Financial Drivers and Metrics:

1. *Reduced Maintenance Costs:*

Prior to the implementation of Air Space, the funeral home had to conduct frequent and intensive cleaning and maintenance routines to combat mould and fungi. These routines required substantial labour, cleaning supplies, and downtime for the facilities.

Outcome: With Air Space technology effectively reducing mould and fungi in the air, the funeral home witnessed a significant decrease in the frequency and intensity of cleaning. This led to a substantial reduction in maintenance costs.

2. *Preservation of Facility Infrastructure:*

Mould and fungi can not only pose health risks but also compromise the structural integrity of a facility over time. Repairing or replacing affected structures can be a costly endeavour.

Outcome: By preventing mould and fungi build-up in the first place, Air Space technology contributed to the preservation of the funeral home's infrastructure. This resulted in substantial long-term cost savings, as the facility avoided the expenses associated with structural repairs and renovations.

3. *Increased Efficiency:*

Efficiency is a critical metric in the funeral industry, where time constraints are prevalent. Excessive cleaning and maintenance routines due to mould and fungi issues could lead to delays and inefficiencies in the operation of the funeral home.

Outcome: Air Space's ability to reduce mould and fungi build-up not only lowered cleaning and maintenance costs but also enhanced overall operational efficiency. Funeral directors and staff had more time to focus on providing respectful and timely services to grieving families.

4. *Positive Customer Experience:*

The financial health of a funeral home is closely tied to its reputation and customer satisfaction. Unpleasant odors and mould issues could deter customers and lead to negative reviews, impacting the facility's revenue.

Outcome: With Air Space effectively eliminating unpleasant odors and contributing to a cleaner and more comfortable environment, the funeral home experienced improved customer satisfaction. Positive reviews and increased patronage led to enhanced revenue.

Summary:

The implementation of Air Space technology not only addressed the mould and fungi challenges faced by the funeral home but also had a significant financial impact. Reduced maintenance costs, preservation of facility infrastructure, increased operational efficiency, and improved customer experience all contributed to substantial financial savings and a healthier bottom line for the funeral home, making it a wise investment for funeral directors and mortuaries seeking both operational and financial improvements.

These case studies illustrate the effectiveness of Air Space technology in addressing the unique challenges faced by funeral directors and mortuaries, leading to safer, cleaner, and more efficient operations.

Conclusion: Air Space- Advancing Environments through Scientific Excellence:

The Air Space family of products represents a pinnacle of scientific achievement, poised to enhance environments across diverse domains. Driven by cutting-edge technology, Air Space offers a multifaceted array of benefits and advantages:

- **Air Quality Enhancement:** A precision-engineered system that orchestrates the removal of airborne contaminants, leading to superior air quality characterized by reduced particulate matter and enhanced respiratory well-being.
- **Pathogen Mitigation:** A formidable guardian against the infiltration and proliferation of airborne pathogens, including viruses, bacteria, and fungi, ensuring optimal safety and a profound sense of reassurance.
- **Elevated Hygiene Standards:** Air Space's sophisticated disinfection mechanisms contribute to meticulous cleanliness, leading to discernible reductions in sanitation costs and ensuring that hygiene protocols are consistently upheld.
- **Balanced Aromatics:** By effectively eliminating unpleasant odours, Air Space achieves a harmonious balance in the environment. This results in spaces that not only maintain high standards of cleanliness but also exude a welcoming, fresh and appealing scent, leaving a lasting positive impression.
- **Regulatory Excellence:** A steadfast adherence to industry-specific regulations and benchmarks underscores Air Space's unwavering commitment to regulatory compliance, bolstering the stature and reliability of facilities in various sectors.
- **Financial Optimization:** Beyond its scientific results, Air Space yields tangible financial efficiencies by curbing healthcare expenditure, streamlining maintenance costs, and enhancing overall operational efficacy.
- **Environmental Responsibility:** Embracing environmental stewardship, Air Space's eco-conscious design and energy-efficient operations contribute to sustainable practices, aligning seamlessly with eco-sustainability objectives.
- **Remote Precision Monitoring:** Augmenting its scientific prowess, Air Space offers optional remote monitoring capabilities, furnishing real-time insights into critical parameters. This feature ensures operational precision and reinforces peace of mind.

The Air Space family of products transcends conventional air purification. It embodies scientific rigor, delivering wide ranging benefits that transform spaces into sanctuaries of health, efficiency, and fiscal responsibility. Whether in healthcare, hospitality, education, or many other sectors, the future is poised to thrive with Air Space.

Next Steps

To explore the implementation of Air Space technology in your funeral home or mortuary facility, please contact our distributor at info@osy-group.com.

This white paper is intended to provide information and guidance regarding the benefits of Air Space technology for funeral directors and mortuaries, addressing key industry problems and issues. These benefits extend across various markets where air quality and pathogen control are important. For specific inquiries, further information and evidence or to explore implementation options, please contact info@OXONOX.com.

Disclaimer: The information provided in this white paper is based on the knowledge available as of the publication date and may be subject to change. Readers are encouraged to verify the information and consult with experts in the field for the most up-to-date recommendations and solutions.