Clean Room Technology

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ILKAZELL Insulation Technology Ltd. Zwickau is your competent partner when it comes to clean room technology. We design and produce flexible systems that are designed according to your special needs and requirements. This makes our services unique and allows us to offer flexible and versatile products. Our name is equal to top quality in clean room and insulation technology. Our company has worldwide references and is certified according to DIN EN 9001:2000. The consequent and innovative further advancement of our product range has become a tradition for us. All our products are developed by our qualified staff – from design to production. We always stay curious and that makes us a consistent partner.

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Clean Room Technology

It is said that a profound knowledge of the field is necessary to produce high quality clean room systems. We completely subscribe to this. Our partners know that ILKAZELL provides functional room systems of the highest quality. The clean room systems at ILKAZELL are the results of our own research and development combined with an optimal price-performance-ratio.
Wall Systems

Our tried and tested AluClick joint system (figure 1.2) guarantees the fast and clean installation of our clean rooms. Special connections in the form of corner, T and four-way pieces allow for a variety of uses and open unique opportunities for the interior design of the clean rooms.

The ILKAZELL clean room partition wall is a self-supporting mono block construction with an insulating core and two closely compounded, surface refined metal covers that are arranged on both sides of the core. The insulation is made of CFC-free polyurethane rigid foam (building material class B1 according to DIN 4102) or mineral wool (building material class A1 according to DIN 4102). The covers are made from galvanised steel sheets with a Polyester coating (similar to RAL 9010) and liners.

The wall has a thickness of 80 mm. The standard grid is 1200 mm. Intermediate grids in all sizes are available. Of course our products are a 100% tailor-made in our plant – no more customization is necessary on site. Our wall systems are self-supporting and can be delivered up to a length of 6000 mm without any further horizontal joints or cross braces.

<table>
<thead>
<tr>
<th>Technical Characteristics</th>
<th>CRW 80 PU</th>
<th>CRW 80 MI/Lo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation</td>
<td>80 mm polyurethane rigid foam</td>
<td>80 mm mineral wool</td>
</tr>
<tr>
<td>U-Load</td>
<td>0.27 W/m²K</td>
<td>0.52 W/m²K</td>
</tr>
<tr>
<td>Cover layers</td>
<td>0.75 mm galvanised steel sheet</td>
<td>0.75 mm galvanised steel sheet</td>
</tr>
<tr>
<td>Coating</td>
<td>Polyester coating similar to RAL 9010 with liners (others available on request)</td>
<td></td>
</tr>
<tr>
<td>Joint finishing</td>
<td>3 to 4 mm</td>
<td>3 to 4 mm</td>
</tr>
</tbody>
</table>
Our partners expect a high accuracy of measurements. We provide these requirements through a high degree of accuracy in our production and through the use of large scale grids to reduce the number of joints. To make sure that the surfaces are smooth and meet the requirements for clean rooms we only permit joint finishings of 3 to 4 mm which are then filled with clean room sealing material.

We furthermore direct special attention to the „interior“ of our clean room systems. To allow for the clean laying of media and supply lines our wall systems provide separate installation ducts and foamed-in empty conduits and sockets.

Already existing walls can be clad with special prefixed walls (figure 1) according to the requirements. The panels are 40-60 mm thick and are fixed to the already existing walls by means of a base frame. The surface of the panels corresponds to our ILKAclean wall system.
Floor Fitting

Our clean rooms are tight and safe even on uneven floors. The wall elements are standing on telescope profiles which can balance out irregularities of up to 30 mm.

For clean rooms, especially in the pharmaceutical field, the floor-wall connection is equipped with an adjustable negative base. The height and depth of the negative base can be individually designed. This allows for a variety of floorings of various layer thicknesses to be flush mount with a cove (figure 1,2,3) to the clean room walls. In addition, the floor fitting with U-shaped profiles without a negative base (figure 4,5) is available.

On request we can also offer to fit your room with floor coverings that meet clean room requirements.

We offer a great variety of flooring materials. Our wide range of floorings enables us to fulfil almost all of our clients' wishes. Due to the manifoldness of our floor covers we could only present a minimal number of choices here.
Clean room glazing

Glass elements are flush mount on both sides into the clean room wall systems. The laminated safety glass (2 x 8mm) with bevelled edges meets the most stringent requirements. The dimensions of the glass elements are tailor-made to the client’s needs.

Special solutions such as completely glassed-in return air levels (figure 1) or entire glass walls show the versatile use of this system.

The flush mounting of the windows on both sides of the partition walls can be made during the production process or on site.

We generally use safety glasses for our windows. A variety of custom-made versions such as amber light glazing or built-in blinds underline our manifoldness even with the details.

The standard dimensions of our windows are 900 x 1200 mm. However, these can obviously be adapted to our client’s needs.

Professional sealing with the help of clean room approved sealing materials guarantees hygienic conditions under all circumstances.
Clean room swing doors

The single or double leaf clean room swing doors consist of a tubular frame construction made from aluminium system profiles that are powder coated. The frame construction is absolutely smooth without any undercuts and can easily be cleaned.

The customers can decide from all colours of the RAL colour scheme. Our high quality clean room doors are fitted flush on both sides of the partition walls. Double-sided lip gaskets made of EPDM rubber (page 8, figure 1) and lowerable floor gaskets (figure 2) provide for a very high tightness.

Alternatively we can also deliver the three-dimensionally adjustable, completely maintenance-free aluminium hinges in a stainless steel design (figure 3).

The integration of spandrel double glazing that is flush-mounted on both sides, overhead door closers with slide channels and lowerable floor gaskets is optionally available.

Single leaf clean room swing door with 1000 mm clear opening and double-sided, flush-mounted, integrated spandrel double glazing, overhead door closer and lock seal (figure 1).
Our double leaf clean room doors can be concentrically or asymmetrically divided with a stationary leaf on the left or the right. On request we can also integrate overhead door closers for the movable leaf or alternatively, for two-leaf doors, overhead door closers with closing sequence control.

Further optional equipment:

Stainless steel fittings (figure 3), lock seals, bow handle (figure 2) in connection to lock seal, air vents, opening limiters, provisions for door cylinders, automatic swing door drives

<table>
<thead>
<tr>
<th>Technical Characteristics</th>
<th>Single Leaf Clean Room Swing Doors</th>
<th>Double Leaf Clean Room Swing Doors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (Standard)</td>
<td>maximum 1500 mm x 3000 mm</td>
<td>maximum 3000 mm x 3000 mm</td>
</tr>
<tr>
<td>Material</td>
<td>aluminium system profiles</td>
<td>aluminium system profiles</td>
</tr>
<tr>
<td>Colour</td>
<td>powder coating from the RAL colour map</td>
<td>powder coating from the RAL colour map</td>
</tr>
<tr>
<td>Fittings</td>
<td>aluminium EV1</td>
<td>aluminium EV1</td>
</tr>
<tr>
<td>Gasket</td>
<td>double lip gasket from EPDM</td>
<td>double lip gasket from EPDM</td>
</tr>
</tbody>
</table>

**FIGURE 1**

**FIGURE 2**

**FIGURE 3**
Clean room sliding doors

Our high quality, hermetically sealing clean room sliding doors in the manual or automatic version can both be integrated into our clean room wall systems.

These doors save space and cause a distinctly lower movement of the air which gives them obvious advantages in comparison to a swing door. If closed the door is securely fitting to the floor. Its surface has been purposely designed as smooth and even to allow for easy cleansing.

Technical Features

The aluminium frame of the door leaf is made to be flush with the door panel. In addition the aluminium profiles also absorb shocks from the door which could otherwise lead to scratches. The coating on both sides of the door is equal to that of our wall systems. Furthermore, we can also provide the clean room slide door completely in stainless steel (figure 2).

With our clean room sliding doors we only use viewing panels made from 2 x 6 mm laminated safety glass which is flush mount to the door on both sides.

By using the dead weight of the door and a special recess in the rail construction the door is closing tightly all around the door frame and the floor, and can consequently guarantee a hermetic sealing.

The easily spinning, double pivoted, plastic carrying wheels travel in an aluminium rail construction (figure 3). This rail construction is covered by a blind in the colour of the door leaf (figure 1).
Clean room sliding doors (automatic)

Of course our clean room sliding doors can be delivered with an automatic drive. The doors can be connected to a network and controlled in groups, for example as part of a master control system for a building. Each door by standard already possesses the necessary features for this usage.

The microprocessor control has been especially designed for the drive of hermetically closing sliding doors. Even extremely heavy sliding doors do not pose any problem for this system. In addition, all due attention was given to hygienically important aspects. Consequently, the photo cell control is flush-integrated to the door frame profile.

For the opening and closing of the clean room sliding doors customers can choose from push buttons, elbow switches, non-intrusive radar switches (figure 2) or pull switches.

If the sealing of 2 or more sliding doors is necessary, this may be done through our ILKAZELL lock control system (figure 1).

<table>
<thead>
<tr>
<th>Technical Characteristics (Standard)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>230 V/50 Hz or 110 V/60 Hz</td>
</tr>
<tr>
<td>Power consumption</td>
<td>min. 18 W/max. 450 W</td>
</tr>
<tr>
<td>Opening speed</td>
<td>max. 800 mm/sec</td>
</tr>
<tr>
<td>Closing speed</td>
<td>max. 500 mm/sec</td>
</tr>
<tr>
<td>Control</td>
<td>microprocessor</td>
</tr>
</tbody>
</table>
Lock control systems

The lock control system is designed for the two-way locking of doors. Flat holding magnets, piezo buttons (red/green) (figure 1,2) and emergency stop switches fulfil the highest standards.

The ILKAZELL lock gate control system guarantees control over a lock system of up to ten doors. It is modularly mounted and consequently very flexible. The dependences of the different doors from one another are directly programmed in one of the modules of the lock control system by means of an easily adjusted matrix control (figure 3). At each door it is determined which other door should be opened or closed at the same time that this door is open. This is done with the help of DIP switches. The dependences between the individual doors can easily be changed on site without the need of special knowledge of matrix controls.

Surface holding magnets with monitoring contacts (figure 4) and/or the door locking unit TVR1 can be used as locking units. Additional elements such as delaying circuits or time modules complete the system. In addition access control systems can be integrated without problems.

Comments to the integration matrix (figure 3):

The [+] symbol defines the basic door, the [-] symbol deactivates the door (this door cannot be opened if the basic door is open), the [0] symbol shows that the button is activated (it is enabled for the opening of the door).
The lock gate control system works according to the quiescent current principle. That means that in operating mode all closed doors are locked. Its easy application allows for a change in the locking dependences on site without problems.

The door terminals are flush mounted into the door frames. The door frame profiles offer sufficient space for the control terminals with the appropriate control module (figure 1) as an addition.

The compact composition of the control terminal (figure 2) reduces the amount of work for the installation of the system significantly. Besides the locking mechanism each door has to be equipped only with the terminal. No additional buttons have to be installed and no further grooves are needed in the door frames. The reduced number of components also helps to allow for an easier cleansing of the clean room.

Flush mount surface holding magnet on a closed lock gate (figure 3,4)

The system is handed over entirely wired and ready for operation.

<table>
<thead>
<tr>
<th>Mechanical data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions in mm (W H D)</td>
<td>39 x 130 x 55</td>
</tr>
<tr>
<td>Operation switch</td>
<td>piezo button with two-coloured ring illumination (red/green)</td>
</tr>
<tr>
<td>Emergency stop button</td>
<td>illuminated, latching</td>
</tr>
<tr>
<td>Control</td>
<td>by standard up to ten doors (expandable)</td>
</tr>
<tr>
<td>Voltage</td>
<td>24 VDC</td>
</tr>
<tr>
<td>Input voltage</td>
<td>230 V/50 Hz</td>
</tr>
</tbody>
</table>
Clean room ceiling panels

The production of our clean room ceiling panels is analogue to that of our wall systems. A cantilever, walkable ceiling up to the range of 6000 mm is possible, depending on the ceiling pan. That allows for the number of joints to be reduced to a minimum.

Integrated profiles make the suspension of ceilings of large dimensions from the original ceiling of a building or from a steal construction possible. That allows for the panel ceilings to be freely accessible and walkable.

The panel system is similar in construction to that of the ILKAclean wall system. This even includes the same joints and wall thicknesses available. Therefore the panel systems offer the same unique characteristics as the wall systems.

For ceilings with large dimensions special foamed-in profiles guarantee that the ceiling can be suspended also in large rooms. The self-supporting construction therefore makes the panel ceiling versatile in its use, just like all our products.

Panel ceilings can be fixed on already existing ceilings or on a wide-span truss construction which is mounted on top of the ceiling system. The weight of the construction is conducted away by the ILKAZELL clean room wall system. That means that our clients receive a fully cantilever, walkable ceiling system.
Metal coffered ceilings

Our tried and tested metal coffered ceiling system consists of 0.5 mm galvanised steel sheet or 0.6 mm aluminium sheet and is approved for many types of clean rooms.

The visible side of the ceiling tiles is powder coated similar to RAL 9010 and cannot be walked on. A circumferential chamfer (figure 1) on the coffer sheets allow for the sealing with silicon or polyurethane sealing materials, if needed.

The sub-construction consists of galvanised clamp and supporting profiles and the suspension of the ceiling is realised by means of Nonius hangers.

<table>
<thead>
<tr>
<th>Technical Characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions in mm</td>
<td>625 x 625/600 x 1200</td>
</tr>
<tr>
<td>Material</td>
<td>galvanised steel sheet 0.5 mm, Aluminium 0.5 mm</td>
</tr>
</tbody>
</table>
Clean room lighting

Flush mount clean room lights provide for the optimal illumination of the rooms.

Our lights are precisely integrated into our coffered ceilings or our panel ceiling systems. They are operated from the inside of the clean room. The covers are white, powder coated with an integrated polycarbonate prismatic pane (standard). On request clear or satined safety glass is available. The lights are installed according to the protection level IP 54 towards the walkable space above the ceiling and guarantee the necessary safety. Of course our clients can choose from a variety of type of lighting. You can furthermore decide individually whether the lighting should be installed with a dimmer, or be equipped with emergency batteries or emergency lights. For the easy mounting of the lights connecting leads of the WACO plugging system can be used on request.

Of course we will also provide you with a calculation of the necessary lighting for the individual clean room.

<table>
<thead>
<tr>
<th>Technical Characteristics (Standard)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total luminous flux</td>
</tr>
<tr>
<td>System performance</td>
</tr>
<tr>
<td>Dimensions in mm</td>
</tr>
<tr>
<td>Equipment</td>
</tr>
<tr>
<td>Voltage</td>
</tr>
<tr>
<td>Protection level</td>
</tr>
</tbody>
</table>
Media ducts

The ILKAclean wall system offers a variety of possibilities for the integration of supply lines for electrical and other process equipment that is necessary for the clean room.

Empty conduits and sockets

Empty conduits built into our wall systems allow for the laying of electric and data supply lines in combination with the use of empty wall sockets (figure 1/C). The design and planning of these already takes place during the project planning phase.

Media ducts

According to the requirements of our clients vertical (figure 1/A) or horizontal (figure 1/B) media ducts can be integrated into our wall systems. Of course the ducts are made absolutely flush. In the vertical version of the ducts (figure 1/A) the clients can decide between a one or two-sided use/operation.
Pass through box

The casing of our material locks on the inside and the outside is made of stainless steel 1.4301 in a ground design. The door leaves are flush with the lock carcase on the outside. In addition, viewing panels are flush mount on both sides of the door leaf and an electronic latch (figure 1) is integrated into the door.

The sealing of the material locks is realised through surface holding magnets, buttons, a red/green display (figure 4) and an internal wiring with a voltage of 12/24 V DC. This allows for a mutual locking of the pass through box with swing or sliding doors.

The carcases of our material locks are welded. For an easy cleansing the inner corners have a wide radius (figure 3).

Optionally, shelves (figure 2) or drawers (perforated or blank) can be integrated. The pass through box can be delivered either with stainless steel or plastic handles.

Active pass through box

Ventilation slots in the doors as well as perforated metal plates in the ceiling (figure 3) allow for air exhaust. The exhaust air unit (DN100) is situated on top of the ceiling. There are models equipped with HEPA filters or an integrated FFU available.
Skirting protection against ramming

According to the client's requirements we can provide a variety of skirting protections.

Stainless steel protective skirting
The ILKAZELL protective skirting units are made of 2 mm stainless steel and are fixed to the panels with the help of mounted brackets. A setscrew M8 is additionally fixing the elements to the floor to guarantee a high stability. The upper angle is 45° and the joints are sealed with silicone.

PE protective board against scratches
The scratch protection made of PE is mounted directly onto the wall system. The screws are covered. The scratch protection has 45° bevelled ends on the top and bottom equipped with an undercut to allow for the sealing with silicone or polyurethane materials.

Stainless steel tube
ILKAZELL also offers skirting protections against ramming made of stainless steel tubes.