LAMINAR
AIR FLOW CEILINGS

HYBRID ROOMS
RISK 4 – ISO 5
The continued development of both minimally invasive procedures and imaging technologies led to the development of the hybrid operating room – it combines a conventional operating room with an imaging system – MRI, CT scan or angiography systems. This hybrid operating room makes it possible to simultaneously reach a diagnosis and provide treatment during surgical interventions, in particular for cardiovascular surgeries.

On the first hand, the economic benefit is reflected in the increased demand for intricate surgeries. On the other hand, surgery durations, as well as hospital stays for patients, are shorter thanks to gentler surgery methods.

In addition, intraoperative imaging also facilitates immediate quality assurance which results in a reduction of errors.

Two aspects are especially important when building and utilizing the hybrid operating room. First, progressive planning is essential; and adequate time and resources should be spent during the planning stage. To ensure the best possible utilization at a later point, all parties involved need to be included in the run-up.
The design of the hybrid room must take into account the recommendations of the multidisciplinary teams working on the choice of equipment and its implementation: interventional cardiologists and surgeons, anesthetists, nurses, radiologists, perfusionists, radio manipulators, etc.

A videotransmission system can also be installed to make all radiological images acquired preoperatively accessible on a large screen.
The C-arm:

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<tr>
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<th>Advantages</th>
<th>Disadvantages</th>
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<tbody>
<tr>
<td>Floor fixation</td>
<td>Does not require a specific hybrid laminar flow</td>
<td>- Non versatile room&lt;br&gt;- Heavy volume for the patient moves and medical staff.&lt;br&gt;- Cost: ★★★★★&lt;br&gt;- Useful area: between 80 and 100 m²&lt;br&gt;- Complicated and limited movement of the C-arm.</td>
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<tr>
<td>Ceiling fixation</td>
<td>- Room versatility: parking position of the C-arm optimizing the useful area.&lt;br&gt;- Necessary useful surface: 50-70m²&lt;br&gt;- Optimized freedom of movement for the staff</td>
<td>- Cost: ★★★★★★&lt;br&gt;- Requires ATA MEDICAL specific solution.</td>
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Operating lights

The choice of the operating light must be made according to the lighting specifications, but also according to its ability to avoid disturbances of the air treatment, as the C-arm is already problematic on this point.

The quantity, sizing and positioning of the lights must be optimized to avoid collisions with the other suspended elements of the room.
Air treatment

Air treatment in the operating room is a fundamental element guaranteeing maximum safety conditions.

To define an optimal air treatment, it is first necessary to define the risk of contamination of the room, by distinguishing the operating surface from the rest of the room. For each level of risk then corresponds a set of technical performances to reach.

**Objectives for a Hybrid Room at Risk 4:**

- Particulate class ISO 5
- Class of particulate decontamination kinetics CP10 at 0.5 μm
- Bacteriological class B10
- Air temperature between 19 and 26 °C,
- Air humidity between 45 and 65%
- Maximum sound pressure 48 dB,

The European standard 14644-1 also recommends a unidirectional flow over the area to be protected and a velocity of 0.25 to 0.3 m/s at the air supply. We commonly recommend an air renewal rate of 50 volumes / hour, so as to avoid recirculation of potentially contaminated air from the chamber to the operative field.

However, the configuration of the ceiling of a hybrid room must be studied in such a way as to prevent the collision of equipment such as:

- The C-arm
- The suspended equipment (monitor, screens, lights, pendants, beams...)
ATA Medical, an expert in air treatment for more than thirty years, offers reliable "hygiene" products such as hygienic air handling units and laminar air flow ceilings.

The range of laminar flow ceilings provides effective protection against the risk of contamination during invasive surgeries and caused by inert and living particles suspended in the air.

The ATA laminar air flow ceilings adapt to any room configuration and meet surgeon specific needs by creating a clean area around the patient, medical staff and equipment. Our laminar air flow ceilings are mainly used with our CLINICAIR® air handling units, but can also be adapted to all other brand.

The ceilings are dedicated to operating theaters in order to comply with the ISO 5 class (in accordance with EN ISO 14644-1). According to its use, the hybrid operating room, can also be requested in risk 3, ISO 7.

The ATA hybrid laminar air flow ceilings therefore meets all expectations, including those in risk 3.
Thermo-mechanic simulation of the flow – with or without C-arm.

Drawing without C-arm

Drawing with C-arm.

Designed for all manufacturer

HITACHI

SIEMENS

PHILIPS

TOSHIBA

Semi-circular diffusers

ATA MEDICAL – contact@ata-medical.com - +33 (0) 2 40 92 03 00
Specifications of the hybrid laminar air flow ceiling

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Details</th>
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<tbody>
<tr>
<td>Fabrication</td>
<td>RAL 9010 epoxy coated steel sheet.</td>
</tr>
<tr>
<td>Diffusion</td>
<td>By double fabric layer and semi circular diffusers in perforated stainless steel RAL9010 coated.</td>
</tr>
<tr>
<td>Lighting</td>
<td>LED RGBW watertight IP67, 24V voltage with wall control board</td>
</tr>
<tr>
<td>Dimensions</td>
<td>According to project specifications / custom made.</td>
</tr>
<tr>
<td>Filtration</td>
<td>HEPA 14</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Access openings for filters maintenance and cleaning</td>
</tr>
<tr>
<td>Options</td>
<td>Decontamination technology Bioxigen® in the duct, between the AHU and the laminar air flow ceiling for an efficient microbiologic decontamination.</td>
</tr>
<tr>
<td>Mounting &amp; installation</td>
<td>Mounting on site, according to the NF EN ISO 898-1 and NF EN 20898-2 standards. Mounting and installation according to ATA MEDICAL setting-up notice.</td>
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</table>

ATA EXPERTISE

ATA MEDICAL – contact@ata-medical.com - +33 (0) 2 40 92 03 00
Also in our product range:

- Temperature control
- Humidity control
- Air renewal and air decontamination (filtration)
- Pressure in the room
- Air flow speed from 1,000 to 20,000 m³/h.
- Pressure up to 1,500 Pa
- Cooling system: direct expansion or chilled water

- Temperature control
- Humidity control
- Air renewal and air decontamination (filtration)
- Pressure in the room
- Air flow speed from 3,000 to 8,000 m³/h.
- Pressure up to 500 Pa
- Cooling system: direct expansion or chilled water

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