Ultra Clean
Operating Theatres & Suites
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Today, Howorth is a specialist supplier of air technology solutions, serving the global medical, pharmaceutical and wider industrial markets. Our clients include small business, blue-chip private companies and the government sector.

The company’s strong reputation has been earned by providing well designed, high quality goods, together with a superior level of customer service, both pre and post order.

**Inventors of the Ultra Clean Operating Theatre**

In the early 1960s, Howorth’s experience and skills were applied in response to the needs of the medical profession. Working in close collaboration with renowned orthopaedic surgeon, Sir John Charnley, Howorth designed and developed the world’s first Ultra Clean Ventilation (UCV) system.

From this pioneering first step, the company went on to create the Howorth Exflow™ UCV which, in its current derivation, remains a global leader in the field of ultra clean ventilation.

In addition to the Exflow, Howorth also provides a broad range of additional products and services for the medical market, ranging from theatre lighting and ceiling service units to complete turnkey healthcare facilities.

**Showroom & Research Facility**

Howorth’s recently refurbished medical products showroom includes a fully fitted twin operating theatre complex, complete with Exflow UCVs and a variety of ancillary equipment. The showroom is an invaluable aid for demonstrating Howorth’s range of healthcare products and is also extensively utilised in our ongoing product development programmes.

**US Operations**

In 2008, Howorth continued its ongoing expansion into the Americas with the opening of a brand new manufacturing facility in Louisville, Kentucky. The facility enables Howorth to better serve the North American market both in terms of manufacturing new equipment, including Exflow systems, and to provide a base from which to deliver an enhanced level of aftermarket support.
**Exflow™ UCV Systems**

The original and still the best, today’s Exflow provides a larger Ultra Clean zone and a reduced risk of entrainment without the need for restrictive full length side walls.

**Exflow - The Original UCV System**

The Howorth Exflow UCV system was jointly developed with the internationally acclaimed orthopaedic surgeon, Sir John Charnley. Howorth subsequently perfected and patented the unique Exflow unit with a graded velocity airflow, vertical in the central area and radially outwards at the periphery, creating an exponential profile.

Installed in over 2,300 operating theatres worldwide, the Howorth Exflow is now available in two sizes. Both models provide microbiological cleanliness and airflow results exceeding all current regulatory requirements.

**Exflow 32™**

Launched in 2006, the Exflow 32 is the latest addition to the Exflow family. The new system has an enlarged Ultra Clean operating zone of 3.2 x 3.2m, allowing the entire operating team and all their instrument tables to be accommodated beneath the canopy. Its in-built luminaires can provide a measured light level in excess of 1,200 lux.

Despite the increase of nearly 50% in the volume of air generated by the Exflow 32, the system is extremely quiet, meeting noise level targets set-out in HTM 03-01.

**Exflow 28™**

The Exflow 28, as its name suggests, provides an Ultra Clean operating zone of 2.8 x 2.8m. The unit provides all the benefits of its larger brother but in a compact package that makes it ideal for retrofit or refurbishment projects.

**Barn Theatres**

The Exflow’s ability to exclude entrainment of external airborne particulate has made it particularly suitable for so-called ‘barn theatres’, within whose totally open space multiple operations can be carried out simultaneously under adjacent Exflows. Barn theatres are validated regularly to ensure complete safety and full compliance with HTM requirements.

**Body Exhaust**

The Charnley Howorth Body Exhaust System has been designed to remove bacteria-carrying particles emitted by the surgical team and works in perfect conjunction with the Exflow canopy to bring new levels of air cleanliness to operating theatres.
Healthcare Associated Infections

The use of Howorth’s Exflow™ UCV has been proven to reduce the occurrence of micro-organisms within the operating theatre and more specifically at the wound site.

Healthcare associated infections (HAIs) are one of the most pressing issues facing health services today. In the UK and many other European countries nearly one in ten patients acquires a HAI.

Surgical Site Infections (SSIs)
Surgical site infections (SSIs) are an important cause of healthcare associated infections. In the UK, they account for 14% of all HAI and have been estimated to nearly triple the length of a hospital stay.

However, infection rates associated with orthopaedic surgery are around 1% and many researchers believe this is a direct result of the use of Ultra Clean Ventilation (UCV) systems in orthopaedic operating theatres.

But there is no room for complacency. Staphylococcus aureus (both in the form of MRSA and MSSA), along with a number of other micro-organisms, are still to be found in many operating theatres.

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Antibiotics
Antibiotics are often seen as complementary or even alternative to ultra clean operating theatres. However, there is an increasing consensus that a major driver of antimicrobial resistance is the use and particularly overuse/misuse of antimicrobial agents (antibiotics).

There is also growing evidence that antibiotic use is a major contributor to the development of Clostridium difficile.

Thus the optimal use of antimicrobial agents involves a balancing act, with a need to use antibiotics to treat infections on the one hand, and a need to try and reduce antimicrobial prescribing in order to contain or reduce the occurrence of resistant pathogens, on the other.

The utilisation of ultra clean theatres is a proven way to reduce surgical site infection without the excessive use of antimicrobial agents.

Exponential Airflow Technology

Howorth’s exponential flow system (Exflow™) offers superior levels of patient protection through its unique engineered air profile.

Exponential Flow
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In addition to the standard benefits that an ultra clean canopy can provide, i.e. bathing the patient in sterile HEPA filtered air, the unique graded flow profile of the Exflow (higher flow in the centre) helps to overcome buoyancy related updrafts, while the exponential flow path assists in carrying away any contamination generated by the surgical team.

The Exflow’s air streams also create a barrier against the entrainment of contaminants from outside the clean zone.

Computational Fluid Dynamics (CFD)
Computational fluid dynamics (CFD), also known as flow visualisation, is a type of computer-aided engineering program that uses numerical methods and algorithms to solve and analyse complex fluid flow problems.

At Howorth, we utilise CFD as a key tool to support our ongoing project engineering and as an integral part of our product development process.

One of the key advantages of CFD is that it enables a variety of possible design solutions to be quickly assessed. The results of which can be visually studied, hence the term flow visualisation.
New Build Theatres & Suites

A new Theatre Department complete with Ultra Clean Theatres and state-of-the-art equipment in less time than you might think.

Howorth is able to design, build and install operating theatres and suites, including critical care units, TSSUs and aseptic suites.

Our highly experienced team of project managers and engineers have successfully undertaken a variety of turnkey healthcare construction projects. Whether working alone or in collaboration with one of our partner companies, we will ensure that your new facilities are delivered on time and to budget.

Our service includes the undertaking of a full feasibility study which can include layout proposals, drawings, options and budgetary pricing.

- Full Turnkey Projects
- Fast Track Programmes
- Multiple Building Material Options
- External or Internal Construction
- Complete Supply of HVAC & Air Management Systems, including Ultra Clean Ventilation
- Fully Compliant with HTM & Other Standards
- All Services Lamps, Pendants & Other Equipment Fully Fitted, Tested & Operational

Modular Building Solutions

Configured to suit your specific requirements and site conditions, Howorth’s modular healthcare buildings are factory built and brought to site in rapidly assembled sections. Whether your capacity issues are short-term or permanent, our modular buildings offer you a flexible solution.

- Whole-life Cost Savings
- Rapid Deployment
- Reduced Site Disruption
- Strict Production Quality Control
- Permanent or Relocatable
- M & E Plant Rooms Fully Fitted Off-site
- Reduced Maintenance
- No Wet Trades

Howorth modular healthcare buildings provide the rapid solution to your needs without compromising quality, design or functionality.
Theatre Refurbishments & Upgrades

Under a month, you could have a virtually new operating theatre, complete with Exflow Ultra Clean Ventilation and fully compliant with HTM 03-01.

Increase Throughput, Reduce Infection Levels
Howorth has refurbished hundreds of operating theatres, literally transforming them in just a few weeks into state-of-the-art, Ultra Clean, fully HTM compliant facilities.

Whether you are looking to extend an existing structure, convert a redundant area into a new operating department or upgrade an old facility - we have the experience and expertise to make your plans a reality.

Turnkey Solutions
Howorth’s cost effective design, manufacturing and comprehensive installation service will provide additional clinical capacity with minimum downtime.

Upgrade your existing facilities to a high performance fully compliant Ultra Clean operating theatre, quickly and economically.
- Fully Compliant with HTM 03-01 standards
- Ultra Clean Exflow ventilation system
- Medical Gas Pendants
- Surgical Lighting
- Theatre Control Panels
- Isolated/Uninterrupted Power
- Flooring and Ceiling Replacement
- Decoration
- Fully Commissioned and Validated
- Sterilised and Ready for Operational Use

Audits, Surveys and Designs
Without charge or obligation, we will undertake an initial feasibility study, develop a layout proposal and produce budgetary pricing. As part of this free service we can typically offer...
- Audit of current facilities to assess their potential for compliance with current regulations
- Physical site inspection
- Testing to measure performance against design criteria
- Full written proposal, including budget pricing
- Layout drawings and schematics
- Provisional project schedule

We can then work with you to develop a more detailed design in order to furnish you with a fixed price quotation.
Theatre Control Panels

Theatre Control Panels are a key part of any Ultra Clean Theatre. Howorth’s panel is clear, easy to use and can be fully integrated with the Exflow™, surgical lights and other theatre systems.

Howorth’s range of theatre control panels provide the surgical team with their environmental controls and equipment monitoring alarms, together with clocks and many optional extra facilities, including X-Ray film viewers or monitor screens.

- Display all theatre environmental factors
- Fully HTM 03-01 Compliant
- Integral X-ray film viewers
- Monitors to view digital images
- Easy wipe clean stainless steel or membrane facia
- Touch screen option

These systems can be mounted into either a stainless steel facia or behind a polycarbonate membrane.

The membrane option offers the advantage that all switches and lamps are mounted behind the flush, easy-clean membrane.

Also exclusive to the Howorth’s theatre panel is the graphic visual representation of the Exflow unit and the operating lamps for ease of recognition, monitoring performance and control switching.
Pendants & Ceiling Service Units

The Howorth Extension range of service pendants and workstations is the only pendant system specifically designed to work in conjunction with an ultra clean air canopy.

Extension Pendants

The Howorth Extension range of service pendants and workstations is the only pendant system specifically designed to work in conjunction with the Exflow Ultra Clean Air system, together with an endoscopy system carrier and multiple monitor-screen arms extending into the clean zone, achieving a compatibility exclusive to Howorth.

Their stylish design comprising three legged equipment carriers for maximum stability with the incorporation of electro-hydraulic power units and electronically controlled braking system, combine to make this equipment extremely user-friendly, safe and versatile, whether in an operating theatre, an endoscopy suite, or a critical care unit.

The Howorth Extension range of service pendants and workstations are all CE registered and fully compliant with UK and other international Standards.

Media Bridges

Media bridges or beams offer an alternative to traditional pendants. Howorth are able to offer media bridges fully integrated into the Exflow UCV. As with our pendants, these systems can be configured to your specific needs. They are capable of delivering electrical services, medical gases, data, video and other services.

The multi-movement workstations are designed to enable the users to position the equipment to suit their particular requirements with the minimum of effort - the arms can be rotated, raised or lowered as necessary.
Lighting for Ultra Clean Theatres

Surgical lighting can have a substantial influence on the performance of an Ultra Clean Ventilation system and therefore the overall sterility of the operating theatre.

Maquet are a world leader in the supply of surgical lighting systems and have developed a range of lights specifically for use in ultra clean operating theatres.

In independent testing and in tests conducted in Howorth’s own research facilities, Maquet lights have been shown to exhibit superior flow and heat dissipation characteristics.

Moving forward, Howorth and Maquet plan to collaborate in order to further optimise the next generation of Maquet UCV lighting systems.

The Importance of Lighting under UCVs

In addition to the principle purpose of any surgical light, i.e. to provide adequate levels of lighting for the clinical team, surgical lights can have a substantial influence on the performance of an Ultra Clean Ventilation system and hence the overall sterility of the operating theatre.

Factors such as the light’s cross-sectional area, the shape of the light, and amount of heat that it dissipates all have an influence upon the surrounding airflow. This in turn impacts upon the ability of the UCV to operate effectively.

Maquet

Howorth have, and continue to work with all the major surgical lighting suppliers around the world, but for use in Howorth’s Exflow we recommend Maquet surgical lights.
Aftermarket Support & Servicing

We can offer you an ongoing support service over the full lifetime of our products and beyond to your future needs.

In our 150 year history we have learnt many things, but none so as important as to ensure our customers get outstanding levels of product support and aftermarket service.

All of our installation, commissioning and service teams utilise only fully trained, skilled personnel. We use genuine factory approved OEM spares, with guarantees on all our work coming as standard.

Installation and Commissioning

We are totally focused on minimising downtime and disruption, delivering you a theatre that operates as quickly as possible. Our installation service covers every aspect of successful project implementation.

- Exflow Ultra Clean Ventilation
- HVAC Ductwork & Air Handling Unit
- Theatre Control Panels
- Operating Lights & Room Lighting
- Flooring & Ceiling Replacement
- Isolated Power
- Decoration, Clean-up & Deep clean

Howorth’s commissioning of all air systems includes an initial validation to HTM 03-01 and all other relevant standards.

Service and Validation

Regular servicing, validation and preventive maintenance of your clean air systems and other theatre equipment is not only a legal obligation, but makes economic sense as well.

Howorth’s maintenance packages can be tailored to suit the level of support you require from parts-only to all-inclusive, multi-year service contracts and anything in between, including a number of emergency call-out options.

Extended Service Offerings

The Howorth Group’s recent acquisition of Westbury Filtermation means we can now offer an enhanced range of service options, including:

- Full Inspection & Servicing of Air Handling Units
- Remote CCTV Video Surveys of Ductwork Systems
- Cleaning of Ductwork
- IAQ Monitoring and Testing
- Microbiological Sampling
- Deep Cleaning of Theatres & Other Aseptic Areas

Additionally, we are also able to offer our own new range of filtration products developed specifically to meet the needs of your operating theatre UCV units.