



GLF VERTICAL FILTER TYPE



GLD HORIZONTAL FILTER TYPE

DESCRIPTION:

GLF and GLD Series Laminar Flow Unit is designed for supplying fresh air with a stable, parallel flow into all types of clean rooms in the medical field, for operating theatres and selected industries, e.g. pharmaceutical, chemistry, etc. The stable parallel flow and the low speed of the fresh air flow represent the main advantages of the GLF and GLD.

CONSTRUCTION:

Standard Material 304 Stainless Steel. Optional: .316 Stainless Steel

APPLICATION:

Usable for sterility-sensitive places such as operating rooms, chemical labs and clean rooms. Laminar flow provides removal of particles and microbes from requested area.

FINISHING:

Standart finishing 304 Stainless Steel

ACCESSORIES:



VAV



CAV



DUCT TYPE ELECTRO-HEATER



SOUND ATTENUATOR

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GLF- VERTICAL FILTER LAMINAR FLOW CEILING SYSTEMS



The parallel flow of fresh air expels from the laminar field all secondary air contamination and, thanks to the very convenient constructional design, no deviation of the fresh air flow occurs.

From the medical point of view the speed of the air flow, which is significantly lower than that of the conventional air supply, noticeably decreases hypothermia in patients in the operating area.



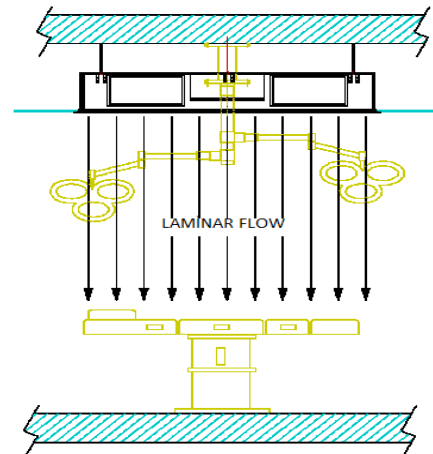
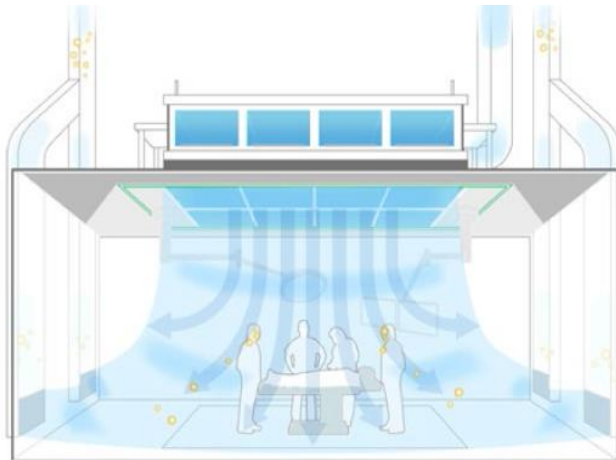
The laminar field ensures a very low number of particles in a clean room, a low concentration of harmful substances in the operational zone and high temperature stability. GLF is resistant to disinfectants

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GLF-ADVANTAGES



- A defined low number of particles in the operating zone and in the incoming airflow Low air speed in the operating area with a parallel flow (Air Flow in clean rooms exhibits a linear behavior. Air velocity is stable on every section of parallel flow lines 0,22-0,28 m/sn.
- On the other hand, turbulent air flow shows an unstable behavior. Air flow lines are at random, air velocity is between 0,35 and 0,55 m/sn.)

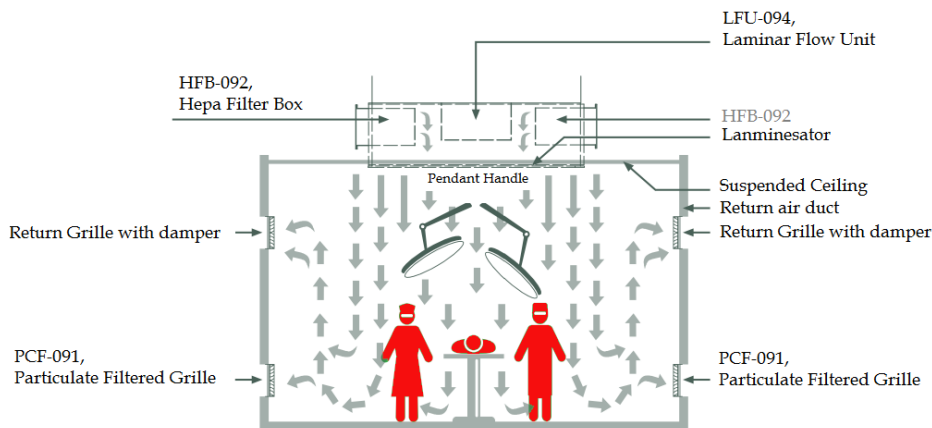
Fig.1: Turbulent Flow



Fig.2: Laminar Flow



- A low concentration of harmful gas substances also in the anesthesiology area
- Good shielding of the operating area from disturbances caused by opening the door
- Sealed operating light that makes air contamination impossible
- Easy maintenance and disinfection
- Easy installation



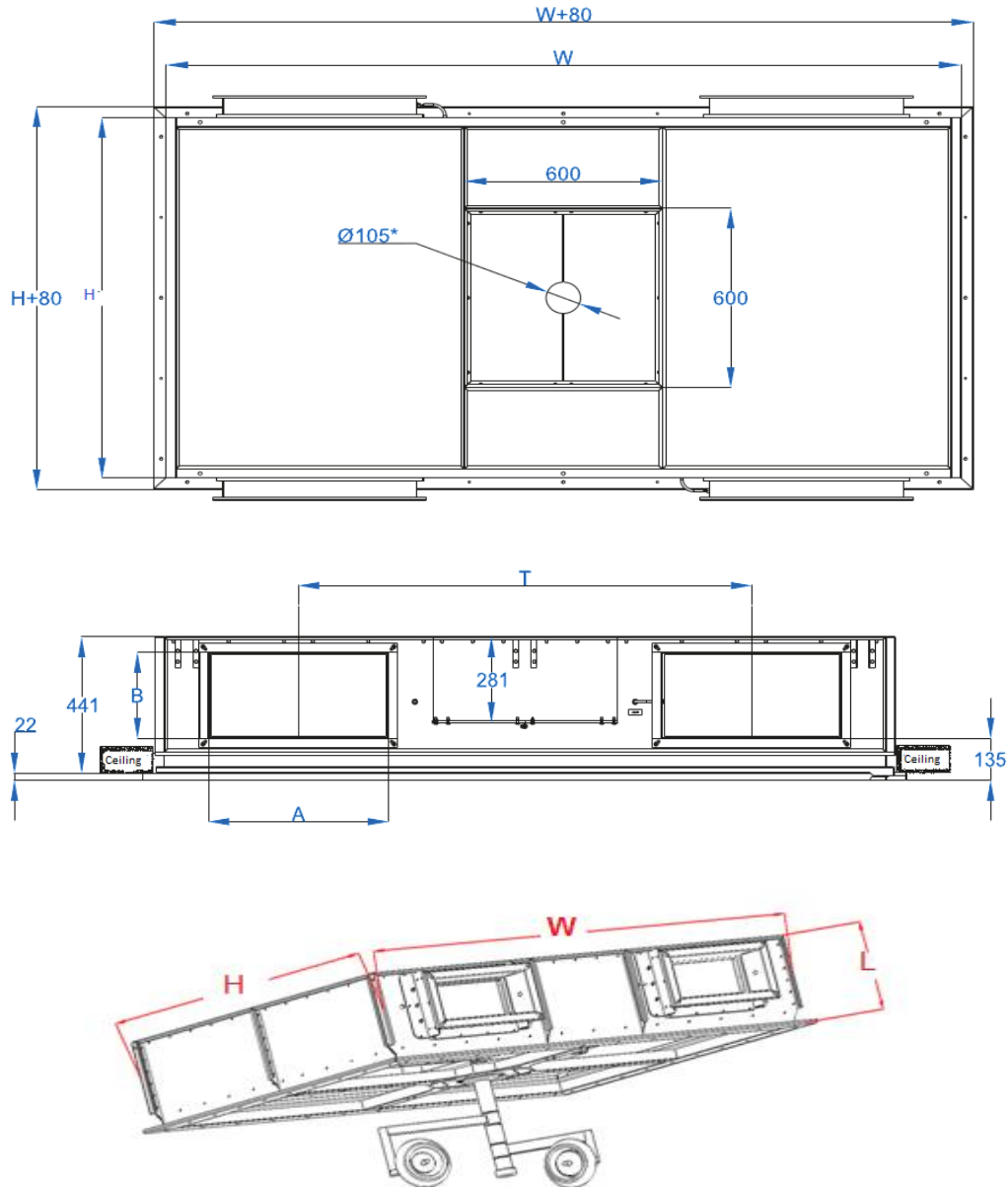
Hygienich Products Cooperate working principle

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STANDARD SIZES:

GLF TYPE



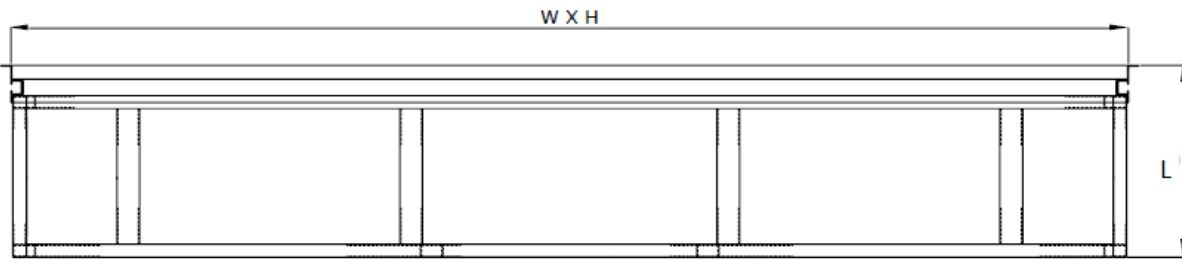
Item	W(mm)	H(mm)	L(mm)	Filter Width (mm)	Filter Height (mm)	Axis Filter T (mm)	Filter Unit	Duct Width A (mm)	Duct Height B (mm)	Lighting 2x18W IP65
1	2400	1200	450	610	305	1474	2	586	281	2x3600 Lumen
2	2400	1400	450	610	305	1474	2	586	281	2x3600 Lumen
3	2400	1600	450	610	305	1474	4	586	281	4x7200 Lumen
4	2400	1800	450	610	305	1474	4	586	281	4x7200 Lumen
5	2400	2000	450	610	305	1474	4	586	281	4x7200 Lumen
6	2400	2200	450	610	305	1474	4	586	281	4x7200 Lumen
7	2400	2400	450	610	305	1474	4	586	281	6x10800 Lumen
8	3000	2400	450	610	305	2074	4	586	281	6x10800 Lumen
9	3000	2800	450	610	457	2074	4	586	281	6x10800 Lumen
10	3000	3000	450	610	457	2074	4	586	281	6x10800 Lumen

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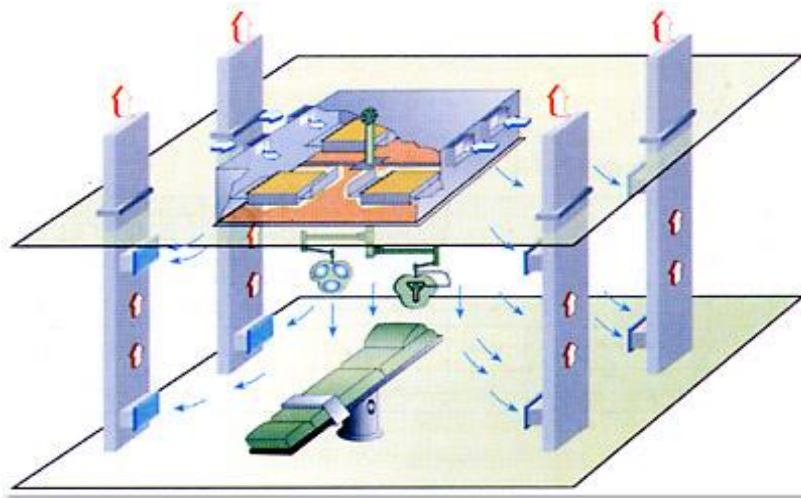
GLF QUICK SELECT



Item	W(mm)	H(mm)	L(mm)	Air Flow (m ³ /h)	Velocity m/sn	Average Sound Power Level [dB]	Pressure Loss at Start (Pa)	Pressure Loss at Final(Pa)
1	2400	1200	450	2400	0,23	35	120	600
2	2400	1400	450	2800	0,23	35	150	600
3	2400	1600	450	3200	0,23	30	110	600
4	2400	1800	450	3600	0,23	30	130	600
5	2400	2000	450	4000	0,23	35	120	600
6	2400	2200	450	4400	0,23	35	130	600
7	2400	2400	450	4800	0,23	35	150	600
8	3000	2400	450	6000	0,23	35	120	600
9	3000	2800	450	7000	0,23	40	160	600
10	3000	3000	450	7500	0,23	40	170	600

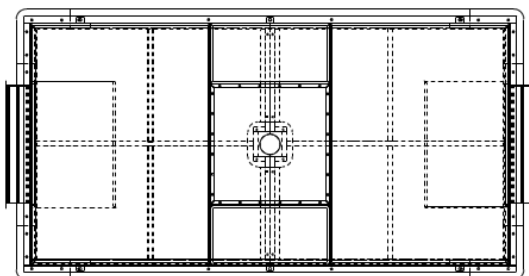


GLF LAMINAR FLOW UNIT APPLICATION

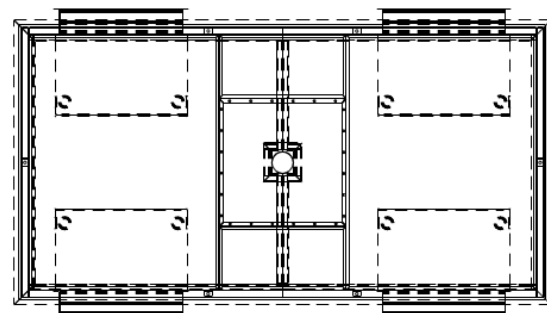


Standard Laminar Flow System Application

- A laminar air flow, as defined by the 'Federal Standards, is a unidirectional air flow moving at a velocity of 0.45 m/s which does not allow the deposit of suspended particles which are instead held suspended in the air even if suitably filtered by HEPA filters.
- In fact to prevent the human body from being negatively affected by direct exposure to constant air flows, the air velocity should be not more than 0.15 - 0.2 m/s: higher velocities can be dangerous to a patient spending several hours in the operating theater.
- Another important aspect to be considered is the presence of the surgical staff, since while the patient is lying at about two meters from the inlet air the surgical team are standing up with their heads bowed at only 70 - 100 cm from the inlet air. The type of air flow must thus be unidirectional, with a very low velocity, improperly called laminar because it does not have specific velocity.



Two Filter Inlet

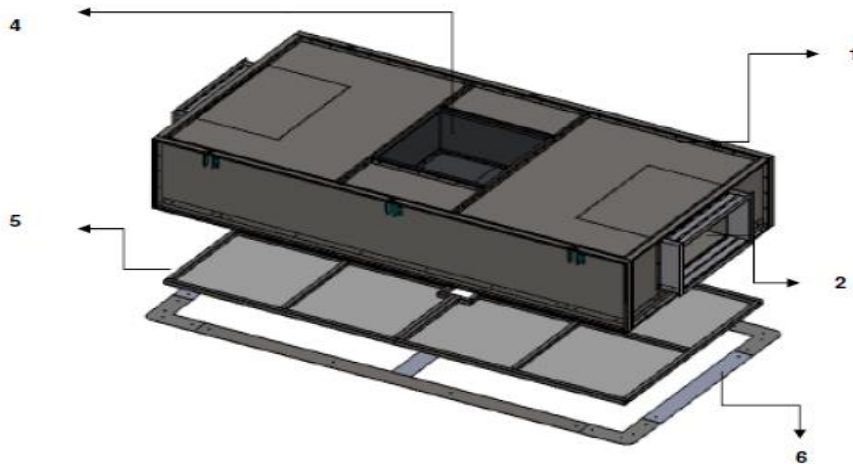


Four Filter Inlet

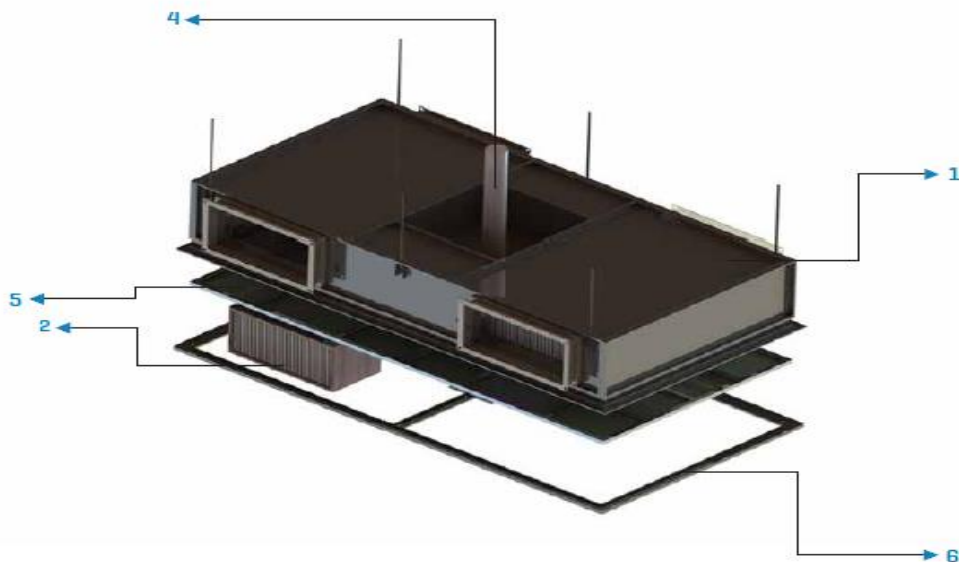
- **GLF Laminar Flow Ceiling** is formed by a coffer structure from stainless sheet without surface treatment.
- The laminiser, equipped with a single layer of PES fleece, ensures a parallel flow of outgoing air.
- The laminar field is suspended into a coffer or light ceiling via M6 suspension rods anchored into holes along the circumference of the cabinet.
- It is possible to fit part of the top lid of the laminar field chamber with hardened glass that enables the space under the laminiser to be lit with free lights independent on
- GLF. Their application, also for small-dimensional GLF bases, is enabled by clamping the filters with auxiliary frames to side entries.
- The free distribution of light is enabled by sliding the clamping frames out of the coffer chamber side wall.



GLF Two Filters Inlet



GLF Four Filters Inlet



1 – Main Case
4 – Pendant Box

2 – H13/H14 Hepa Filter
5 – Laminiser

3 – Inner Enlightning
6 – Frame Parts

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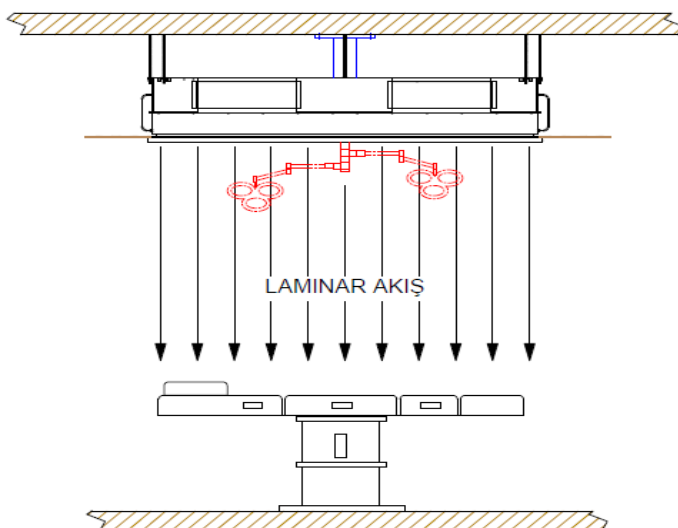
GLD- HORIZONTAL FILTER LAMINAR FLOW CEILING SYSTEMS



- GLD-Horizontal Filtered Laminar Flow Ceiling Systems are used in operating theaters, intensive care units and industrial establishments producing in clean room standards.
- Every manufactured Laminar Flow Ceiling System is tested by DIN 1946/4 and DIN 25414 and offered to the customer with 100 100% Sealing Guarantee ”.
- H14 class gel seal hepa filter is used in the system. Thanks to its gel seal structure, a high level of sealing is provided between the filter and the filter seat. In this way, it provides protection against harmful particles that may spread to the environment in which it is used.
- H14 class aluminum frame and gel seal filter is at least 99,995% efficient according to EN 1822 standards. The filters are tested to EN 1822 standards.

WORKING PRINCIPLE

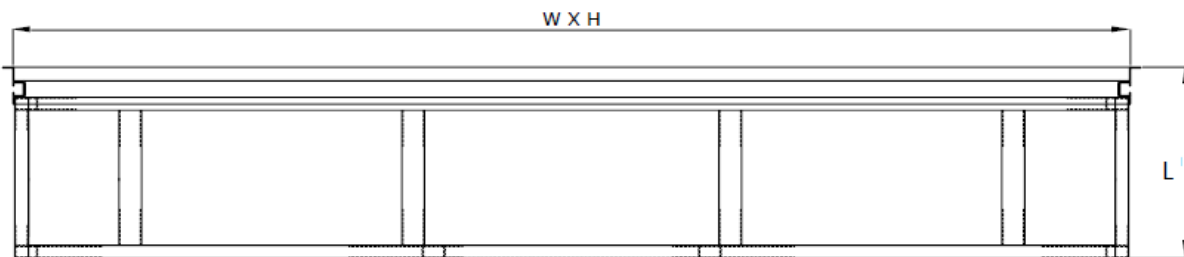
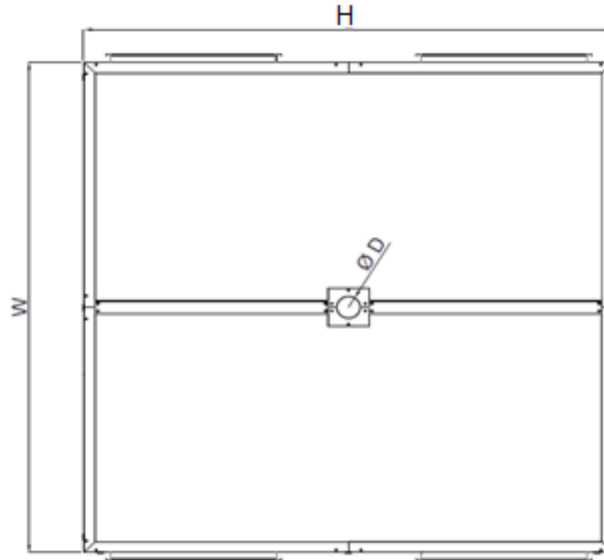
GLD Horizontal Filtered Laminar Flow Ceiling Systems create laminar flow on patient and operating room



personnel under them and provide protection against bacteria, viruses and germs by pushing the existing air. This reduces the risk of infection for humans. In terms of comfort, the human body is adversely affected by constant velocity air flows higher than 0.18-0.40 m / s. Undoubtedly, the inpatient will be disturbed by the high speed, but the medical team performing the surgery should also be able to work comfortably. Long-term operation in hours of surgery requires unidirectional and low-speed air flow. This air flow can be achieved with Laminar Flow Ceiling System.



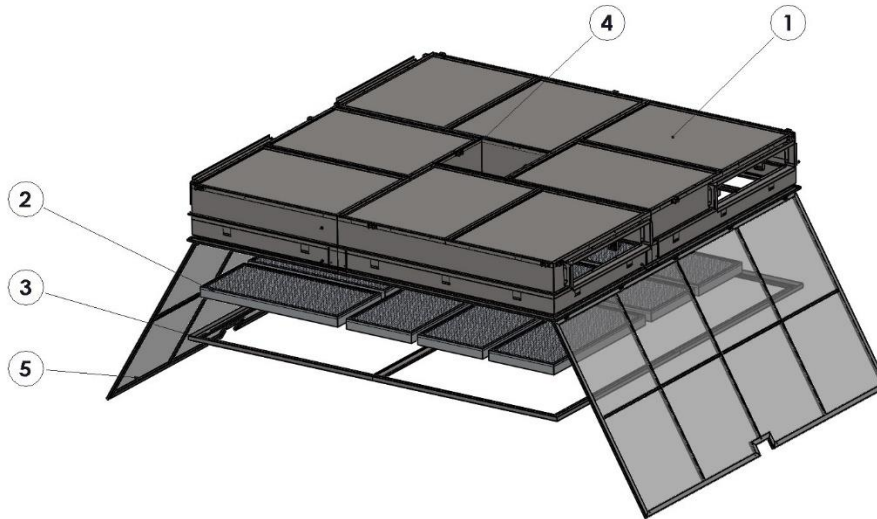
GLD QUICK SELECT



Code	Dimensions (mm)			v = 0.23 m/s surface velocity with Hepa Filter and Laminizator		
	W	H	L	Air Flow (m ³ /h)	Sound Power Level (dB)	Pressure Loss at Final (Pa)
GLD - 1400x2400	1400	2400	450	2800	35	90
GLD - 1600x2400	1600	2400	450	3200	35	90
GLD - 1800x2400	1800	2400	450	3600	35	90
GLD - 2400x2400	2400	2400	450	4800	40	95
GLD - 2400x3000	2400	3000	450	6000	40	95
GLD - 3000x3000	3000	3000	450	7500	40	95
GLD - 3200x3200	3200	3200	450	8500	40	95
GLD - 3800x3800	3800	3800	450	12000	40	97



MATERIAL AND COATING



GLD - Horizontal Filtered Laminar Flow Ceiling Systems consists of 6 main parts. These parts are Case, H14 Aluminum Case, HEPA Filter with Gel seal, Pendant Box, Laminator and Laminator Frame

1- Case: 1,00 mm It is manufactured from V2A class AISI 304 stainless steel in accordance with DIN 1.4301 standard. It is easy to clean and leak-proof. It is produced in a modular structure for ease of assembly and shipment. The casing has manometer terminals for the examination of differential pressures of HEPA filters.

2- Hepa Filters: H14 class. It has high flow rate and low initial pressure loss values. The filter casing is anodized aluminum profile, which is a bacteria-free material. To prevent damage to the filter during assembly, protection wire shall be provided on both sides. Thanks to its gel seal structure, a high level of sealing is provided between the filter and the filter seat.

3- Laminator Frame: Gives an aesthetic appearance to the GLD by closing the gap between the laminator and the case.

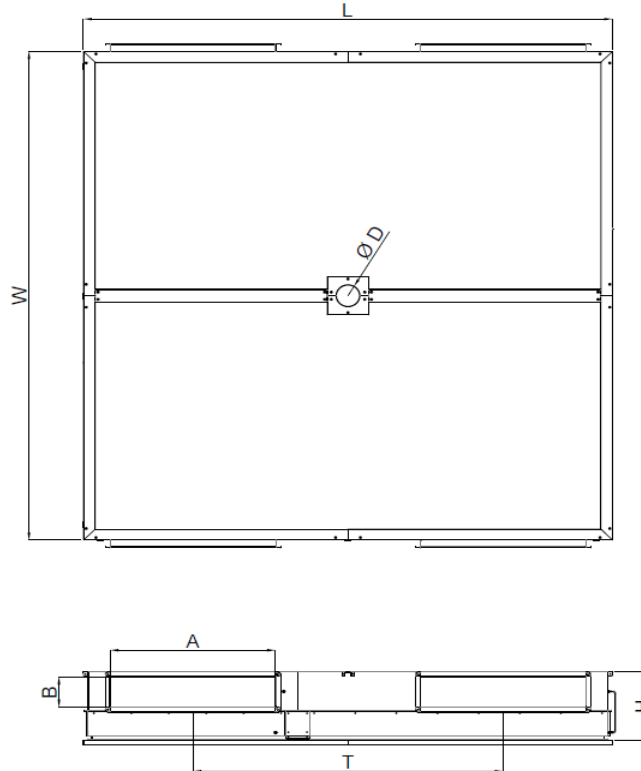
4- Pendant box: Located in the center of GLD. This box is used to conceal the flange of the surgical lamp and to intervene if necessary.

5- Laminator: Skeleton is produced from stainless profile. It is covered with a special silk cloth made of micro-nets which can be disinfected by spraying, wiping, non-decaying and resistant to fire. The laminator is attached to the case with torque hinges and clips. Torque hinge system provides ease of filter changes.



STANDARD SIZES:

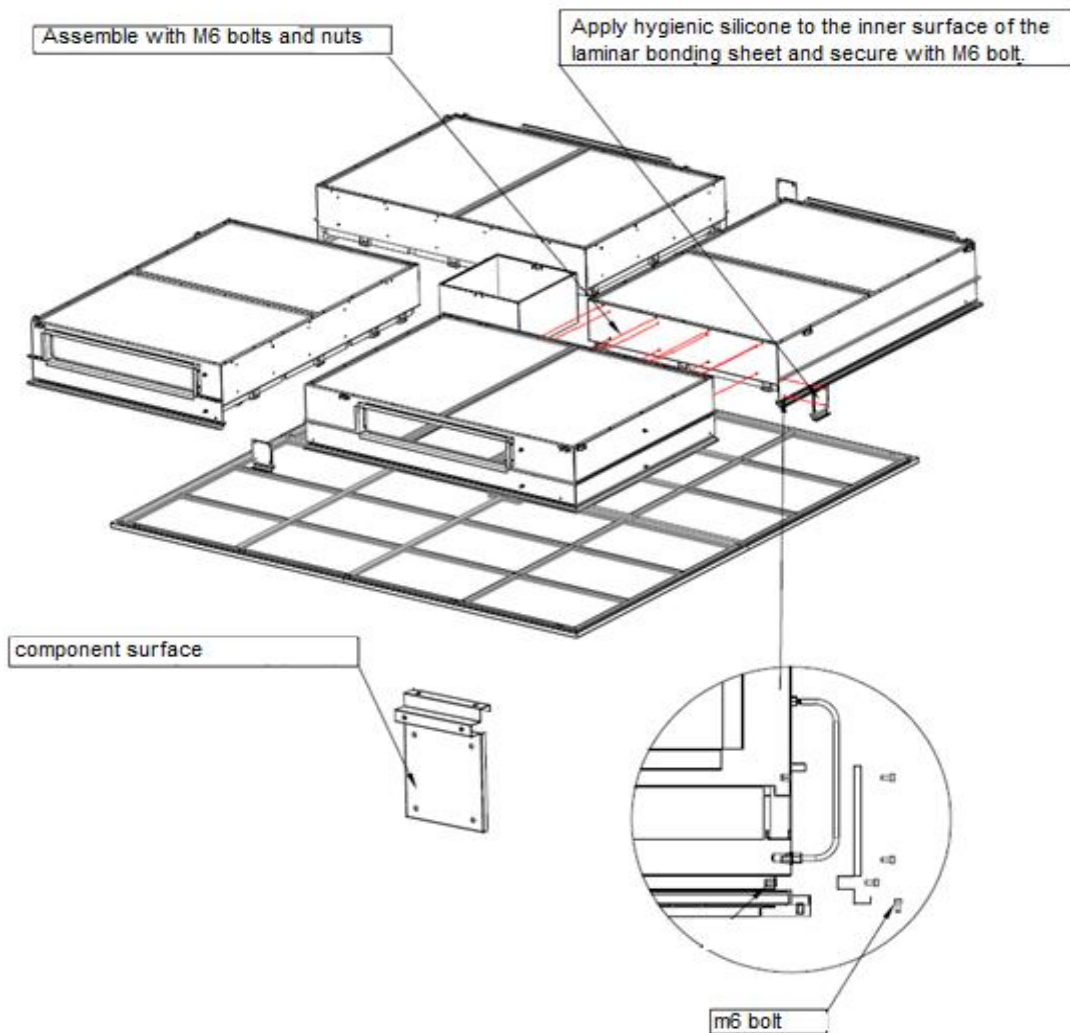
GLD TYPE



Code	Dimensions (mm)						Filter Quantity and Size
	W mm	L mm	H mm	A mm	B mm	T mm	
GLD - 1400x2400	1400	2400	450	600	200	-	850x465x80 / 2 - Pcs 720x350x80 / 6 - Pcs
GLD - 1600x2400	1600	2400	450	600	200	1192	850x465x80 / 2 - Pcs 720x450x80 / 6 - Pcs
GLD - 1800x2400	1800	2400	450	600	200	1192	850x465x80 / 2 - Pcs 720x550x80 / 6 - Pcs
GLD - 2400x2400	2400	2400	450	600	200	1192	804x530x80 / 10 Pcs
GLD - 2400x3000	2400	3000	450	600	200	1446	1104x530x80 / 2 - Pcs 804x530x80 / 10 - Pcs
GLD - 3000x3000	3000	3000	450	900	200	1778	1092x532x80 / 12 Pcs
GLD - 3200x3200	3200	3200	450	1000	200	1878	1192x565x80 / 12 Pcs
GLD - 3800x3800	3800	3800	450	1200	200	2180	1470x670x80 / 12 Pcs



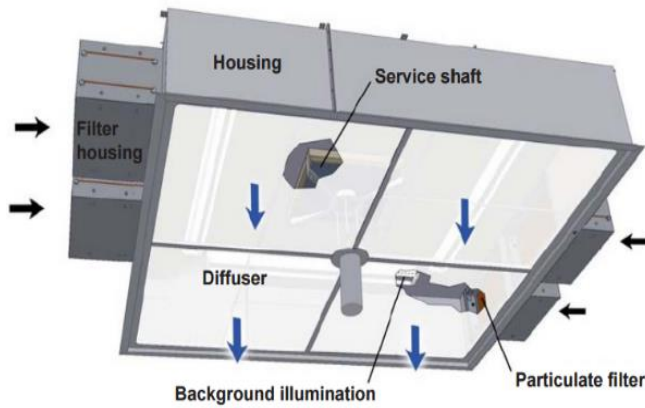
INSTALLATION



- Step 1: Connect the modules with the M6 bolt nut before hanging on the ceiling. (There is gasket on the module joining surfaces.)
- Step 2: Apply hygienic silicone to the inner surface of the joint.
- Step 3: Fix the modules connected with M6 bolt nut to each other with the coupling part. (Laminar Flow with 2 and 4 modules are combined in the same way.)
- Step 4: Squeeze hygienic silicone between the assembled modules before hanging on the ceiling.
- Step 5: Fix the M10 rods fixed to the ceiling by passing the modules through the hanging ears on the laminar flow and then fasten them with m10 nut.
- Step 6: Attach the laminator to the case with torque hinges and clips.
- Step 7: Attach the profile frame to the frame with fixing bolts.
- Step 8: Make sure the attic is at negative pressure before testing.

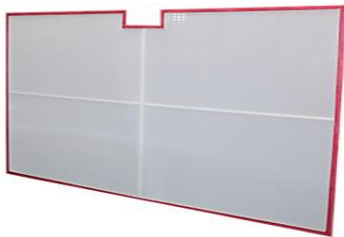


LAMINAR FLOW EQUIPMENT



1- Laminiser - Diffuser

Specially designed synthetic laminator for laminar air flow after HEPA filters



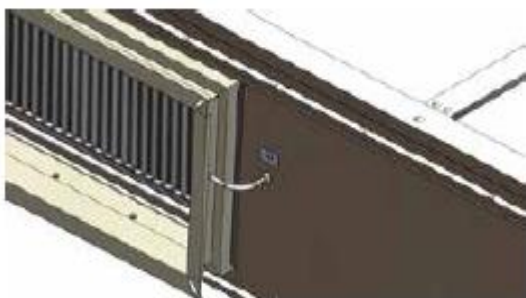
- Uniform speed distribution
- Low pressure loss
- To the desired extent
- In operating room and pharmaceutical factory applications

2- Main Housing



Standard Material 304 Stainless Steel. Optional: 316 Stainless Steel

3-Test Probe



Test Probe



Pollution Filter Differential Pressure Probe

GLF-GLD LAMINAR FLOW UNITS IN OPERATING THEATRES



ORDER PARAMETERS

GLF - 2400x1200		H14	304SS
GLF-2400x1200	GLD-1400x2400		
GLF-2400x1400	GLD-1600x2400		
GLF-2400x1600	GLD-1800x2400		
GLF-2400x1800	GLD-2400x2400		
GLF-2400x2000	GLD-2400x3000		
GLF-2400x2200	GLD-3000x3000		
GLF-2400x2400	GLD-3200x3200	*H13 Hepa Filter	
GLF-3000x2400	GLD-3800x3800	*H14 Hepa Filter	
GLF-3000x2800			
GLF-3000x3000			
- Standard Application			304SS: Stainless Steel 316SS: Stainless Steel GA: Galvanised