



Office: 106, Cosmos Mary Park, Opp Pratap Cinema,
Kolbad Road, Thane west - 400601

Technical Submittal of Modular Clean Room

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1. Purpose:

The purpose of Technical Specification is to ensure that all the critical aspects of Process / Product requirements, cGMP & Safety have been considered in designing the equipment and is properly documented.

2. Scope:

- This qualification protocol will define the responsibilities, acceptance criteria, technical specifications, list of major bought out parts and documentation requirements.
- The Technical Specification is an essential part of the qualification mechanism and will serve as a basic document for the validation activity.
- The scope of this document is limited to the qualification of the Modular Partition and Doors of **M/s. KAVS SPEC TECH PVT LTD**

3. Responsibilities:

- To provide the URS for the Modular Partition & Doors.

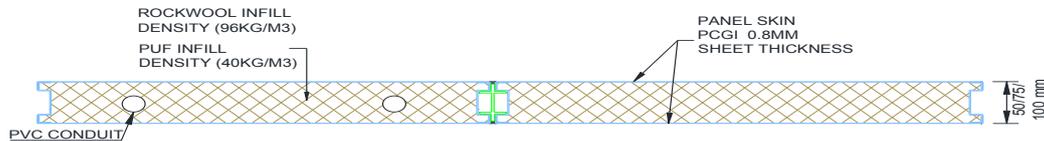
Manufacturer: M/s. KAVS SPEC TECH PVT LTD

1. To design and provide the complete technical details of the Modular partition pertaining to its design qualification viz.
 - A) GA Drawing

- B) Material of construction of major components.
- C) Brief process description.
- D) Pre-installation requirements.

2. To ensure the safe delivery of the Modular Partition & Door to the user side.
3. To ensure that no un-authorized and or unrecorded design modification shall take place. If at any point in time, any change is desired in mutually agreed design, change control procedures shall be followed and documented.

4. Wall Panel:-



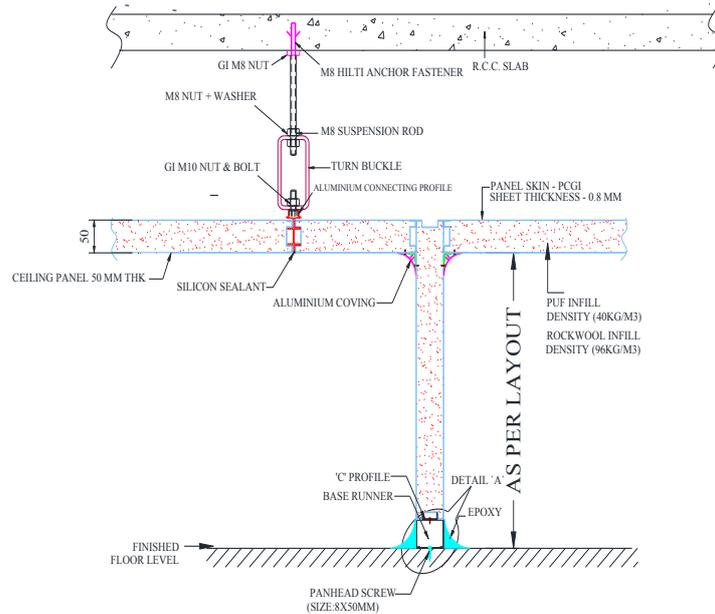
Sr. No.	Parameters	Specification
1	Name of the accessory	Wall Panel
2	Skin	PCGI / PCGI
3	Structural frame work	GI
4	Thickness of Sheet	0.6 & 0.8 mm
5	Thickness of Powder Coating	60-80 micron
6	Insulation	PUF density $40 \pm 2 \text{ kg/m}^3$ ROCKWOOL density 99 kg/m^3
7	Sealant	Food grade silicon on both sides of the panels. Gap should not be more than 4 mm.



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8	Dimension	
	Width	1185 mm
	Height	As per Layout
9	Panel thickness	35,50,75,80,100,150mm
10	Support	Base runner
11	Color	RAL 9001,9002,9003
12	Scope	It is used as wall of clean rooms
13	Technical description	<p>Sandwich type wall panel made out of (PCGI/PCGI) sheets on both side and inside filled with PUF of specified</p> <p>Thickness along with peripheral G.I profile. Panels will be in the form of planks of 1185 mm width and height as per the drawing.</p>

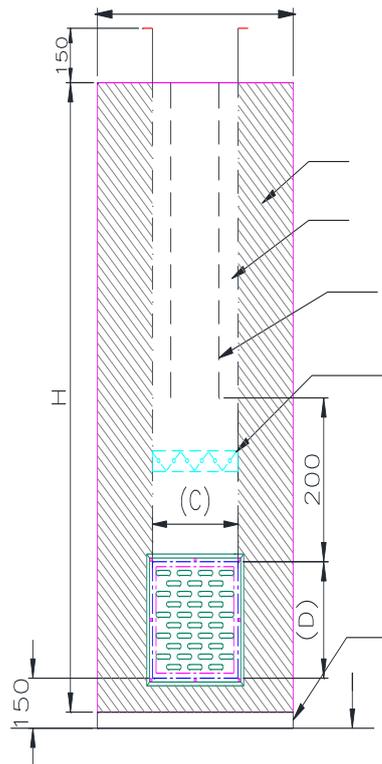
5. Ceiling panel :- (Walkable)



Sr. No.	Parameters	Specification
1	Name of the accessory	Ceiling panel (Walk able)
2	Skin	PCGI / PCGI
3	Structural frame work	GI
4	Thickness of Sheet	0.6 & 0.8 mm
5	Thickness of Powder Coating	60 - 80 micron
6	Insulation	PUF density $40 \pm 2 \text{ kg/m}^3$ ROCKWOOL density 144 kg/m^3
7	Sealant	Food grade silicon of the panels. Gap should not be more than 4 mm.
8	Dimension	
	Width	1185 mm
	Length	As per Layout
9	Panel thickness	50 mm & 80mm Thick
10	Load carrying capacity	150 kg/ m^2 UDL

11	Support	Wall panels and suspension rods
12	Color	RAL 9001,9002,9003
13	Scope	It is used as ceiling of clean rooms in which lights and HEPA filters mounting arrangements made.

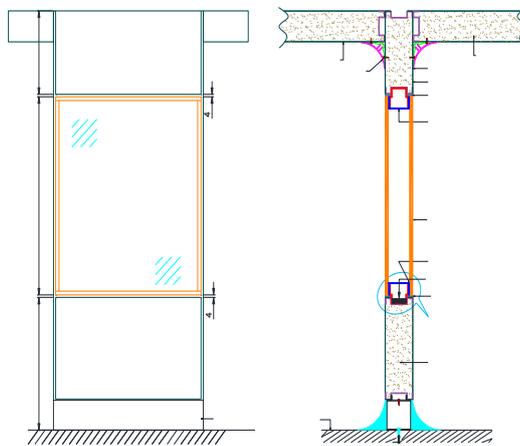
6. Return Air Riser



Sr. No.	Parameters	Specification
1	Name of the accessory	Return Air Riser
2	Skin	PCGI / PCGI
3	Structural frame work	GI

4	Thickness of Sheet	0.8 mm
5	Thickness of Powder Coating	20micron
6	Technical description	
7	Flush riser duct panels with long projecting neck for connection with flange for HVAC duct connection. (With 10micron filter) (Inclusive of Removable perforated Grill fixed at 200 mm above FFL in riser panel). With Dome Bolt Arrangement (Sizes as per BOQ)	

7. View Panels: -



Sr. No.	Parameters	Specification
1	Name of the accessory	View Panels
2	Material of construction	GI
3	Skin	PCGI / PCGI
4	Description	Supply and Installation of double glass



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		6mm thick view panel flush from both side of wall fixed with both side adhesive tape over GI frame width to match wall thickness with silica gel desiccant arrangement and made air tight with sealant.
5	Dimension	View Panel Glass Size – Depends on size of each view panels.

8. Clean Room Doors

Sr. No.	Parameters	Specification
1	Material of construction	GI Sheet (0.8 mm thick)& Frame (1.2 mm thick)
2	Shutter	46 mm thick
3	Paint / Finish used	Powder coated
4	Thickness of Powder Coating	60-80micron
5	Description	Double skin door with or without view panels, with the construction same as modular panels assembled with the door profile
6	Sizes	Single & Double Doors 50mm, 75mm,100mm Frame Thickness Width 900,1000,1200,1500, and height 2100/2200mm
7	Door Accessories	Stainless steel hinges. Stainless Steel 'D' type of handles on pull side Stainless Steel push plate on push side. Dorma make door closure Std. Arm (TS-68). Both side key operated locking arrangement. Automatic door bottom seal at the bottom. View panel with 6 mm thick safety glass, self-adhesive tape and silicon sealant.



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		Flush Tower Bolt in Double door Stainless Steel Kick Plate NOTE: DOOR ACCESSORIES WILL BE AS PER DOOR SCHEDULE PROVIDED BY CLIENT
8	Filler material	PUF/ROCKWOOL
9	Color	RAL 5007

9. Snap Fit Coving Base Profile:-

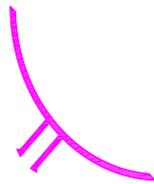


Sr. No.	Parameters	Specification
1	Name of the accessories	Base profile (Snap fit)
2	Material of construction	Aluminum
3	Paint / Finish used	Aluminum
4	Location	It is used at the junction of ceiling and modular wall on which coving fixed by snap action.
5	Color shade	NA



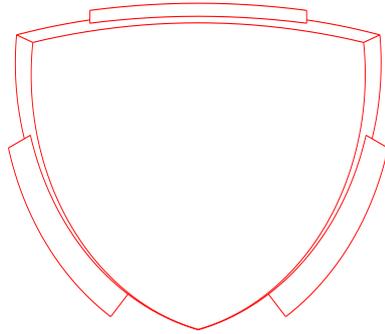
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10. Snap Fit Coving Top Profile:-



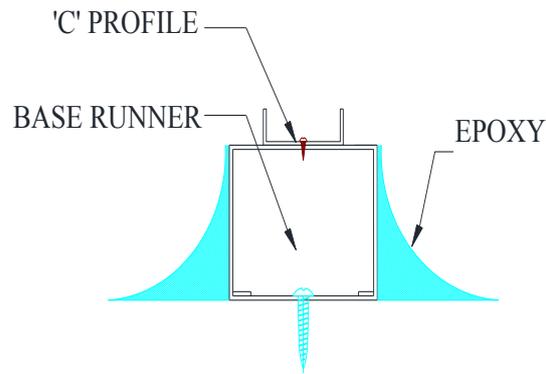
Sr. No.	Parameters	Specification
1	Name of the accessories	Finish Coving (Snap fit)
2	Material of construction	Aluminum
3	Paint / Finish used	Powder coated
4	Location	It is fixed on the base coving to avoid sharp edges of Walls.
5	Color shade	RAL - 9002

11. Three Way Corner Piece:-



Sr. No.	Parameters	Specification
1	Name of the accessories	Three way corner piece
2	Material of construction	Aluminum
3	Paint / Finish used	Powder coated
4	Color shade	RAL - 9002
5	Location	It is used at the corner junction of the coving.

12. Base Runner:-



Sr. No.	Parameters	Specification
1	Name of the accessories	Base Runner 'BOX' Type
2	Material of construction	GI
3	Paint / Finish used	Plain GI
4	Location	It is used at bottom of the panel wall
5	Color shade	Same as panel color



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13. Wall Connecting Profile:-

Sr. No.	Parameters	Specification
1	Name of the accessories	False ceiling connecting profile
2	Material of construction	Aluminum
3	Paint / Finish used	Powder coated
4	Color shade	RAL - 9002
5	Location	It is used at the junction of the ceiling panels from which ceiling suspensions are fixed to the slab.

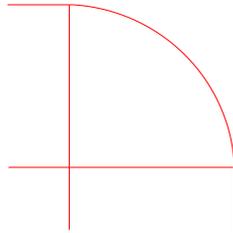
14. False Ceiling Connecting Profile:-

Sr. No.	Parameters	Specification
1	Name of the accessories	False ceiling connecting profile
2	Material of construction	Aluminum
3	Paint / Finish used	Powder coated
4	Color shade	RAL - 9002
5	Location	It is used at the junction of the ceiling panels from which ceiling suspensions are fixed to the slab.



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15. External Pillar:-



Sr. No.	Parameters	Specification
1	Name of the accessories	External Pillar
2	Material of construction	Aluminum
3	Paint / Finish used	Powder coated
4	Color shade	RAL - 9002
5	Size	50,75,80 & 100mm
6	Location	It is used at the corner junction of two wall



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16. Technical Specification For 1000 CFM BIBO Riser:-

Sr. No.	TECHNICAL SPECIFICATION	
1	Unit Nomenclature	<ul style="list-style-type: none"> • Technical Nomenclature – Return Air Riser BIBO. • Model No –KTPL / RB -02 • Nomenclature by Users – Return Air Riser BIBO • Area –CLEANROOM
2	Construction	<ul style="list-style-type: none"> • MOC- MS Powder Coated (RAL 9010) • Gauge of construction sheets – 16 SWG thick.
3	Technical Requirement	<ul style="list-style-type: none"> • Class – ISO Class 5 • Air Velocity –As per HVAC Design
4	Physical Requirement	<ul style="list-style-type: none"> • Overall Dimension Of Unit – For 1000 CFM- 1025 (W) x 540 (D) x 2325 (H) mm



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5	First Stage Filtration	<ul style="list-style-type: none"> • Pre Filter - Freudenberg Make • Micron - 3 Micron • Efficiency - 95% • Grade - F-7 • Media - Micro Glass Fiber Paper • Initial Pressure Drop - 7.5-8.5 MM OF W.C. • Final Pressure Drop - 20-22 MM OF W.C. • Separator - Aluminum • Sealant - PU Adhesive • Casing - Aluminum Box Type • Size- For 1000 CFM- 610 W x 305 D x 305 H mm- 01 No
6	Final Filtration	<ul style="list-style-type: none"> • HEPA Filter - Final delivered Air (Freudenberg Make) • Micron - 0.3 Micron • Efficiency - 99.95%@MPPS • Grade - H - 13 • Media - Micro Glass Fiber Paper • Initial Pressure Drop - 25+ 10 mmwg.

		<ul style="list-style-type: none"> • Final Pressure Drop - 60 mmwg. • Separator - Aluminum • Sealant - PU Adhesive • Casing - Aluminum Box type <p>Size - For 1000 CFM- 610 W x 305 D x 305 H mm- 01 Nos</p>
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<p style="text-align: center;">7</p>	<p style="text-align: center;">Standard Features</p>	<ul style="list-style-type: none"> • PAO Port to check DOP upstream concentration. • Differential Pressure Gauge Across HEPA Filter & Fine Filter • Capsule Perforated, SS 304, Grill For Suction. • Acrylic, 8/10 mm thick view window fitted with Quick Release Coupling, • Hyplon Glove with Glove Port, And Flexible Scanning probe for online • Validation of system. • SS 304 Cam arrangement with pressure adjustment for leak proof fitting of HEPA & Fine Filters • PVC Bag, 3 mtr. long with proper sleeve and silicon cord for safe filter change. • DOP/Pressure/Upstream port with PU piping and covered with SS channel • Hinged type, open able door with SS ball bearing type hinges, cam lock, and Rockwool/insulated flush door. • Base C channel (ISMC) of size 75x40 mm with provision of grouting. • Aluminum aero foil damper for outlet of riser
<p style="text-align: center;">8</p>	<p style="text-align: center;">Test Certificates</p>	<ul style="list-style-type: none"> • Factory Acceptance Test Certificate • HEPA Filter Test Certificate • Pre Filter Test Certificate • Magnehelic Gauge • Calibration Certificate • MOC Test Certificate, • Gloves Test Certificate



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17. Materials & Certifications:-

- **GI sheet specification-**
Skin passed Galvanized Iron coil 120 GSM & make - POSCO.
- **Chemical Composition-**
Carbon - 0.0381%, Silicon - 0.015%, Manganese - 0.200%, Phosphorus - 0.0095%, Sulphur - 0.0044 % & Nickel - 47%.
- **Powder type-**
Epoxy polyester, it has good mechanical & bending property.
Following test we carry out:
Impact test-100 kg cm, Cross hatch adhesion- GT "0",
Scratch hardness- 2000 GMS, Pencil hardness- 2 H,
Specific gravity- 1.4 to 1.8,
Particle size distribution- under 63 microns- 95%, under 90 microns- 100%.
Make - Jotun/Berger paints.
- **GI threaded rod-**
8mm x 2 mtr length - Dimension std. - As per IS 1367/ Din 975 - minimum proof load - 8.2 KN. Test is carried out by ASTM:E415 - 2014.
- **Infill material-**
PUFF mixture of Polyol & Isocyanate. HCFC free. Cream time - 20-24 s, Gel time - 130-160 s, free rise density - 26-28 kg/m³. Working ratio - 100/110, overall density - 42 kg/m³, Initial thermal conductivity - 21 mW/mK, Compressive strength - 140 KPa.
- **Infill material-**
PIR mixture of Polyol & Isocyanate. HCFC free. Cream time - 40 s, Gel time - 151 s, free rise density - 34.2 kg/m³. Working ratio - 100/130, overall density - 48 kg/m³, Initial thermal conductivity - 24 mW/mK, Compressive strength - 170 KPa.
- **Infill Rockwool-**
Rockwool is a high quality non-combustible bonded Rockwool with a vertical fiber structure, which provides high shear, compression and tensile strength. Free of (H) CFC's and fully recyclable. Thermal conductivity - 0.046 W/mk. High compressive, shear & tensile strength.
- Panels are under certification with Rockwool insulation of **2 hours fire rating** - as per BS 476 section 7 Part 22. From material Lab - Dubai - Under process



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- **VHP compatibility test for panels** – Approved by SVAN Analytical.
- Walkable ceiling load bearing test of **150 kg/sq. m** – As per ASTM E3090 – from IIT Powai – Under WIP
- PIR test done as per ASTM E84-2018a – Flame Spread Result - Calculated Flame Spread (CFS) - 55.27, Flame Spread Index – 55. Smoke developed Result - Calculated smoke developed – 656.15, smoke developed Index – 650. – Discussion under WIP.
- FM approved – under process as per 4880 / 4881 – Discussion under WIP

18. Installation Guideline:-

- The civil construction viz, the columns, beams, plinth, slab and the external walls should be completed plastering, painting.
- Enough time should be provided by the civil contractor for curing of the concrete. Improperly cured concrete is likely to pose problems during installation as well as during the long run.
- The floor should now be leveled, ready for finish floor installation. Leveling of floor is utmost important since difference in floor levels will effect panel installation. Of course packing will be put in the runner wherever floor is not leveled.
- If there is any equipment of case size larger than the openings left on the peripheral wall then these should be brought and placed in location.
- First Floor markings will be done and any deviation will be inform to client for approval.
- Wall panel's erection can be started by any area, followed by risers, view panels and door frames.
- Ceiling panels fixing can be done room wise followed by fixing of covings & corner piece.
- Door shutter fixing so that shutters are align uniformly from all three sides.
- After epoxy & first blow down – fixing of door accessories, view glass, grills will be done.



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- Final finishing which is important and crucial, which is delamination, silicon filling and total area cleaning.
- Snag list if any will be attended
- Work completion certificate signed by client on successful installation.